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PERIODICALS

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FOOD PROTECTION TRENDS

SCIENCE AND NEWS

FROM THE
INTERNATIONAL ASSOCIATION
FOR FOOD PROTECTION

NOVEMBER 2005



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FOOD PROTECTION TRENDS

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We live in a global economy and the way food is grown, processed, and handled can impact people around the world. From a public health perspective, it often provides unique challenges to food safety professionals. Combine these issues with the complexity of protecting the food supply from food security threats and the challenges seem overwhelming. However, with your support the Foundation can make an impact on these issues. Funds from the Foundation help to sponsor travel for deserving scientists from developing countries to our Annual Meeting, sponsor international workshops, and support the future of food science through scholarships for students or funding for students to attend IAFP Annual Meetings.

The Foundation is currently funded through contributions from corporations and individuals. A large portion of the support is provided from the Sustaining Members of IAFP. The Sustaining

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Support from individuals is also crucial in the growth of the Foundation Fund. Contributions of any size make an impact on the programs supported by the IAFP Foundation. Programs currently supported by the Foundation include the following:

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“PERSPECTIVES FROM NORTH OF THE 49TH”

The aftermath of Hurricane's Katrina and Rita has certainly shown us the fury of Mother Nature. Our hearts and good wishes go out to everyone that has been affected by these hurricanes. Times like this cause us to reflect on life, be grateful for what we have, and realize that "caring is sharing", and that it is "healthy to give". Our Association members have always stepped up in times of need, and now is no exception.

The Florida Association for Food Protection (FAFP) has set forth an international challenge to IAFP and to all IAFP Affiliates to step forward and support the hurricane effort. Toward this goal, FAFP started things off with a pledge of \$1,000. They are also asking IAFP and all Affiliates to reach down deep and give to this effort. The efforts of FAFP should be applauded, and are a testament to the truly great nature of our Affiliates and our Association. I am pleased to report that the Executive Board of IAFP has also approved a \$1,000 donation to the Red Cross to assist the relief efforts resulting from the devastation caused by both hurricanes. We hope that this donation will help in some small way to ease the suffering of people in the affected areas. We are also encouraging each IAFP Affiliate group and all individuals to consider donating to organizations designated to provide hurricane relief. We know that you will come through because IAFP Members have very big hearts!

The IAFP Executive Board will also be looking at the possibility of providing some relief to those affected IAFP Members who may



By JEFFREY FARBER
PRESIDENT

***“Times like this
cause us to reflect
on life, be grateful
for what we have,
and realize that
'caring is sharing',
and that it is
'healthy to give'”***

have annual dues coming up. We are discussing the possibility of developing an umbrella policy that would deal with all types of emergency situations or, in other circumstances where for some reason, Members do not have the means to pay their annual dues fee because of some extenuating circumstance(s).

Getting back to our Affiliates for a moment, I cannot tell you how pleased I am that we have the “Kiwis”, as New Zealanders are affectionately known, on board as a new Affiliate, the “New Zealand Association for Food Protection.”

Although the Silver Fern is better known as New Zealand's “National Emblem,” the Kiwi is still the “National Icon” and part of New Zealand's worldwide image. New Zealanders have been “Kiwis” since the days of the First World War. It's a nickname bestowed by fellow Australian soldiers, and it stuck. Today New Zealanders' identity as “Kiwis” is based around their national bird. Interestingly, the kiwi is a curious bird, as it cannot fly, and has loose, hair-like feathers and long whiskers. Largely nocturnal, it burrows in the ground, and is the only bird known to have nostrils at the end of its bill and literally sniffs out food!

Some of you may have noticed that we are in the process of hiring a fourth Editor for the *Journal of Food Protection*. This is largely a result of the great success of the *Journal of Food Protection*! The Journal has grown to the point where our three current Editors are overloaded and feel that the quality of the Journal will begin to suffer without an extra Editor to provide additional strength. You can be rest assured that we will find a high caliber individual who will become part of our current great team of Editors and Reviewers! I cannot thank Joe Frank, John Sofos, and Mike Davidson enough, for all their hard work and great devotion to the Journal.

In this regard, unfortunately, Bev Brannen, who has worked for many years with IAFP both on the Journal and with the Program Committee, decided on a career change and left us in the middle of September. I have personally known Bev for a number of years and was always impressed with her cheery disposition, excellent work habits

and dedication to IAFP. On behalf of all IAFP Members, I would like to thank Bev for all that she has done for us and wish her nothing but the best, as she moves on to start another chapter in her life. Even though I live in the frozen tundra (according to Dr. Morrie Potter), I can be reached by E-mail at jeff_farber@hc-sc.gc.ca and would love to hear from you, eh!

Quote of the month:

All religions, arts and sciences are branches of the same tree. All

these aspirations are directed toward ennobling man's life, lifting it from the sphere of mere physical existence and leading the individual towards freedom.

Albert Einstein

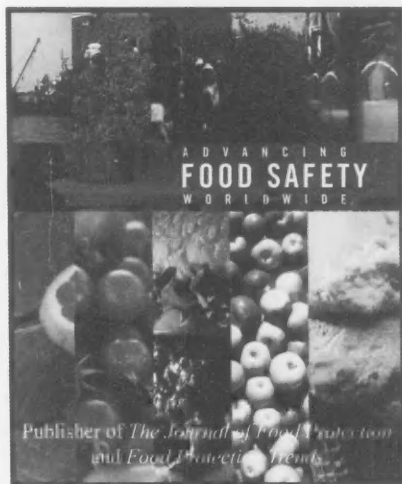
Dr. J's Science Tip of the Month:

Great news for chocolate lovers! Recent studies suggest that "dark chocolate" can help prevent heart disease, ward off diabetes and may even reduce the risk of strokes and dementia by improving blood

flow to the brain; it is the flavonoid levels that are important and these are the highest in dark chocolate, so look for bars that contain at least 70% cocoa solid or mass. Dark chocolate contains 5 times as much antioxidant activity as blueberries! The CATCH, as there always is in science; these bars are the most expensive and of course, remember – 100 grams of dark chocolate will add 470 calories onto that beautiful body of yours!

Have a great month!

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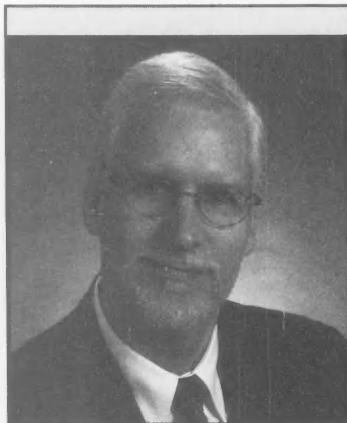
“COMMENTARY” FROM THE EXECUTIVE DIRECTOR

This issue of *Food Protection Trends* is the largest ever produced which is probably appropriate because within this month's *FPT* is included a review of IAFP 2005 which was the largest Annual Meeting ever held by IAFP! A number of years ago, we changed *FPT* to a perfect bind (glued on cover) from a saddle stitch (stapled on cover) for this reason – to enable *FPT* to produce issues of more than 100 pages. Looking back, this was a good decision!

For the review of IAFP 2005, we must first report on attendance. Again this year, attendance exceeded our expectations and increased by 12% to 1,774 attendees. This was an increase of 190 attendees over IAFP 2004! The hotel we chose (four years prior to the meeting) was a great property with beautiful views of Baltimore's Inner Harbor, but ended up being too small for the needs of our meeting and attendees. In the end, it all worked out and we had an excellent meeting!

A review of IAFP 2005 begins on page 838. If you were able to attend, we hope this review brings back memories of things learned and friendships made. If you were not able to be with us in Baltimore, maybe this review will entice you to begin plans now to be with us in Calgary for IAFP 2006.

IAFP's encouragement of student activities continued again this year with students helping in each of the session rooms. As a part of this program, the student monitors are asked to write a summary of the session they are assisting in. These summaries begin on page 870. Our thanks to all of the students who helped out at



By **DAVID W. THARP, CAE**
EXECUTIVE DIRECTOR

“A review of IAFP 2005”

IAFP 2005 – this is a great program that assists both our Student Members and the Annual Meeting!

Students also participated through the student booth where they held a job fair with job postings as well as student resumes for those actively searching for their first job. The job fair has worked out very well over the now many years it has been held. For educational purposes, a Student Luncheon was held on Sunday with more than 70 in attendance and for fun, a Student Mixer took place on Tuesday evening.

A new Student Travel Scholarship was established for IAFP 2005

with two scholarships being awarded – one to Brooke Whitney from Virginia Tech and the second to Stephen Grove from the University of Tasmania. Both students were awarded the scholarships during the Opening Session on Sunday evening. You may read summaries regarding their participation in IAFP 2005 beginning on page 870. For 2006, the IAFP Foundation will support four scholarships. We are proud of our student involvement and look forward to increased activities in the future.

Social events are a large part of the IAFP Annual Meetings and this year we held the Opening Reception on Sunday evening in the exhibit hall; on Monday we cruised the Inner Harbor on a dinner cruise; and on Wednesday, the Awards Banquet was held. In addition, all breaks were held in the exhibit hall and lots and lots of conversations took place in the foyers. Many of our survey comments report that networking is a very important part of the IAFP meeting. We can learn so much from each other in face-to-face conversations!

Presentation reviews submitted by Dr. Douglas Archer (our Ivan Parkin Lecturer) and Dr. Michiel van Shothorst (our John H. Silliker Lecturer) are presented on pages 856 and 863, respectively. Both lectures were well received by those in attendance. Thank you to Dr. Archer and Dr. van Shothorst for their excellent presentations.

I want to take a minute to thank Jill Snowden, the Chairperson of this year's Local Arrangement Committee (LAC). Jill organized and helped keep the Capital Area Food Protection Association volunteers

on track throughout the meeting. The LAC volunteers helped at registration, with the silent auction, in the audiovisual-speaker ready room, and with all social events. Thanks to Jill and thank you to all the volunteers who assisted during IAFP 2005. Your help is very much appreciated!

Also, I want to sincerely thank each of our sponsoring companies and our exhibitors. With your

wonderful support, the IAFP Annual Meeting has grown and thrived. Listings of exhibitors and sponsors and are shown on pages 924 and 931 respectively. We appreciate the assistance sponsors and exhibitors give through their financial support. This helps make IAFP's Annual Meeting the best gathering of food safety professionals any place in the world! Thank you and we look forward to seeing you in Calgary.

As we close the book on IAFP 2005, we can remember the many new colleagues we met, the things we learned from presentations and the new products and services that came to our attention in the exhibit hall. I encourage you to plan now to be with us in Calgary next August for IAFP 2006. This promises to be another excellent gathering of food safety professionals from around the globe!

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Guidelines for Conducting *Listeria monocytogenes* Challenge Testing of Foods

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SUMMARY

Challenge testing using *Listeria monocytogenes* is a useful tool for determining the ability of the organism to grow in a food, for validating the effectiveness of growth inhibitors, and for validating the degree of lethality delivered by processes intended to inactivate the organism. This document addresses factors that should be considered when designing and conducting *L. monocytogenes* challenge tests, including the type and number of strains of *L. monocytogenes* used, the inoculum level, inoculum preparation and method of inoculation, formulation of the product, delivery of a lethal treatment, incubation of samples, the length of the study and frequency of sampling, and sample analyses. An expert microbiologist should be involved in all phases of the study, especially in the design and the interpretation of results. Studies conducted according to these guidelines can be used to validate the level of reduction achieved by a lethal treatment or the level of control achieved by an antimicrobial treatment or process to assess product safety and compliance with government laws, regulations, and policies.

INTRODUCTION

Challenge testing using *Listeria monocytogenes* is a useful tool for determining the ability of the organism to grow in a food, for validating the effectiveness of growth inhibitors, and for validating the degree of lethality delivered by processes intended to inactivate the organism. There is need for a standardized approach to challenge testing to facilitate demonstration of compliance to regulatory requirements. For example, the USDA Food Safety and Inspection Service (11) recognizes that treatments that reduce and/or inhibit growth of *L. monocytogenes* can reduce consumer risk, and thus these products may be sampled less frequently by the agency than products without such controls.

In addition, several countries such as Canada, Germany and France have established limits for *L. monocytogenes* in foods that do not support growth (13), and a Citizen Petition has been submitted to the Food and Drug Administration (FDA) to allow a regulatory limit of 100 CFU of *L. monocytogenes*/g in foods that do not support its growth. A similar petition was submitted to the United States Department of Agriculture's Food Safety and Inspection Service. A basic framework for conducting challenge studies would facilitate generation of data that is likely to be deemed adequate by regulatory agencies.

A peer-reviewed article

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TABLE 1. Limits¹ for growth of *L. monocytogenes* (15)

	Minimum	Optimum	Maximum
Temperature (°C)	-0.4	37	45
pH	4.39	7.0	9.4
Water activity	0.92	--	--

¹Minimum and maximum limits are attained when other factors are optimum.

The design, implementation, and assessment of microbiological challenge studies requires an expert microbiologist to consider all relevant factors related to how the product is formulated, manufactured, packaged, distributed, prepared, and consumed. When conducting a microbial challenge study with *L. monocytogenes*, a number of factors must be considered. These include (1) the type and number of strains of *L. monocytogenes* or surrogates used, (2) the inoculum level, (3) the inoculum preparation and method of inoculation, (4) the formulation of product (especially when it contains antimicrobials), (5) the delivery of a lethal treatment, (6) the incubation of samples, (7) the length of the study and frequency of sampling, and (8) sample analyses. The interpretation of the data and pass/fail criteria are critical in evaluating whether a food provides an adequate level of safety throughout its shelf life given normal handling conditions.

The guidelines described in this document can be used to validate the level of reduction achieved by a lethal treatment (including a "post-lethality" treatment as described by FSIS (11)) and the level of control achieved by an antimicrobial treatment or process. Studies conducted according to these guidelines can provide data that meet current FSIS validation requirements and could also be used for regulated products should the agencies respond favorably to the petitions for a regulatory limit for *L. monocytogenes*.

ASSESSING THE NEED TO CONDUCT A VALIDATION CHALLENGE STUDY

With respect to validating inhibition of growth, products with characteristics that clearly fall outside the minimum and maximum limits for growth of *L. monocytogenes*, as specified in Table 1, need

not be subject to microbiological challenge tests, as the effectiveness of these limits have been well documented in the scientific literature (15). When parameters fall within the growth limits, other information may impact the decision on whether a challenge study is needed.

Challenge testing is often used in conjunction with microbial predictive models such as USDA's Pathogen Modeling Program (<http://www.arserrc.gov/cemmi>). Conservative parameters should be applied when using models (e.g., consider the variability of the parameters in the food system being modeled and select values most favorable to growth or survival). According to the National Advisory Committee on Microbiological Criteria for Foods (NACMCF), current growth rate models tend to be conservative with respect to most foods because the models have been developed using pure cultures in laboratory media. Thus, the model usually over-predicts the amount of growth, and can be used as a "safe harbor" (18). If the model predicts that growth is not likely throughout the shelf life of the product during normal distribution and storage practices, with a reasonable margin of safety, challenge studies would not be necessary (18). If, however, the conditions modeled suggest that growth could occur or that there is limited lethality for the product/process, then additional studies would be warranted. Expertise is necessary to determine the relevance and validity of a model to the specific circumstances. If there is less confidence in the model, then limited challenge studies may be warranted to verify the prediction from the model.

Depending on the results of the modeling, it may also be desirable to conduct limited studies to provide additional validation data and confirm the model predictions. For example, FSIS guidelines (11) suggest the potential for a reduced regulatory sampling frequency for products in which growth is ≤ 1 log as op-

posed to > 1 log and for products in which post-process lethality treatments achieve ≥ 2 log reduction compared to those that provide < 2 log reduction. Therefore, it may be advantageous to conduct a challenge study to affirm a specific claimed change in relative numbers.

An experienced microbiologist should assist in the use and interpretation of the model and the results, as well as in the development of any challenge studies. Such studies should be designed to take into account the inherent variability of the product, the microorganism of concern, and the processing and storage conditions, as outlined below.

TYPE AND NUMBER OF STRAINS OF *L. MONOCYTOGENES*

To account for variations in growth and survival among strains, challenge studies should generally be conducted with 3–5 strains of *L. monocytogenes*, either individually or in combination (18). An alternative approach is to screen a variety of strains and determine which strain has the highest resistance, grows fastest, etc. (depending on the purpose of the challenge study, e.g., to determine inactivation or growth characteristics in a product) and conduct the challenge studies with that single strain. This can avoid potential problems due to strain competition (2) or to major strain differences in heat resistance (7). However, when multiple stress factors are involved, there may not be a single strain that is most resistant to all the factors (7, 22). Moreover, it has been shown that strains with the shortest generation time may not have the shortest lag time and strains with the longest generation time may not have the longest lag time under the test conditions (23). Likewise, with inactivation studies, strains may vary in response to changes in the inactivation treatment, e.g., strains may have different z values with respect to heat inactivation, so the most resistant strain at one temperature may not be the most resistant at another temperature (6). Thus, an inoculum of multiple strains is usually preferred. When using multiple strains, it may be necessary to assess strain compatibility, e.g., to ensure that bacteriocin-producing strains are not included in the mix (24, 25) or to avoid competition (2).

Isolates should be appropriate for the food product being challenged. For example, the isolates for challenge studies of ready-to-eat (RTE) meat and poultry products may be from foodborne illness

outbreaks attributed to meat or poultry products, from meat and poultry products, and/or from meat or poultry processing environments. Challenge studies on dairy products may include isolates from a dairy product and from dairy processing environments, as well as clinical isolates from dairy-related outbreaks. Where possible, at least one of the isolates used should be from a product as similar as possible to the product to be challenged, e.g., a strain isolated from luncheon meat should be included in challenge studies for luncheon meats. A similar approach would be used for challenge studies on seafood, vegetables or other products. Ideally, isolates from foods should be "fresh" strains that have not undergone multiple laboratory passages over the years.

Isolates for challenge tests can be obtained from a number of sources. One means of obtaining isolates is to purchase strains from culture repositories such as the American Type Culture Collection (ATCC; <http://www.atcc.org/Home.cfm>) or the National Collection of Type Cultures (NCTC; <http://cphl.phls.org.uk/divisions/cdmssd/nctc/>). Cornell University hosts the ILSI *Listeria monocytogenes* strains collection, which provides researchers with a standard set of *L. monocytogenes* isolates, thus allowing for comparison of data on *Listeria* physiological and genetic characteristics generated in different laboratories. These isolates are grouped into two subsets, including one diversity subset (25 isolates representing genetic diversity) and one matched human and food isolate subset (20 isolates, 2 of which are also included in the diversity subset) representing isolates from human listeriosis outbreaks and cases. More information on the ILSI *Listeria* strain collection, including a list of all isolates in the collection, source information, year of isolation, serotype and ribotype information, is available on Dr. Martin Wiedmann's website at <http://www.foodscience.cornell.edu/wiedmann/listeriadbase.htm>. A fee is charged by each of these repositories to cover preparation, shipping and handling.

Using a marked strain, e.g., one containing green fluorescent pigment or a unique antibiotic resistance, can allow confirmation that a strain isolated during or after the challenge is the test organism. When marked strains are used, one should ensure that the marked strain has the growth/inactivation characteristics desired (similar to unmarked strains) in order to demonstrate that the behavior of the marked strain under challenge conditions is predictive of the behavior of unmarked strains. Another approach would be to use genetic characterization meth-

ods such as ribotyping or PFGE pulso-typing as a means of determining that the organism recovered from a test sample was the same as that used for inoculation. However, this can be a cumbersome approach when using a cocktail of strains, as it would require isolation and genetic characterization of multiple colonies. While the use of marked or fingerprinted strains may be desirable, it is not necessary, especially when the product contains few microorganisms that could be misidentified as the challenge organism(s).

USE OF SURROGATES

In certain circumstances it will be necessary to use a surrogate organism, e.g., when conducting a challenge test in a food processing facility or, in some cases, a pilot plant to validate a process. Surrogates should be used only when there are no other options, and they should not be used for controlled laboratory studies. The surrogate(s) used should demonstrate resistance equal to or greater than (or growth characteristics similar to) that of *L. monocytogenes*. In instances where it is not possible to duplicate the resistance, the characteristics of the surrogate in relation to those of *L. monocytogenes* should be determined and the differences accounted for in interpretation of the challenge test results. *L. innocua* has sometimes been used as a surrogate for *L. monocytogenes*; however, companies may be averse to bringing *L. innocua* into facilities that use environmental monitoring for *Listeria* spp. to verify control of *L. monocytogenes*.

INOCULUM LEVEL

The inoculum level used in the *L. monocytogenes* challenge study depends on whether the objective of the study is to determine product stability and shelf life or to validate a step in the process designed to reduce microbial numbers. It may be desirable to conduct challenge studies using multiple inoculum levels to determine the margin of safety in the process/formulation.

CHALLENGE STUDIES TO DETERMINE GROWTH

Ideally, the level used should reflect the level of contamination expected for the product. Typically, an inoculum level of between 10^2 – 10^5 CFU/g of product is used to ascertain whether or not a formulation supports growth. Although this inoculum level generally exceeds the expected levels of *L. monocytogenes* in most products, this level enables enumera-

tion. Lower levels may be used if documentation of low levels of natural contamination exists, as this will more accurately represent the product's ability to support growth and thus the risk from that product. Depending on the product formulation, some of the inoculum may die off initially before adapting to the food environment, particularly if cells have not been pre-adapted. If too low an inoculum level is used, the risk of listeriosis from the product could be underestimated, as an erroneous assumption could be made that the product does not support growth or that growth would be very limited (16, 19). Conversely, if the inoculum level is too high for this purpose, the preservation system or hurdles to growth may be overwhelmed by the inappropriate inoculum size, leading to the incorrect conclusion that the formulation does not inhibit growth sufficiently or that the shelf life should be dramatically shortened (16, 19).

Challenge studies to determine lethal effects

When validating a process lethality step such as heat processing, high pressure processing, or irradiation, which is generally designed to inactivate several logs of *L. monocytogenes*, it is usually necessary to use a high inoculum level (for example, 10^6 – 10^7 CFU/g of product) to demonstrate the extent of reduction in *L. monocytogenes*. While this level is unrealistically high, it allows for quantitative evaluation of the kinetics of inactivation, if desired. Some studies may be designed to validate lower levels of inactivation. Examples include validation of a 'post-lethality treatment' designed to inactivate low levels resulting from product recontamination after an initial lethal treatment or validation that an antimicrobial agent not only limits growth but inactivates *L. monocytogenes* over time. In such instances, lower challenge levels, such as 10^2 – 10^5 CFU/g, may be appropriate. Lower inoculation levels can also be used by increasing the sensitivity of the enumeration method. For example, direct plating can be used to enumerate non-diluted samples, or larger portions of product can be enriched in a Most-Probable-Number (MPN) procedure, yielding a lower limit of detection.

INOCULUM PREPARATION

The preparation of the inoculum to be used in *L. monocytogenes* challenge testing is an important component of the overall protocol. Typically, 18–24 h cultures (or longer, if cells are being adapted)

are prepared from working stock cultures – refrigerated broth cultures or slants – prepared from cultures frozen in glycerol or lyophilized (16). Procedures should be developed to minimize the number of times a culture is transferred to produce new working stock cultures, as mutations and adaptation can occur that 'weaken' the strain.

The challenge cultures should be grown in media and under conditions that would provide organisms in a state that is representative of the product being produced or representative of the probable sources of environmental contamination. In some studies, challenge organisms may be adapted to certain conditions, e.g., cold temperature, acid environment (16). For challenge studies that are to be conducted at refrigeration temperatures, it may be desirable to adapt the inoculum to cold temperature by growing in Trypticase Soy Broth (TSB) at the temperature at which the challenge study is to be conducted (e.g., 5–8°C) for approximately 7 days. For products with reduced pH, it may be desirable to acid-adapt cells (e.g., transfer a 24-h TSB culture to TSB-pH 5.0 for 3 h at 30°C); however, overnight growth in TSB plus glucose may reduce the pH enough to provide sufficient acid resistance for products with pH 5 or above (7). Likewise, if the product has a reduced water activity (a_w), the challenge organisms may be adapted by growth at the lower a_w by including in the TSB appropriate levels of the humectant that lowers the a_w in the food. In many studies, stationary phase cells are appropriate as they may best represent the cells that would contaminate a product from the plant environment (18).

When a mixture of strains is used for a challenge test, there should be approximately equal numbers of each strain. If strains are prepared in the same manner and the growth rates are similar, this can be achieved by simply mixing equal volumes of the individual cultures. Prior to conducting challenge tests, it should be determined that the procedure for preparing the inoculum provides consistent inoculum levels. The exact inoculum level should be determined by enumeration of the mixture.

METHOD OF INOCULATION

When inoculating foods for challenge studies, it is important that the critical parameters of the product formulation are not changed by addition of the inoculum, and care must be taken not to create a microenvironment that would foster

growth or survival (16). Thus the inoculation method will depend on the type of product being challenged. Liquid (aqueous) products may be directly inoculated, using a minimal amount of sterile water or buffer as a carrier. Use of a diluent adjusted to the approximate a_w of the product using the humectant present in the food (16) or adding the inoculum as a freeze-dried culture (19) minimizes the potential for erroneous results in foods with reduced a_w . (It should be noted that use of freeze-dried cultures may not be desirable, as they likely do not represent the state of *L. monocytogenes* that would contaminate products.) Likewise, diluents may be adjusted to the pH of a reduced-pH food. The pH, a_w , level of preservatives and other intrinsic factors should be reported with the results to allow for comparison of different trials.

Depending on the product, the inoculum may be added to batches of product during preparation or to the surface of solid products. Where surface contamination is the source of *L. monocytogenes*, this latter approach is preferable. A small volume of product can be pipetted onto the surface and spread with a sterile rod or spatula. Alternatively, an atomizer may be used to spray the inoculum onto the surface of product; however, this procedure must be calibrated and controlled to deliver the appropriate inoculum level consistently and should be conducted only under controlled conditions, such as in a biosafety hood (16). Inoculum may also be transferred using a sponge, velvet pad, paint pad, or similar fibrous cloth, provided the method is calibrated and reproducible levels of inoculum can be delivered (16). In all these applications, the smallest amount of water or buffer practical for suspension of the inoculum should be used, and preliminary analyses should be conducted to determine that the critical parameters of the formulation are not changed after inoculation (16). For products with complex geometries, such as bone-in turkey breast, care should be taken to inoculate all surface types (e.g., inside cavity, outer skin), as inactivation or growth parameters may differ depending on surface type. If sliced product is challenged, it is recommended that inoculum be applied to each type of interface (e.g., product/product and product/package).

The product should be pre-equilibrated to the temperature at which it will be stored, unless product contamination is most likely to occur when the product is at a different temperature. Care should be taken to minimize exposure to temperatures in excess of the intended storage temperature during the process of inoculating product. If the product is dis-

tributed frozen and thawed prior to use, inoculation of the product prior to freezing would be appropriate to mimic the conditions that the organism would experience during normal use.

It may be desirable to determine the level of the inoculum in the food product following inoculation. However, it must be recognized that this may not represent the true inoculum level, as, in some foods, there will be an initial die-off followed by recovery. For most products, counting the inoculum itself is generally considered to be the most accurate determination of inoculum level. Whenever possible, the same media and methods should be used to enumerate the inoculum and to recover the cells from the food.

FORMULATION FACTORS

When evaluating a product, it is important to know the range of variability of the key parameters that affect the growth or inactivation of *L. monocytogenes*. It may be useful to collect data on the inherent manufacturing variability of the critical parameters and ensure that the challenge test conditions encompass this variability, as appropriate, by a specified margin (e.g., 95% confidence interval). These parameters should be adjusted to the worst-case conditions expected for the product with respect to microbial growth or inactivation (e.g., highest pH and a_w , lowest level of preservative) for the challenge test. One approach would be to use the 95% confidence interval for the parameter, or the mean plus two standard deviations. Alternatively, multiple levels (different formulations) can be challenged to assess the margin of safety. Relevant intrinsic properties such as pH, a_w , preservative, fat, moisture, and salt level of the product being challenged should be documented for each study for future comparison and reference. Use of formulations more favorable to growth can limit the need to conduct challenge tests on formulations less favorable to growth (18).

DELIVERY OF A LETHAL TREATMENT

Challenge studies may be conducted to determine the level of inactivation of a process (e.g., heat, high pressure, drying etc.). Products that have been given a lethal treatment but which are exposed to recontamination from the environment may be given a subsequent 'post-lethality' inactivation treatment to kill *L. monocytogenes* that may have recontaminated the product. When evaluating an initial lethal treatment or a post-process lethal

treatment, it is desirable to conduct tests in a manner that provides a margin of safety. Intrinsic factors of the food that could impact inactivation during the treatment should be adjusted to levels favoring survival of the organism. For example, since heat inactivation may be a function of pH value or preservative level, the pH of the product tested should be the level closest to neutral for the product and the preservative level should be the lowest level expected in the product at the time the treatment is applied (including the variation in formulation). The treatment should be for the shortest period of time and the lowest temperature, pressure, etc., a manufacturer intends to use (i.e., factors critical to delivery of the process should be tested at levels most likely to result in survival). Where lethality is delivered by an antimicrobial, it should be tested at the lowest concentration of use. Conducting tests at multiple test variable levels is also an option that allows the determination of a margin of safety and provides data that may be needed to evaluate process deviations. Lethality studies should be conducted with sufficient intervals (e.g., enumeration of survivors at multiple time intervals at a specified temperature) to determine if the inactivation kinetics is log-linear.

STORAGE/INCUBATION CONDITIONS

When determining growth of *L. monocytogenes* in a product, ideally the same packaging as intended for the commercial marketplace should be used for storage of the test samples (16), although the package sizes may be smaller. If the commercial product is vacuum or modified atmosphere packaged, then the samples used in the microbiological challenge study should be packaged under the same conditions, using the same packaging film (16). Packaging atmosphere can also affect the recovery of *L. monocytogenes* that survive inactivation treatments. It is desirable to maintain the same surface:headspace volume ratio that would be present in commercial product.

The storage temperature used in the *L. monocytogenes* challenge study should be determined on the basis of the typical temperature range at which the product is to be held and distributed, including temperature abuse, as appropriate (4, 16). However, it should not be expected that products would withstand excessive abuse temperatures for a large portion of the shelf life. Audits International (1) has conducted studies to determine temperatures

for retail and home refrigerators for various products that can assist in selecting appropriate temperatures for challenge studies. Often, challenge studies are conducted at more than one temperature (e.g., 4.4–7°C (40–45°F) and 10–12°C (50–55°F)) to get a better understanding of the behavior of the challenge test organism in the product. This may be particularly important with some antimicrobial compounds whose inhibition of microbial growth is temperature dependent. Some challenge studies may incorporate temperature storage variations into the protocol. For example, the manufacturer may store and distribute a refrigerated product under well-controlled refrigeration conditions for a portion of its shelf life, after which the product may be subjected to higher temperatures immediately prior to and during use (16). Likewise, conditions that simulate the storage of a product that is held frozen prior to refrigerated sale can be incorporated into the challenge protocol.

Storage temperatures should be measured and recorded during the study. Continuous monitoring and recording is preferred, but other methods are acceptable. Although it may be desirable to have product temperatures, it is more common to measure the temperature of the storage chamber.

DURATION OF THE STUDY AND SAMPLING FREQUENCY

Assessing growth

L. monocytogenes challenge studies should extend over at least the desired shelf life of the product, and preferably for the desired shelf life plus an additional margin (e.g., 1.25 – 1.5 times the length of the desired shelf life) in order to determine what would happen if users were to hold and consume the product beyond its intended shelf life (16). Extended storage (beyond the end of shelf life) may allow growth of organisms that have been injured and therefore have an extended lag period. However, when incubating at higher temperatures it may be necessary to terminate portions of the study after a shorter period of time due to spoilage of product.

The frequency of sample analysis will depend in part on the shelf life of the product and the duration of the challenge study. Two to three samples should be analyzed on the day the product is inoculated and at each sampling interval,

along with controls (uninoculated product, untreated product, etc.). The larger the number of replicates at each time point, the greater confidence there will be that the results are genuine (19). If the shelf life is measured in days, the frequency of testing should be at least daily. If the shelf life is measured in weeks, the test frequency is typically at least once per week (4, 16). For longer shelf life (e.g., several months to a year), sampling may be conducted monthly. Generally, it is desirable to have a minimum of 5–7 sample intervals over the shelf life of the product in order to have a good indication of the inoculum behavior (4, 16, 18).

Many protocols for recovery of microorganisms from foods call for testing a 25-g or 25-ml sample. In many instances this will prove adequate. However, analysis of larger sample sizes is likely to increase the sensitivity. Ideally the entire product sample should be homogenized and used for enumeration of the *L. monocytogenes* present (or determination of whether there are any survivors). Depending on the inoculation process, it may be acceptable to sample a specific location (e.g., the inoculation spot when point inoculation has been used or the surface when product has been surface inoculated). Where *L. monocytogenes* is surface inoculated, rinsing the entire contents of a package may be more sensitive in recovering the microorganism than other procedures (17) for products that will not absorb the rinse solution.

Assessing lethality

For validation of the lethality of processes designed to destroy the challenge inoculum, it is not necessary to examine product samples over the shelf life of the product, taking into account the possibility of injured cells. Samples should be examined after delivery of the lethal treatment. It may also be desirable to examine samples at the end of the shelf life as part of the validation process to assess whether the process results in injured cells that could grow out over time. Sample size and methodology discussed under growth also apply for lethality.

SAMPLE ANALYSIS

Assessing growth

As already noted, it is desirable to have at least duplicate (and preferably triplicate) samples for analysis at each time point; more samples may be needed where there is variability or where higher

levels of certainty are needed. It is desirable to replicate the study (two to three independent trials) using different batches of product to account for product, inoculum level and temperature variation. However, if data are available from other studies on similar products, the need for replication is reduced.

The selection of enumeration media and method (for example, direct plating versus Most Probable Number) is dependent on the type of product, the extent of injury expected, and the level of *L. monocytogenes* expected. If the product does not have substantial background microflora, non-selective media for direct enumeration may be used. This has the advantage of recovering injured and non-injured organisms. However, it may be necessary to confirm that the recovered organisms are the test organism. Marked test strains are advantageous in allowing rapid confirmation that the organism recovered is the challenge organism. If antibiotic resistant challenge strains are used, a non-selective medium supplemented with the antibiotic can be used to recover the challenge strain in the presence of non-resistant background flora.

Selective-differential plating media have been developed that may be useful to enumerate *L. monocytogenes* with limited need for confirmation (e.g., BCM® *Listeria monocytogenes* Plating Medium, Biosynth® Biochemica & Synthetica, Naperville, IL; ALOA®, AES - Chemunex, Inc., Princeton, NJ; RAPID L.Mono™, Bio-Rad, Hercules, CA; CHROMagar *Listeria*, CHROMagar, Paris, France; Chromogenic *Listeria* Agar, Oxoid, Basingstoke, UK). Many of these newer media are selective chromogenic plating media that allow direct detection and enumeration of *L. monocytogenes* in 24–48 hours (9, 21). When selective media are used, the effect of such media on recovery of injured microorganisms must be considered. In overlay methods that have been developed, the cells are plated on a layer of non-selective medium such as Trypticase Soy Agar and incubated for several hours to allow recovery of injured cells before overlaying with the selective medium. An experienced microbiologist should conduct the studies and interpret their results, as there are many complexities to consider. For example, when evaluating growth in a product containing an antimicrobial agent, injury may be limited and growth on a laboratory medium may recover cells that would not grow in the food in the presence of the antimicrobial agent; this could result in a conservative estimate of outgrowth.

When background microflora result in difficulty in obtaining consistent results, or levels of background microflora are inconsistent, treatment of samples using radiation or high pressure prior to introducing the challenge organisms can help. However, if the spoilage microflora play a role in limiting shelf life and therefore the opportunity for growth of *L. monocytogenes*, this may not be an option.

It is prudent to analyze the product, including appropriate uninoculated control samples, at each sampling point in the study to determine levels of background microflora during the product shelf life (16). Uninoculated controls may not be necessary for all variables in a study. High levels of background microflora may suppress the growth of the challenge organism. In some cases, this is useful and desirable because the product spoils before *L. monocytogenes* can grow to levels that present a risk. However, in some situations, the background microorganisms may not be universally present, which can provide a different outcome for different studies with the same product and lead to a false sense of security in those studies where the microflora suppressed growth of *L. monocytogenes*. This is another reason for replicating the study with a different batch of product, especially when little is known about how *L. monocytogenes* might behave in a product.

It is also important to track pertinent product parameters over the shelf life to see how they might change and influence the behavior of the *L. monocytogenes* (16). Understanding how factors such as a_w , moisture, salt level, pH, titratable acidity, gas concentrations (when modified atmosphere packaging is used), preservative levels, and other variables change over product shelf life is key to understanding the control of *L. monocytogenes* in the product. These analyses should be conducted using standard methods (5, 9, 12, 14) where available.

Assessing lethality

When assessing lethality, one approach is to apply the lethal treatment (e.g., heat, high pressure) and enumerate the survivors of the treatment. Another approach is to simply determine if survivors are present (end-point determination). Considerations with respect to enumeration (selection of media, recovery of injured microorganisms, confirmation that survivors are the test organism) are similar to those previously described for growth studies. However, lethal treatments

are more likely to generate injured cells that may not be detected on selective media without a prior resuscitation step. Depending on the treatment, background microflora may be less of an issue, as the lethal treatment may eliminate these organisms along with the test organism. (However, if the product contains high levels of sporeformers, they would not be inactivated by lethal treatments designed for vegetative cells such as *L. monocytogenes* and they could interfere with recovery of the test organism.) Although most antimicrobial agents limit growth of a microorganism rather than kill it, in some instances use of these agents can result in lethality. When evaluating lethality due to an antimicrobial agent, it should be recognized that inactivation of *L. monocytogenes* may be related to time and temperature of exposure to the agent. Prior to inactivation, cells may be injured. Culturing in laboratory media after short exposure times may recover injured cells that would not be recovered at longer exposure times.

As with growth studies, it is desirable to have at least duplicate, and preferably triplicate, samples for analysis at each time point when assessing the lethality of a process or antimicrobial agent on *L. monocytogenes*. If lethality involves an end-point determination (e.g., determination of time/temperature combinations at which there are no survivors) there may be as many as ten replicate samples cultured in recovery media to determine if the test organism survived (presence/absence). It is desirable to replicate the study (two to three independent trials) using different batches of product to account for product, inoculum level and variation in delivery of lethality. Again, if data are available from other studies on similar products, the need for replication is reduced.

When conducting lethality studies and *L. monocytogenes* is no longer detected using direct plating methods, it may be desirable to use an enrichment method (with a minimum level of detection of <1 CFU/g) to determine if the organism is present at levels below those detectable by direct plating. In studies designed to inactivate all *L. monocytogenes* present in the challenge study, this may be particularly important if the studies were done using realistic inoculum levels. Studies to determine the presence or absence of *L. monocytogenes* should follow FDA (9), USDA FSIS (12), or other validated methods as appropriate.

INTERPRETATION OF RESULTS

Determination of the risk presented by a product is complex and, as already noted in several instances, requires evaluation by expert microbiologists who will consider all relevant factors. For lethality experiments, log reductions should be determined in replicate trials. The lowest log reduction achieved should be compared to the highest contamination level expected in the product, and should exceed the contamination level by an amount that incorporates a margin of safety, given the variability expected in the process.

In determining that a product does not support growth of *L. monocytogenes*, a < 1 log increase above the initial inoculum level throughout the shelf life of the product and across replicate trials would be an appropriate acceptance criterion (16, 20). This reflects the inherent variation that exists with enumeration of microorganisms. However, once again we urge the use of an expert microbiologist in interpreting the data, as a microbiologist can best determine if the data represent a trend of increasing numbers or the variation normally seen with enumeration studies. Trial replicates should not be averaged; however, within trials replicate results may be averaged according to conventional statistical rules. The best estimate of growth, with variation and uncertainty, determined from the challenge study should be used for risk assessments (in determining exposure assessment), even if it is a fraction of a log unit.

Recent risk assessments (3, 8, 10) indicate that low numbers of *L. monocytogenes* present a low risk to public health. There is also increasing evidence that products that support the growth of *L. monocytogenes* present an increased risk (8, 10). Some countries such as Canada, Germany, France and others have risk management strategies for *L. monocytogenes* that include a tolerance for low levels of this organism in certain ready-to-eat foods that will not support growth to high levels (13). To date, a tolerance for *L. monocytogenes* has not been established in the United States, although, as noted before, petitions have been submitted to FDA and FSIS for a regulatory limit of 100 CFU/g in foods that do not support growth of *L. monocytogenes*. An *L. monocytogenes* level of 100 CFU/g at the time of consumption may provide an acceptable level of consumer protection (3, 8); however, the public health risk is

related to the level of contamination, the ability of the food to support growth, and the time and temperature at which a product is held. In determining whether growth of *L. monocytogenes* in a product presents a risk, a 1-log increase may be considered an appropriate level of control for *L. monocytogenes* when information on initial levels is lacking or when "zero tolerance" is in effect. This level accounts for variability in enumeration techniques and represents a view that growth of this organism to high levels represents a risk to public health that must be controlled (16). Reducing the level of contamination and preventing growth are key components of *L. monocytogenes* control. Challenge studies as outlined here can assist in validating lethal treatments and formulations that limit growth of *L. monocytogenes* as manufacturers enhance their controls for this organism.

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Consumer Reaction and Interest in Using Food Thermometers When Cooking Small or Thin Meat Items

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SUMMARY

Color is known to be an unreliable indicator of whether ground beef is safely cooked. It is recommended that consumers use a thermometer when cooking hamburger and do not rely on the internal color of the meat to insure food safety. However, fewer than 6% of consumers follow this recommendation. Consumer focus groups were used to gather information regarding attitudes about food thermometer use and suggestions for the design of effective motivational intervention materials. Prior to focus group discussions, participants read two brochures about food thermometers and used food thermometers to assess the endpoint in cooking a small meat item. For most participants, thermometer use with a hamburger, chicken breast or pork chop was a new experience, and they expressed a variety of opinions. Avoidance of foodborne illness, especially when cooking for children or elderly persons, was the major factor in favor of thermometer use. Barriers to thermometer use included lack of time, forgetfulness, laziness and lack of confidence in accurately positioning the thermometer. Participants suggested that consumers need to be informed about the disconnect between color of ground beef and safe endpoint temperature and about the usefulness of thermometers for assuring consistently high quality cooked meat by avoiding overcooking.

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INTRODUCTION

Adequate cooking of meats is a major control factor that consumers can use to reduce their risk of foodborne illnesses. Most consumers are aware of the need to adequately cook meats to kill pathogens (1); however, almost all home food preparers rely on visual cues to judge doneness of meat rather than the more accurate method of measuring the endpoint cooking temperature (3). For example, according to a 1998 consumer food safety survey conducted by the Food and Drug Administration and Food Safety and Inspection Service, only 6 percent of consumers checked hamburgers with a food thermometer (13). A consumer survey conducted in 2002 by the American Dietetic Association and the ConAgra Food Foundation (4) found that only 25% reported using a thermometer "always or most of the time" to validate the cooking process for flesh foods. Only 1 of 67 participants (1.5%) in a focus group study used a thermometer to check the temperature of ground beef (3). In a telephone survey of Idaho consumers conducted in June 2003, 3 percent of the 100 respondents said that they used a thermometer to determine the cooking endpoint of small meat items such as hamburger and chicken breast (McCurdy, unpublished data).

FIGURE 1. Contents of 3-fold, 2-sided, color brochure, *Why use a thermometer in ground meat?*

Using a thermometer is the only way to be sure ground meats, such as hamburger patties, meatloaf, and casseroles containing ground meats, reach the safe temperature of 160°F.

Why use a thermometer in ground meat?





ICS
The University of Idaho provides equal opportunity in education and employment on the basis of race, color, religion, national origin, gender, age, disability, or status as a veteran and extends, as required by state and federal laws.



Ground beef can contain the harmful bacteria, *E. coli* O157:H7, which is killed by adequate cooking to 160°F.



Different batches of ground beef turn brown at different temperatures.



Using a thermometer prevents over-cooking, so the meats you cook are tender and juicy, not tough and dry.



Research has documented that consumers cannot judge whether ground beef is adequately cooked on the basis of visual cues such as color and texture (10). The US Department of Agriculture (USDA) notes that "one out of every four hamburgers turns brown before it's been cooked to a safe internal temperature" (5). Thus, USDA recommends that consumers use a thermometer when cooking hamburger and not rely on the internal color of the meat to insure food safety (10). Cody and Hogue (4) have suggested, based on the "Home Food Safety—It's in Your Hands" (HFSYH) surveys, that thermometer use is the food safety behavior that offers the most opportunity for positive change in the US

population. Concurrent with education about thermometer use, consumers need to know the safe endpoints for cooking meats. The HFSYH telephone survey of 1,006 adult home food preparers found that only 9% of respondents knew the correct cooking temperature endpoint for ground beef (4).

Food thermometers generally available to consumers for testing thin or small meat items include instant-read dial and digital types. In dial thermometers, a bi-metallic coil in the stem measures food temperature by moving the pointer on the dial gauge. The lower 2 to 3 inches of the stem or probe must be inserted in the center of the food to obtain an accurate assessment of temperature. Digital ther-

момeters employ a thermister (an electronic device whose resistance to electrical current changes with temperature) in the tip of the stem to measure temperature. Electrical wires carry the signal from the thermister to a circuit board and digital read-out in the head of the thermometer. A 1/2-inch portion of the tip of the stem of a digital thermometer must be inserted in the center of the food to assess temperature accurately. Instant-read thermometers generally require 10 to 30 seconds to reach the final temperature of 160°F (11). Dial thermometers are less expensive and more generally available than digital models (11); one food safety expert has suggested they are not suitable for measuring endpoint temperature in hamburger patties because the lower 2-3 inches of the stem cannot be positioned accurately to measure the cold spot (14).

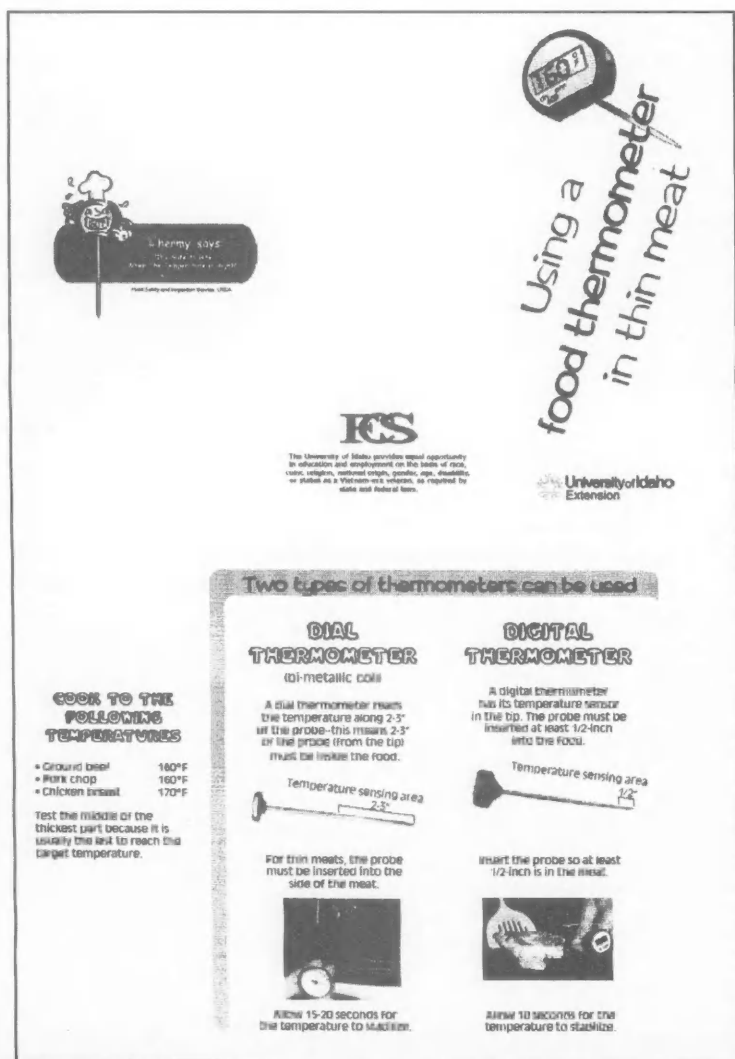
Increasing consumers' use of thermometers to determine doneness when cooking hamburgers and other small or thin meat items such as chicken breasts and pork chops has been described as a challenging task, which perhaps can be likened to convincing consumers to wear seat belts when traveling in automobiles. A national consumer education campaign to promote food thermometer use (6) was launched by USDA Food Safety and Inspection Service in May 2000. The USDA Thermometer Campaign provides information about thermometer use, including a widely distributed Thermometer flyer and 30-second television Public Service Announcements featuring Thermometer, a cartoon thermometer character.

Exploring consumers' attitudes about thermometer use is key to developing an effective campaign. Focus group discussions are a useful tool for researchers collecting qualitative information about people's needs, attitudes, and beliefs. They are often used in the early stages of a project or program to probe for in-depth information that cannot be obtained in paper-and-pencil or phone surveys (7). They have been used to aid in the development of consumer educational materials on the safe handling of fresh produce (9). Prior to developing the Thermometer Campaign, the USDA conducted, via contract, focus group interviews to investigate the barriers that limit consumers' use of thermometers when cooking meat and poultry (3,8). In these focus groups, some participants were fairly resistant to adding thermometer use to the process of cooking meat: some felt that thermometers could be used to check doneness, but not to determine if the meat is cooked sufficiently to be safe to eat (8). Many of the participants noted that they had been cooking without a thermometer for years without suffering any adverse results (3).

TABLE 1. Information about focus group participants—number of participants in each category (total number of participants = 37)

Gender	Age	Children	Number of family meals prepared at home weekly	Percentage of family cooking done by participant					
Male	3	20s	2	Yes	3	1 to 5	1	25%	4
Female	34	30s	7	No	6	6 to 10	7	50%	3
		40s	13			11 to 15	10	75%	10
		50s	6			15 to 21	19	100%	20
		60s	7						
		70s	2						

FIGURE 2. Contents of 3-fold, 2-sided, color brochure, *Using a food thermometer in thin meat*



A few expressed interest in changing their cooking procedures to include use of a thermometer to assess doneness; however, young adults were reported to be very resistant to use of a thermometer.

This research was part of a multi-step project to increase consumers' use of thermometers to determine doneness in hamburger and other small, thin meat items such as pork chops and chicken breasts. The specific objective was to gather information about consumer attitudes toward food thermometer use for the development of an effective educational campaign.

METHODS

Four consumer focus groups, of 8 to 11 individuals each, two in Washington and two in Idaho, were convened at county Cooperative Extension offices with cooking facilities. Focus group participants were recruited by Family and Consumer Sciences county extension educators through extension newsletters, posters and newspaper ads. Potential participants were screened to insure that they did cook meat. Since recruiting was conducted via county Extension offices which have extension Master Food Preserver/Food Safety Advisor (MFP/FSA) programs (a program of consumer volunteers with high interest in food safety), participation was limited to one MFP/FSA volunteer per focus group.

To encourage focus group participants to relax and feel comfortable, they were served a catered dinner and encouraged to get to know one another. After dinner, they were asked to read two prototype brochures on why and how to use a food thermometer to assess the end-point of small meat items (Fig. 1 and 2). Next, participants cooked either a ground

FIGURE 3. Questions posed to focus group participants to elicit discussion about use of food thermometers when cooking small meat items

Warm-up Questions

- A. What is your attitude about cooking?
- B. How did you learn to cook meat?

Thermometer Questions

- 1. What determines whether you use a meat thermometer?
- 2. What did you think about the experience of using a thermometer to cook thin meat to a certain temperature?
- 3. Now that you have had the experience of using both a dial and a digital thermometer, what did you think of them?
- 4. What would keep you from using a thermometer when cooking thin meats such as hamburgers, pork chops and chicken breast?
- 5. What do you think would motivate you to use a food thermometer when cooking thin meats?
- 6. The objective of this project is to develop materials to motivate consumers to use these thermometers. What would motivate them?
- 7. You received two brochures before starting to cook. We are interested in how we could improve them to get people to read them. (Each brochure was discussed individually.)
- 8. Look on the back of your brochures. The cartoon figure is "Thermy™," the U.S. Department of Agriculture's character for encouraging consumers to use a meat thermometer. Has anyone seen the Thermy™ commercial on TV?

beef patty (a thawed, commercially-formed and frozen 0.25-pound patty), a pork chop (0.5-inch thick), or a chicken breast (3 to 4 ounces), using both a dial (Good Cook model 25110, Bradshaw International, Inc., CA) and a digital (Good Cook model 25111) instant-read food thermometer to assess the endpoint of the meat. The thermometers had been checked for accuracy at 160°F prior to use (11). The meat items were cooked using an electric fry pan, a double-sided (clam-shell type) grill, or a fry pan on an electric stove.

Following the cooking exercise, participants gathered to discuss the use of food thermometers. The focus group discussion was facilitated by one of two group leaders using guidelines developed by Morgan and Krueger (12). The questions posed during the discussion are shown in Fig. 3; these questions were pre-tested and refined during a pilot test of the focus group. Warm-up questions were used to allow time for the group to feel comfortable discussing the questions

posed by the facilitator and were not used in the study. Questions were used to focus on the advantages, disadvantages, barriers and methods that would overcome the lack of thermometer use. The discussion was audiotaped and transcribed and entered into an Ethnograph 5.0 software program to aid in the organization, analysis and reporting of the group answers, ideas and reactions. The participants received a digital thermometer, as well as the catered dinner, for participating. The study methodology was approved by the University of Idaho Human Assurances Committee and subjects gave informed consent to participate.

RESULTS

Participant characteristics

The focus group participants were mostly women (34 of 37 participants) in their forties (35%) with children (84%), who prepared a majority of family meals at home (Table 1). In response to the ques-

tion "What determines whether you use a food thermometer?" (Question 1), fifty-four percent of the participants said they did not use a thermometer when cooking meat of any type, 41% used an oven-safe food thermometer when preparing roasts and turkeys, and two participants reported that they used a food thermometer when cooking small meat items, such as hamburgers, pork chops or chicken breast.

Attitudes about thermometer use

When asked what they thought about the experience of using a food thermometer to test doneness in thin meat items (Question 2), participant response was varied. For most (95%), it was a new experience. Several participants in each of the four focus groups said that use of a food thermometer revealed to them that they were overcooking thin meat items, although a few noted they thought they were undercooking them. Many indicated they would like to use a food thermometer, especially when cooking unfamiliar or seldom-cooked items or when using a new or seldom-used appliance. A few also mentioned it "felt good" to know that the meat was safely cooked. One participant said she thought it was fun, quick and easy.

On the other hand, a number of participants found use of a food thermometer to take too much time and extra work and to be inconvenient and awkward. They also tended to be unconvinced of a need to replace their visual and texture-based method of judging doneness. A few participants objected to holes in the meat left by the thermometer stem, although one thought the holes were an improvement over her method of cutting meat to check doneness.

A number of participants were concerned about a discrepancy between temperature readings obtained on the dial and digital thermometer in the same piece of meat. Several were concerned about whether they were properly positioning the thermometer in the meat.

The preference for dial and digital thermometers was split (Question 3), and many participants strongly supported the type they preferred. Some thought that the dial thermometer was easier to read, while others found the numbers on the digital thermometer were more readable. Some found the digital thermometer reading to tenths of a degree to be confusing. Similarly, opinion was split on the perceived response time of the two thermometer types, with some participants finding

the dial model faster and others reporting the digital model to respond more quickly (Laboratory testing of the two thermometer models in a water bath showed that the dial model required about 22 seconds and the digital model 14 seconds to reach 160°F (11)). One respondent said that a slower response time gave her confidence that the thermometer reading was accurate. The most frequently mentioned advantage of the dial thermometer was that there is no on-off switch and no need to change batteries. The chief advantage reported for the digital model was that it was easier to position in meat because it did not need to be inserted as far.

Motivation for use

When asked what would keep them from using a food thermometer to test for a safe endpoint in thin or small meat items (Question 4), focus group participants frequently mentioned lack of time when preparing meals, forgetfulness and laziness. They also mentioned that it was inconvenient to monitor closely the cooking of thin meats and that they were not entirely comfortable with the procedure of inserting the thermometer correctly to achieve an accurate temperature reading. Particularly if cooking several thin meat items at one time, participants felt that it would be difficult and time consuming to check each item. Several participants said that storing the thermometer in an accessible kitchen location would be an obstacle for them, as would questions or critical comments from other family members. A number of participants repeated that they were not convinced of the need to use a thermometer to determine doneness in thin meat items.

When asked what would motivate them to use a food thermometer when cooking thin meat items (Question 5), the most frequently mentioned reason was avoidance of foodborne illness, especially when cooking for children or elderly persons. Participants felt that personal or family experience with foodborne illness was the strongest motivation. A number of participants mentioned that improved meat quality, via the avoidance of overcooking, particularly when grilling, would motivate them to use a food thermometer. All of the groups mentioned that it would be necessary for them to form the habit of using a food thermometer and that having the thermometer on their kitchen counter or other handy location would serve as motivation for use. In each focus group, there were 1 or 2 individuals who stated that they were not inter-

ested in using a food thermometer to measure the endpoint in thin meat items and that nothing would motivate them to do so. Some mentioned they were more apt to use a thermometer with a chicken breast or pork chops than with hamburger to avoid overcooking because they needed more help in assessing doneness of these items. Several participants noted that an improved thermometer design, to make it easier to insert in thin meats, would increase their use.

Participants were also asked what they thought would motivate others to use a food thermometer when cooking small meat items (Question 6). All of the groups mentioned that the brochure pictures showing the disconnect between color of ground beef and safe endpoint temperature (that is, the fact that different lots of ground beef can appear brown before reaching 160°F or can remain pink in color after reaching 160°F) was very important information that should be communicated to consumers. This was new information to most participants. All groups suggested that middle and high school family life classes should teach about using a food thermometer to test endpoint temperature of small meats. Focus groups participants also mentioned that cookbooks and recipes in popular magazines and newspapers and hosts on cooking shows should transmit information about food thermometer use. Several participants in the four groups suggested that demonstrations of how and why to use a food thermometer in grocery stores and at county and health fairs would be useful. Two of the groups said that consumers would be motivated to use a thermometer by emphasizing that it would improve the quality (juiciness) of meat and allow consumers to avoid overcooking of meats.

Brochure suggestions

The groups were also asked how the prototype brochures (Fig. 1 and 2) could be improved to get people to read them (Question 7). All of the groups mentioned that the brevity of the brochures was a good feature; they felt people would be unwilling to pick up and read a brochure with too much text. They suggested adding a website or contact name for more information. All of the groups mentioned that the pictures were vital to communicating the message, but some suggested the photography should be of higher quality. Three of the groups mentioned that the endpoint temperature information should be laminated or in the form of a magnet or cling (peel and stick window film), so that it could be easily retained in a consumer kitchen for reference.

In the final question (Question 8), the focus groups were asked if they had seen the Thermo™ character. None of the focus group participants remembered having seen Thermo™ on television or other types of media. Three of the four focus groups found Thermo™ appealing and his message, "It's safe to bite when the temperature is right," easy to remember. Greater use of Thermo™, on brochures, magnets and perhaps on retail meat packages, was suggested.

DISCUSSION

Use of a food thermometer to assess safe endpoint of small or thin meat items is, at present, a seldom practiced consumer behavior. Bruhn (2) has noted that "knowledge of the consequences of unsafe practices can enhance motivation and adherence to safety guidelines." Our focus group participants agreed, indicating that avoidance of foodborne illness would be the primary motivation for them to begin using a thermometer. The respondents also stated that avoidance of overcooking would be a major motivating factor.

Participants in the USDA's focus groups made suggestions to increase thermometer use, which included: (a) widely disseminate the research findings related to color of ground beef as it relates to doneness, (b) include recommended endpoint temperature with cooking instructions, (c) include recommended endpoint temperatures for meats on safe food handling labels, and (d) find ways to make thermometer use convenient (3, 8). Additional suggestions were to highlight ordinary meals, not special events, and emphasize taste, not safety.

Although the format of our Washington and Idaho focus groups differed from the USDA focus groups, similar suggestions resulted. Focus groups recruited by Washington and Idaho extension offices also urged that the pictures showing the disconnect between color of ground beef and safe endpoint temperature should be communicated to consumers. They also recommended that information about endpoint temperatures and use of a food thermometer be made more widely available in consumer cooking information sources, such as newspapers, magazines, and cooking shows. Our focus group participants had several suggestions for making thermometer use more convenient, such as an attractive holder, perhaps magnetic, to keep it handy in the kitchen, and a new shape or design to make it easier to insert sideways into thin

meats while these are in a frying pan. Teaching youth about the use of food thermometers to determine adequate cooking of hamburgers and other thin meat items in high school Family and Consumer Sciences classes would produce adult consumers who felt more comfortable and confident about this food safety behavior.

ACKNOWLEDGMENTS

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Food Safety Knowledge, Attitudes and Behavior of Irish Teenagers

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SUMMARY

Food safety malpractices in the home are thought to be responsible for a significant number of food poisoning cases. A study was carried out to investigate the level of food safety knowledge that exists among teenage consumers and to gain insight into their food-handling behavior and beliefs as well as their attitudes toward food safety. The study sought to establish whether a link existed between the socio-economic background of teenagers and their food safety knowledge and food-handling behavior.

A questionnaire was distributed to two hundred teenagers (response rate of 90.5%), half of whom attended a school in which the students generally were from higher socio-economic backgrounds and the remainder of whom attended an inner city school, where students usually come from lower socio-economic backgrounds.

Teenagers did not prioritize food safety as an issue that causes them excessive concern. Schools, parents and television are the principal sources of food safety information for young consumers who consider themselves to be well informed in this area. However, when asked how to determine when a whole chicken is cooked, no respondents referred to time or temperature. The majority considered washing hands prior to food preparation or consumption to be very important, yet a large proportion did not do so in school. Teenagers from more prosperous backgrounds tended to have a better knowledge of basic food safety principles than those from low socio-economic backgrounds. A significant proportion of teenagers from disadvantaged areas did not understand the term cross-contamination, nor could they identify the recommended internal temperature of a domestic refrigerator. Teenagers have a positive attitude toward food safety, but they need to be motivated to change their behavior accordingly through effective risk communication incorporating education programs tailored to their needs, including reference to their socio-economic background.

INTRODUCTION

The World Health Organization defines foodborne disease as "a disease of infectious or toxic nature caused by, or thought to be caused by, the consumption of food or water" (4). It is estimated that approximately 1,000 Irish people suffer from food poisoning per annum (7). In 1999 approximately 12% of food poisoning outbreaks in Ireland occurred in private houses (7). The National Disease Center and the Department of Health and Children in Ireland recorded over 1,200 cases of food poisoning caused by bacteria other than *Salmonella* and more than 400 cases of food poisoning caused by *Salmonella* in 2001 (4). The factors contributing to these outbreaks were identified as improper storage of food, inadequate cooking or reheating, cross-contamination and poor hygiene (10). It was revealed that the kitchen environment is actually more heavily contaminated with fecal and total coliforms than the more obvious suspect, the bathroom (8). It is recognized by the Food Safety Authority of Ireland (2003) that consumers are ultimately responsible for ensuring food in their homes is handled and prepared safely, so as to protect themselves from foodborne illness (2). The European Union (EU) strategy of food safety 'from farm to fork' cannot be regulated within the home, so the onus is on individual consumers to protect themselves.

"Consumer's failure to associate home food handling practices with foodborne illnesses is considered a serious impediment to convincing consumers to

A peer-reviewed article

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TABLE 1. Sources of food safety information for teenagers

Source of information	% of respondents
School	79.6
Television	55.8
Parents	44.8
Food labels	24.3
Leaflets	14.4
Newspapers	12.2
Radio	9.9
Magazines	9.4
Internet	2.2

TABLE 2. Food safety issues of most concern to teenagers

Food safety issue	% of respondents most concerned
Food poisoning	34.5
High fat content	29.9
Physical contamination	10.2
BSE	9.6
Pesticide residues in food	6.8
Genetically modified foods	6.8
Food irradiation	1.7
Additives	1.7

change inappropriate food handling behaviors" (8). A survey revealed that many consumers perceived their homes and the homes of their friends as locations where it was highly improbable they would acquire food poisoning (8). It is widely acknowledged that many cases of foodborne illness result directly or indirectly from food safety malpractices in the domestic home (7).

Food safety did not appear to be an issue of concern to the Irish children surveyed by the Food Safety Authority of Ireland (FSAI) (3); drugs, drug abuse and racism were found to be the main sources of anxiety for them. With regard to specific food safety issues, more than half of the respondents were concerned about BSE and 46% were apprehensive about food poisoning. Schools and parents pro-

vided the majority of food safety information for children, according to the survey. The only examination subject in the secondary school curriculum in which food safety is emphasized is Home Economics, at the both junior and senior level, but this is not a compulsory subject.

Evidence that became available to the Irish Food Safety Promotion Board, *SafeFood*, in 1999 suggested that people with disadvantaged socio-economic backgrounds were less aware of food safety issues, and good hygiene practices as well as lacking knowledge pertaining to nutrition (5).

It became apparent after an extensive review of published research relating to consumers and food safety that there is a dearth of information pertaining to teenage consumers and their know-

ledge, beliefs and attitude toward the issue of food safety. Therefore, the focus of this study was on consumers aged thirteen to eighteen years. The aim was to gain insight into food handling behavior of teenagers from both low and high socio-economic backgrounds and to investigate the existing level of knowledge and attitudes regarding food safety.

MATERIALS AND METHODS

The nature of this research was investigative in nature, and the methodology most suited to this purpose involved the use of questionnaires. This approach enabled the generation of various types of data, both qualitative and quantitative, enhancing the quality of the research (1). The dichotomy of data types attained allowed for a more in-depth insight into current knowledge and the expression of behavior and attitudes in a detailed manner.

The aim of the study specified teenage consumers from different socio-economic backgrounds as the intended subjects of the research; therefore, simple stratified sampling of the population was the selected technique employed, whereby the general population was subdivided into various groups, or strata, based upon age and socio-economic background. Irish teenagers from relatively advantaged (wealthy) and relatively disadvantaged (poor) backgrounds were selected. It was possible to access a substantial number of students from high socio-economic backgrounds by making contact with a school situated in a location where the surrounding catchment area has high levels of employment. A significant proportion of pupils who had previously attended this school had gone on to university or other further education, suggesting that the school enrolls many students with various career aspirations and capabilities, indicating that they reign from an advantaged area. Contact was also made with an inner city school, and it was established that only the minority of students attending this particular school were expected to attend university, indicating that the catchment area of this school contains a significant proportion of disadvantaged students. The questionnaire included questions to indicate the type of path the respondent is likely to pursue in life after second level education, to enable students to be further differentiated. Consequently, an equally sized randomized sample was obtained from each stratum separately to ensure that each was equally represented (9).

TABLE 3. Level of concern among teenagers about the safety of the food they purchase and consume when eating out

Level of concern	High socio-economic background	Low socio-economic background
Very concerned	22.7%	46.4%
Concerned	29.9%	30.9%
Not really concerned	42.3%	19%
Not at all concerned	5.2%	3.6%

TABLE 4. Awareness of common food poisoning micro-organisms among Irish teenagers

Pathogen	Respondents* aware of pathogen	
	High socio-economic background (%)	Low socio-economic background (%)
<i>Salmonella</i>	97.9	54.8
<i>E. coli</i>	94.8	11.9
<i>Campylobacter</i>	23.7	3.6
<i>Listeria monocytogenes</i>	18.5	3.6
<i>Staphylococcus aureus</i>	14.4	3.6
<i>Clostridium botulinum</i>	10.3	7.2
<i>Clostridium perfringens</i>	10.3	2.4
<i>Yersinia</i>	4.1	6.0

*n = 90.5%

TABLE 5. Importance of washing hands prior to food preparation or consumption according to Irish teenagers

Importance	High socio-economic background	Low socio-economic background
Very important	69.1%	90%
Important	29.9%	8.6%
Not really important	1%	0%
Not at all important	0%	1.2%

A simple profile of the respondent was developed from questions at the beginning of the questionnaire, which then progressed to the collation of data pertaining to knowledge, attitudes and behavior regarding food safety. Excluding the subject profile, the questionnaire was comprised of 31 questions. These ranged from open-ended questions to facilitate the acquisition of qualitative data and rank questions to multiple choice and yes/no questions to provide quantitative data. The questionnaire was then subjected to a preliminary pilot study (10 teenagers) to assess suitability and identify any necessary changes.

After all necessary changes had been made to the questionnaire, the study was conducted with 200 students aged 13 to 18 years. Approximately half of the students attended a school in a disadvantaged area, while the remainder attended a school in an advantaged area. Questionnaires were issued to and collected from respondents on the same day, ensuring a high response rate. All students completed the questionnaire under the supervision of a teacher, and no communication was permitted between students during the exercise. The SPSS (Statistical Package for Social Science) analytical computer package was used to analyze the collated data.

RESULTS AND DISCUSSION

The majority of teenagers surveyed (86%) consider themselves to be well informed about food safety and food hygiene issues, which conflicts with the actual level of accurate food safety knowledge they possess, as evident from the questionnaire results.

As is evident from Table 1, school provides the majority of teenagers (80%) with most of their food safety and food hygiene knowledge; television (56%) and

TABLE 6. Appropriate domestic refrigerator temperatures, according to Irish teenagers

Socio-economic background	Refrigerator temperature			
	0 – 3°C	4 – 5°C	6 – 7°C	8 – 10°C
High socio-economic	30.2%	63.5%	5.2%	1%
Low socio-economic	17.4%	53.6%	21.7%	7.2%
Total	24.8%	59.4%	12.1%	3.6%

*n = 82.5%

parents (45%) are the next main providers of food safety information. This emphasizes the importance of television as an effective tool to communicate food risk information and guidelines pertaining to food safety to teenagers as well as the significance of the impact and influence parental attitudes and behavior can have on teenage children. School, parents and television were the primary sources of food safety information for children surveyed by the FSAI in 2003 (2), hence supporting the validity of the results achieved in the present study.

Only one-quarter of the respondents claim to have suffered from food poisoning, indicating that perhaps some incidents had been inaccurately classified by the patient as a common gastrointestinal infection, not reported and not associated with foodborne illness. It is accepted that under-reporting of foodborne illness occurs (4) and this study revealed very low levels of reporting of foodborne illness among teenagers, as merely 25% of those who had food poisoning reported it. There appears to be much confusion regarding to whom or where precisely a case of suspected food poisoning should be reported. "A doctor" or "the place where the offending food was purchased" were the most common answers. More than 1 in 10 teenagers did not know at all where to report a foodborne illness.

Food safety is not an issue that greatly concerns teenagers; fewer than 7% cited it as the issue that most concerns them. Drugs and drug abuse (43%) followed by personal safety, bullying and racism are issues they find to be more worrying. However, when questioned about specific issues relating to food safety (Table 2), it transpired that they are concerned mostly about food poisoning (34.5%) and secondly about the high fat content of many foods (29.9%).

Approximately two-thirds of teenagers surveyed are concerned about the safety of food they consume in food establishments. According to the Pearson Chi-Square test, there is a correlation between socio-economic background and perception of food safety measures taken by the food service industry to provide consumers with safe food; those from a lower socio-economic area (46.4%) are 'very concerned' about food safety when eating out, compared to 22.7% of respondents from a relatively wealthy area, as shown in Table 3.

A significant percentage of teenagers are also worried about the safety of the food they purchase when shopping (60%), particularly those who study home economics in school, possibly because they have additional knowledge about food safety since it forms part of the core syllabus. Over half (55%) always check the 'best before' date on fresh produce prior to purchase, perhaps because they lack trust in the business to sell only foods that are within the 'best before' date or possibly to ensure that the product is the freshest in stock. More than three-quarters of teenagers surveyed said they would complain in a shop or restaurant if they observed unhygienic practices, which implies that they are aware of various activities that they would consider unhygienic or unsafe in a food establishment and are not willing to tolerate the perceived risk of getting food poisoning as it increases to an unacceptable level. Half of teenagers surveyed have made a food complaint, relating mostly to physical contamination, insufficient cooking, and incorrect temperature. This suggests that half of these teenagers have realized the importance of food safety and the need for action on their part.

More than half of the teenagers involved in the study had witnessed food

and money being handled by the same employee in a food establishment and had noted that the employee's hands were not washed between the two activities, resulting in potential cross-contamination of the ready-to-eat food served to the next customer. Almost two in five teenagers witnessed employees wearing protective gloves while handling money, suggesting a lack of employee training and supervision.

The microorganisms most commonly recognized by teenagers are *E. coli* and *Salmonella*. There was little awareness of other microorganisms frequently involved in outbreaks of foodborne illness. As these are the microbiological agents causative of food poisoning and the reason why hygiene maintenance in a kitchen is so important, it is evident that young consumers require more education in this area. It is accepted that if consumers know why a particular activity is important, they are more likely to remember the logical explanation and actually perform the activity. There appeared to be a link, supported by the results of Pearson Chi-Square tests, between background and awareness of various microorganisms; students from a low socio-economic background had a lower level of awareness of *Campylobacter*, *Clostridium perfringens*, *Listeria monocytogenes*, *Staphylococcus aureus*, *E. coli* and *Salmonella* than those from a higher socio-economic background, as shown in Table 4.

From this study, it is apparent that those from a higher socio-economic background tend to have a greater knowledge of food safety than their counterparts, which has a positive impact on their subsequent food handling behavior. However, in some areas, such as refrigerator cleaning frequency and hand washing prior to food preparation and consumption, those from low socio-economic back-

TABLE 7. Cleaning frequency of refrigerators in the homes of teenagers

Frequency	% High socio-economic background	% Low socio-economic background
Once per week	17.5	48.2
Once per month	34	12
Don't know	13.4	25.3
Twice per month	12.4	9.6
Not very often	9.3	2.4
Once every four months	8.2	1.2
Once every two months	2.1	1.2
Once per year	2.1	0
Once every five months	1.0	0

grounds behave more similarly to recommended food safety practices.

Hand washing prior to food preparation and consumption was considered a very important action by four out of five teenagers. However, more teenagers claimed to always wash their hands before food handling or consumption at home (61%) than at school (37%). Teenagers from a low socio-economic background consider hand washing prior to food preparation or consumption to be more important than their higher socio-economic counterparts do, as shown in Table 5, and are also more likely to always do so at home and in school. This raises the question of why the procedure of cleaning hands before food consumption is deemed more important in the home than in school by teenagers. Time, peer pressure and apathy may be relevant factors, but this implies a difference between attitude and actual behavior. Teenagers tended to have a very positive attitude toward the importance of hand washing, but their behavior was reflective of a negative attitude in terms of food safety.

Storage of chilled products is an area in which teenagers need more education. Many did not know precisely where various chilled products should be positioned in a refrigerator to avoid cross-contamination. Two in five surveyed were unaware that raw meat or fish ought to be stored on the bottom shelf of a refrigerator to prevent cross-contamination of cooked foods, which indicated a lack of basic food safety knowledge and consequently increased risk of foodborne illness in the home. Those from a higher

socio-economic background had a greater knowledge of how to store food correctly in a refrigerator, particularly positioning of various food items and the temperature that is appropriate for safe food storage in a refrigerator. The majority of teenagers wash fruits and vegetables prior to preparation or consumption, a positive food safety measure.

A significant proportion of teenagers (60%) were able to identify the correct temperature setting for a domestic refrigerator, but 16% believed that the temperature should be greater than or equal to 6°C, which is a cause for concern, as such temperatures permit unacceptably rapid microbial proliferation. This could result in safe foods becoming contaminated within the refrigerator and a reduction in the shelf life of some products, thus increasing the risk of food poisoning if these foods were consumed. Table 6 depicts the results from the survey relating to refrigerator temperature, indicating that those from a higher socio-economic background are more aware of the appropriate temperature setting in a refrigerator. The cleaning frequency of domestic refrigerators is varied throughout the households of different teenagers, ranging from weekly to annually, as is evident from Table 7. More teenagers from a lower socio-economic background claim that the refrigerator in their household is cleaned weekly than their wealthier counterparts. The cleaning methods employed include wiping out with a damp cloth (30%), an ineffective procedure for removal of microorganisms, washing with warm water and a kitchen spray/cream

(34%) and washing with hot water and bread soda (36%), the most effective method.

A small proportion of teenagers were able to explain how to determine when a whole chicken is thoroughly cooked. However, almost nine in ten respondents did not know, or used an unreliable or unsafe method to establish, when a chicken is fully cooked. Such methods indicated making a judgment based on the color of the skin of the chicken. Respondents made no reference to cooking time or temperature. Those from a higher socio-economic background possessed more accurate knowledge pertaining to checking whether a whole chicken is thoroughly cooked than did their lower socio-economic counterparts.

"Cross-contamination" is a term that causes much confusion among teenagers. The majority of teenagers from less privileged areas admitted that they did not comprehend the term, compared to a quarter of those from privileged areas. As prevention of cross-contamination is a very important food safety principle, awareness of how to avoid it should be emphasized when communicating information on food risks to young consumers.

CONCLUSIONS

"The degree to which handling food in the home contributes as a cause of illness remains unknown" (6). This is relevant in an Irish context, where under-reporting of foodborne illness is thought

to be extensive (4). It is necessary to increase the level of food safety knowledge that exists among the teenage population and instigate a positive change in behavior, to curb the occurrence of foodborne illness in the domestic setting. Today's teenagers are tomorrow's adults and inevitably will have a similar influence on their children as their own parents had on them, unless the cycle of poor food handling practices is interrupted.

Effective risk communication is important to educate and inform the public of good food hygiene practices in the home. Increased awareness of the effects of foodborne illness on the individual, the family and ultimately on society is vital, as people need to be motivated to change their behavior. A precursor to changing behavior is initiating a change in attitudes, and the results of this study indicate that the general attitude of the teenage population toward food safety is positive. Food safety issues that necessitate particular attention in the home to prevent food poisoning include food transport, storage, handling, preparation, cooking, reheating and kitchen hygiene. Teenagers may respond more affirmatively to simple messages communicated in a manner that is easy to remember and understand.

Food safety should be considered a basic and essential life skill, necessary for survival, particularly of vulnerable population groups. Food safety should be incorporated into the education system at both primary and secondary level as a compulsory module, so as to ensure that all young consumers are exposed to food safety principles and recommended food-handling practices. A solid base of food safety knowledge would be developed

that could be built upon in the future, eventually infiltrating the entire population. Food safety needs to be marketed as an issue that is relevant and important to young consumers, and their interest needs to be captured to aid retention of food safety information. Effective education is the key to changing attitudes toward food safety and consequently reducing the incidence of foodborne illness in the home.

When designing food safety education programs, the socio-economic background of the target group ought to be taken into consideration. This enables the program to be tailored to the needs of the information recipients, thereby increasing the probability that the knowledge will be successfully imparted to and implemented by the group.

Further study is required in this area, to assess actual behavior as opposed to reported behavior of teenagers in relation to food-handling practices. Observational studies would provide a greater insight into the real behavior and attitudes of young consumers in their homes. Also, research into the particular dietary habits of teenagers would facilitate the development of food safety guidelines relevant to young people.

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IAFP 2005 Snapshots

Baltimore is city of history, culture and charm! Baltimore is also a city which welcomed 1,774 attendees for IAFP 2005. Attendees had the opportunity to attend the leading food safety conference and explore the sights and sounds of Baltimore.

It takes everyone to make the Annual Meeting the premier Meeting it is today.

Over 105 companies showcased their products and services in the exhibit hall and several companies stepped forward and sponsored many of the events that would not have been possible without their support. Thanks to each of you for making IAFP 2005 an astonishing success!

Many attendees took advantage of workshops preceding IAFP 2005. A two-day workshop on Epidemiology and Foodborne Illness provided participants with a better understanding of how foodborne disease is recognized and investigated. Other attendees participated in a Statistics workshop covering the basic statistical concepts and a practical application using HACCP validation and

microbiological testing assurances of meat quality as examples. The Statistics participants were then given the choice of two workshops for their second day, one on Selection and Verification of Methods and the other on Trending Data. The workshop participants each took home a binder filled with information for future reference.



Networking opportunities were abundant throughout the Meeting. On Saturday evening new Members and first time attendees were welcomed to the conference and introduced to several leaders from within the Association. The Affiliate representatives and officers also kicked off the meeting on Saturday with an educational

session and reception.

Standing Committees, Special Committees and Professional Development Groups (PDGs) met throughout the day on Sunday. Minutes from these meetings can be found starting on page 897. If you are not currently involved in one of these Committees or PDGs, we encourage your involvement. Contact the Association office to get involved!





Sunday evening attendees were welcomed to Baltimore by the Capital Area Food Protection Association. A special

thanks to Jill Snowdon and the entire CAFPA crew for their hospitality and assistance throughout the meeting.

Gale Prince, Foundation Committee Chairperson then gave an IAFP Foundation update at which time he challenged the audience to donate to the Foundation. He pledged to personally match

up to \$1,000 in contributions, which was easily achieved, thanks to each



of you who donated. We still have a ways to go to reach our goal of \$1,000,000 in 2010, but each contribution pushes us a step closer.

This year the Foundation funded the first IAFP Student Travel Scholarship Awards. Stephen Grove, University of Tasmania and Brooke Whitney, Virginia Tech were the



honored recipients. With the growth of the Foundation, more Scholarships will be made available in future years.

Following the Scholarship presentation, six individuals were honored as IAFP Fellows. Fellows are individuals who have contributed to IAFP and its affiliates with distinction over an extended period of time. Please refer to page 842 for a listing and biographies of these individuals. Congratulations!



The prestigious Ivan Parkin Lecture was delivered by Dr. Douglas L. Archer,

Professor and Past Chair Food Science and Human Nutrition Department, University of Florida. His presentation was titled *Food Safety 2005: Results Come Easy – Answers are Elusive*. The attentive audience then enjoyed the Cheese and Wine reception sponsored by Kraft Foods. It was a night filled with business



and pleasure as attendees young and old gathered to enjoy the start of IAFF 2005.

Monday through Wednesday saw attendees rushing from session to session. Topics ranged from Microbiological Predictive Models to Produce Packinghouse Sanitation. See the write-ups on page 870 for a summary of these sessions prepared by the student monitors. Abstracts are also available on the IAFF Web site.

Student participation in the Annual Meeting has flourished over the past few years. Once again the students assisted as room monitors for each

session, had a booth in the foyer where they sold polo shirts and t-shirts and hosted the job fair.

These are our future leaders and we value their assistance in the IAFF Annual Meetings. They also held their

second annual Student Mixer which was a huge success!! Please encourage students you know to become active in IAFF and stay active as they pursue a career in food safety. They will make life-long friends, increase their knowledge and have fun at the same time.

The Annual Business Meeting was held Tuesday at 12:15 p.m. Kathy Glass gave a report on the accomplishments and activities of the Association over the past year. The Standing Committees gave brief reports and Stephanie Olmsted reported on Affiliate activity. Roger Cook had the honor of

accepting the charter for the newly formed New Zealand Association for Food Protection. But this did not conclude the affiliate activities, the Florida Association for Food Protection once again came forward in their creative way and presented the Foundation with a \$1,000 check. Thank you FAFP! Minutes from the Annual Business Meeting can be read on page 894.

This year's John H. Silliker Lecture was delivered by Dr. Michiel van Schothorst, Retired Vice President, Food Safety Affairs, Nestle, Vevey, Switzerland. His presentation

was titled *Managing the Safety of Food in International Trade*. A very special thanks goes to John Silliker and Silliker Inc. for making this possible. A sum-

mary of this lecture is on page 863 of this issue.

Evenings were time to take a break from work and enjoy Baltimore. This year's Monday Night Social was a harbor cruise aboard the Bay Lady. The cruise traveled across the harbor and along the Patapsco River. It was a perfect evening and concluded with a beautiful nighttime view of the city skyline.

Wednesday evening the meeting concluded with the Awards Banquet. Several deserving Members were honored for their contributions in the field of food safety. The award winners are listed on page 842. While looking through these awards we encourage you to think of



other deserving individuals and submit nominations for IAFP 2006 Awards.

The Banquet concluded with Kathy Glass passing the gavel to incoming President Jeffrey Farber. We thank Kathy for her leadership during her year as President and welcome Jeff as our new President.

We received several excellent comments in regards to IAFP 2005. A survey was sent to all attendees following the meeting. From this survey 95% of respondents said the scientific

program was excellent or good value to them. One comment stated, "I want to commend the Program Committee for an outstanding program." The Program Committee can take great pride in these results. A special thanks to Chair Catherine Donnelly and the committee for putting together an excellent program.

We also want to thank our Exhibitors and Sponsors, see pages 924 and 931 respectively. Without their support the meeting would not be what it is today. So please review the Sponsorship and Exhibitor listings and take time to thank these companies if you get a chance. We truly appreciate their support!

We hope that the knowledge you gained and the contacts you made are beneficial to you all year long. We look forward to seeing everyone at IAFP 2006 in Calgary, Alberta, Canada. Mark your calendars today – August 13–16, 2006!



IAFP 2005 Award Winners



DuPont receives the IAFP 2005 Black Pearl Award. F & H Equipment Company and Wilbur Feagan sponsor the award.

BLACK PEARL AWARD

DuPont

Wilmington, Delaware

Each year, the International Association for Food Protection honors a single company with its most prestigious award, "The Black Pearl," in recognition of that company's efforts in advancing food safety and quality through consumer programs, employee relations, educational activities, adherence to standards and support of the goals and objectives of IAFP. The recipient of the 2005 Black Pearl Award is DuPont.

DuPont was founded in 1802, and today operates in more than 70 countries. The company's vision is to be the world's most dynamic science company, creating sustainable solutions essential to a better, safer, healthier life for people everywhere.

An ability to adapt to change and a foundation of scientific inquiry has enabled DuPont to become one of the world's most innovative companies. Yet in the face of constant change and discovery, the company's core values have remained the same: high ethical standards; treating people with respect; and commitment to safety, health and the environment.

In 1811, DuPont established its first safety rules, and today is recognized globally for world-class manufacturing safety. The company's pervasive focus on safety, combined with the breadth of its offering to the food industry, makes it a natural champion of food safety. DuPont's food safety story begins with a seed and ends on the grocery store shelf. It encompasses a company-wide commitment to delivering safe food solutions at every link

in the food value chain, to provide benefits to people around the world.

DuPont's offering includes high performing seeds, crop protection products, food packaging solutions, surfaces, refrigeration, analytical solutions, food safety consulting, ingredient technology, food processing clean and disinfect solutions, and other technologies and services. Through these businesses, DuPont provides the food industry with the power of science, supporting its ability to provide consumers with safe, affordable products.

FELLOW AWARD

Fellows are professionals who have contributed to IAFP and its affiliates with distinction over an extended period of time. These individuals received a distinguished plaque in recognition of this prestigious award.



Jenny Scott, Stan Bailey, Susan Sumner, Joseph Frank, Gale Prince, and Robert Brackett receive the IAFP Fellow Award.

Dr. J. Stan Bailey
Athens, Georgia

Dr. J. Stan Bailey is a research microbiologist at the USDA, Agricultural Research Service where he has authored or coauthored over 500 scientific publications in the area of food microbiology. Dr. Bailey has a B.S. degree in environmental health sciences, M.S. degree in food science and Ph.D. in poultry science all from the University of Georgia. He is also an adjunct professor at

Kansas State University and the University of Georgia.

Dr. Bailey's awards include: Outstanding Senior Research Scientist for the USDA, Agricultural Research Service, 2002; IAFP Maurice Weber Laboratorian Award, 2003; USDA, Technology Transfer Award, 1996; the Poultry Science Association Broiler Research Award, 1994 and Poultry Products Research Award, 1992.

Dr. Bailey served as Chairperson of the Food Microbiology Division of the American Society for Microbiology in 1992 and has been a Fellow of the American Academy of Microbiology since 1994. He has been an active Member of IAFP since 1987 and served as Chairperson of the Poultry Safety and Quality Professional Development Group from 1993 to 1995. Dr. Bailey served on the Program Committee and as the Chairperson in 2001. Most recently, Dr. Bailey was elected Secretary for IAFP in 2005.

Dr. Robert E. Brackett
College Park, Maryland

Dr. Robert E. Brackett is the Director of the Center for Food Safety and Applied Nutrition (CFSAN) at the Food and Drug Administration (FDA). In this capacity, he provides executive leadership to the Center's development and implementation of programs and policies relative to the composition, quality, safety, and labeling of foods, food and color additives, dietary supplements and cosmetics.

Prior to his appointment, he was Director of Food Safety and Security within CFSAN. In addition to coordinating new food safety programs and addressing food safety policy issues within FDA, Dr. Brackett represents CFSAN on scientific issues related to transmissible spongiform encephalopathies and counterterrorism efforts, and maintains an ongoing research program on foodborne pathogens.

Prior to coming to FDA, Dr. Brackett was a Professor of Food Science and Technology in the Center for Food Safety at the University of Georgia where he was an active researcher in the area of food microbiology, specializing in microbiological safety of foods.

Dr. Brackett is a member of several professional societies and has served as a member of editorial boards. He has published more than 200 scientific publications and has presented numerous presentations at national and international scientific meetings, as well as through various industry groups.

Dr. Brackett has received numerous awards for his contributions and achievements. He received

the Department of Health and Human Services Secretary's Award for Distinguished Service, 2003; FDA Group Recognition Award, Member of the FDA Obesity Working Group, 2004; FDA Commissioner's Special Citation, Member of the FDA TOPOFF2 Exercise Team, 2004; FDA Award of Merit, Member of the *Listeria monocytogenes* Risk Assessment Group, 2004; and the Terrorist Threat Integration Center award of Exceptional Service, 2004.

Dr. Brackett received his B.S. degree in bacteriology and his M.S. degree and Ph.D. in food microbiology, all from the University of Wisconsin-Madison.

Dr. Joseph F. Frank
Athens, Georgia

Dr. Joseph F. Frank is the son of a Wisconsin cheese maker. As a teen and throughout college he gained valuable knowledge of the food industry and an appreciation of good sanitation practices by working for his father as a cheese and butter maker. Dr. Frank earned a B.S. degree in bacteriology from the University of Wisconsin-Madison, and then earned M.S. and doctoral degrees in Food Science with specialization in food microbiology working under the direction of Dr. Elmer Marth at Wisconsin.

After a year of post-doctoral training with Dr. George Somkuti at the USDA-ERRC, Dr. Frank accepted a faculty position at the University of Georgia with teaching and research responsibility in dairy microbiology. He is currently a professor in the Department of Food Science and Technology at this university and teaches food microbiology and fermentations. His research interests include the control of *Listeria monocytogenes* in food processing environments, inactivation of biofilms, and exocellular polysaccharide production by yogurt cultures.

Dr. Frank has been active in IAFP since 1974 and is a founding member of the Georgia Association for Food Protection. He has been active in association affairs, serving as chairman of the *Journal of Food Protection* Management Committee, and assisting with Annual Meeting arrangements when IAFP has met in Atlanta. Dr. Frank is currently scientific co-editor for the *Journal of Food Protection*.

Mr. Gale Prince
Cincinnati, Ohio

Apioneer in retail food safety with 38 years of experience in the field, Mr. Gale Prince is noted for his contribution in the advancement of food safety in all segments of the food industry.

Mr. Prince earned his BS degree from Iowa State University and began his food safety career at the Eisner Food Store division of the Jewel Companies before joining The Kroger Co. in 1979 as Corporate Director of Regulatory Affairs. He is involved in product safety involving all products offered for sale in Kroger retail stores nationwide or made in the company's 42 food manufacturing plants.

During his industry career, Mr. Prince has compiled a lengthy record of service with a variety of industry, government and technical organizations. He is Past President of the International Association for Food Protection (IAFP) and is currently Vice Chairman of the IAFP Foundation. He is past Treasurer and currently on the Board of Trustees of the Association of Food and Drug Officials Endowment Foundation, and serves on the Food Allergen and Anaphylaxis Network Advisory Council.

For the past 25 years, Mr. Prince has served on the Food Marketing Institute (FMI) Food Protection Committee as well as the American Bakers Association Food Technical and Regulatory Affairs Committee. He serves on the Ohio Retail Food Safety Council and was a member of the Board of Directors of the United Fresh Fruit and Vegetable Association from 2000 to 2004. Mr. Prince also serves on the various committees of the International Dairy Foods Association and has served as Chairman of the NCIMS Council III dealing with Application of Conference Agreements and also served as the Chairman of the CFP Council III dealing with Science and Technology. Mr. Prince served on the United States Department of Justice Drug Enforcement Agency's Suspicious Orders Taskforce and also served on the IFT task group on evaluating the parameters for the definition of potentially hazardous food. Since September 11, 2001, he has served on various groups working on national food defense issues.

As a recognized food safety expert, Mr. Prince is a frequent speaker at food industry meetings and public forums in the United States and Canada. He was the driving force behind the development of the retail food industry's "FightBAC!" program on food safety training, and conducted the industry's first food store manager certification program.

Ms. Jenny Scott
Washington, D.C.

Ms. Jenny Scott is Senior Director in the Office of Food Safety Programs at the Food Products Association (FPA) (formerly the National Food

Processors Association) in Washington, D.C., where she has held a variety of positions since 1980. FPA is a not-for-profit trade association that represents the food processing industry on scientific and public policy issues involving food safety, food security, nutrition, technical and regulatory matters, consumer affairs and international trade. Ms. Scott is responsible for providing expertise and guidance on issues and policies related to microbial food safety and HACCP, as well as technical assistance and crisis management related to FPA member problems.

Ms. Scott received an A.B. degree in biology from Wellesley College, an M.S. degree in bacteriology from the University of Wisconsin, and an M.S. degree in food science from the University of Maryland. She has published numerous research papers and book chapters in the areas of microbial food safety and food processing. She has been active in professional associations such as the American Society for Microbiology, the Institute of Food Technologists and the International Association for Food Protection, where she was President in 2000 to 2001. Ms. Scott serves on the US delegation to the Codex Committee on Food Hygiene and has recently completed her first term on the National Advisory Committee on Microbiological Criteria for Foods.

Dr. Susan S. Sumner
Blacksburg, Virginia

Dr. Susan S. Sumner is currently professor and department head of the food science and technology department at Virginia Tech. She received her M.S. degree and Ph.D. in food science from the University of Wisconsin, and her B.S. degree in food science from North Carolina State University. Dr. Sumner was a project microbiologist for the National Food Processors Association and an assistant/associate professor in the food science department at the University of Nebraska prior to joining the Virginia Tech faculty in 1996. She became department head in 2000.

Dr. Sumner has received over \$8 million of grant funding to support her research and extension programs in food safety. She has taught courses in food microbiology, quality assurance, and food product development; and has conducted industry workshops in the area of sanitation, basic food safety and food microbiology, and HACCP. She has served as panel manager for the USDA NRI competitive grants food safety program and has served on many grant review panels. Dr. Sumner has been a panel member of two National Academy of Science special food safety review teams. She is an active member of IAFP, IFT, Phi Tau Sigma, and Sigma Xi.



Ron Case (left), Wilbur Feagan, John Silliker, and Paul Nierman (accepting for Roy Ginn) receive the IAFP 2005 Honorary Life Membership Award.

HONORARY LIFE MEMBERSHIP AWARD

This prestigious honor is awarded to long-time IAFP Members for their dedication to the high ideals and objectives of IAFP and for dedicated service to the Association.

Mr. Ron Case Dandridge, Tennessee

Mr. Ron Case has been an active member of IAFP since 1978. He was President of IAFP in 1990. He received the Harold Barnum Industry Award in 1992 and the President's Recognition Award in 2001. Mr. Case has served on many IAFP committees and is currently Chair of the Constitution and Bylaws Committee. He was instrumental in establishing the Black Pearl Award which was first awarded in 1994. He is a member of the Tennessee Affiliate and Honorary Life Member of the Illinois Affiliate. Many members will recognize Mr. Case as the man with the camera. He has spent the last few years providing a pictorial history of IAFP's Annual Meeting.

Mr. Case received his A.B. degree in science education from the University of Kentucky and an M.S. degree in chemistry from the University of Notre Dame. He taught high school science and math before entering the food profession. Mr. Case spent 25 years in quality and food safety management with Kraft Foods and Papetti's of Iowa. He is one of the pioneers in food laboratory automation and computerization. He served on the Technical Committee for two editions of *Standard Methods*

for the Examination of Dairy Products and served as a member of the International Joint Committee of Dairy Experts. Mr. Case was an original member of the Board of Directors of the AOAC Research Institute and worked for harmonization of laboratory methods among international standards groups.

Mr. Wilbur Feagan Springfield, Missouri

Mr. Wilbur Feagan graduated from the University of Illinois in 1936 with a B.S. degree in civil engineering, majoring in sanitary engineering.

Mr. Feagan began his career as a mill inspector for the St. Louis Health Department in Cabool, Missouri. This was short lived and he returned to St. Louis to assume the position of Dairy Plant Engineer to assist with compliance on the part of pasteurization plants with the US Public Health Service Milk Ordinance, which St. Louis had just adopted. Completing that assignment, he moved to Michigan as Milk Specialist with the Michigan State Health Department. When Kansas City, Missouri adopted the US Public Health Service Milk Ordinance in 1941, he returned to Missouri to assume responsibility for all ice cream and milk inspection. During World War II, Mr. Feagan coordinated the inspection work of the Health Department and the Army to assure the safe and adequate milk supply to Army posts and related needs in the Kansas City area. Following the war he left public health work to assume management of the Bonne Terre Farming and Cattle Company, a division of the St. Joseph Lead Company. Later Mr. Feagan returned to milk sanitation work with Mr. C.B. Shogren of the Klenzade Company in setting up their marketing efforts for cleaners and sanitary supplies. Seeking more active equipment exposure, he joined the Midwest Creamery and Dairy Supply as Sales Manager.

In 1959, Mr. Feagan and Paul Higley formed the F & H Food Equipment Company in Springfield, Missouri. The company, as distributors, focused on the safety and quality of dairy and food product processing. They have earned an enviable reputation and continue to seek means to improve consumer confidence and faith in our food supply working with manufacturers and processors. The Black Pearl Award, established by Mr. Feagan and F & H Food Equipment Company, is just one of the many contributions towards these efforts.

Mr. Feagan keeps active in the business, remaining as Chairman of the Board.

Mr. Roy E. Ginn Maplewood, Minnesota

Mr. Roy E. Ginn was born in McKeesport, PA in 1926 to Edgar and Isabella Ginn. His heritage goes back to George Souel, a cabin boy on the Mayflower. In 1944 he joined the Army Air Force and spent six months in occupation in Germany. The GI Bill gave Mr. Ginn the opportunity to graduate from Penn State with a B.S. degree in dairy husbandry. While at PSU he married Martha Kornmann and they had four children.

Mr. Ginn's first job was with the Federal Milk Market Administration of Philadelphia. He moved on to Sealtest in Pittsburgh where he became Production Superintendent. After seven years with Sealtest, Mr. Ginn owned and directed the Pittsburgh Control Laboratory for five years. In 1965 he managed the Quality Control Committee Laboratory in St. Paul, MN, which he incorporated into Dairy Quality Control Institute. In 1987 he founded and incorporated DQCI Services and designed a new laboratory.

Over those 26 years, Mr. Ginn and Vernal S. Pakcard, Ph.D., published 28 papers on laboratory procedures. Mr. Ginn served on the IAFP Laboratory Committee, Chairman of the NCIMS Laboratory Committee and also served on the NCIMS Board. He was Secretary/Treasurer of the Minnesota Sanitarians and served on the National Mastitis Council. In 1987 Mr. Ginn became President of IAFP and established the first exhibit program in conjunction with the Annual Meetings. He retired from the dairy industry in 1991.

Dr. John H. Silliker Crown Point, Indiana

Dr. John H. Silliker is the founder of Silliker, Inc. and a preeminent food microbiologist internationally renowned for his *Salmonella* research. A 1950 graduate of University of Southern California with a Ph.D. in bacteriology, he worked for Swift and Company from 1953 to 1962. Prior to leaving the Chicago-based company, he attained the position of Chief Microbiologist and Associate Director of Research.

Hoping to open his own laboratory, Dr. Silliker joined the pathology department of St. James Hospital in south suburban Chicago Heights, IL, and moon-lighted as a food safety consultant. Encouraged by the success of his consulting business, he left St. James in 1967 and opened Silliker Laboratories in a nearby two-floor building.

Under his leadership, Silliker Laboratories grew exponentially over the next decade opening locations throughout North America. As his

namesake organization flourished, Dr. Silliker, already a tireless member of numerous industry associations, intensified his commitment to making contributions to food safety outside the confines of his laboratory.

The author of over 80 published articles, Dr. Silliker served on the International Commission on Microbiological Specifications for Foods (ICMSF) and other highly influential scientific committees. For his six decades of contributions, many organizations have recognized his exemplary service and accomplishments. Examples include: the Institute of Food Technologists, Fellow; American Academy of Microbiology, Fellow; NSF International, Lifetime Achievement Award in research; and the International Association for Food Protection, Harold Barnum Industry Award.



IAFP President Kathleen Glass and John Ferraro (right), Zep Manufacturing, Inc. present Harold Bengsch with the 2005 Harry Haverland Citation Award. Zep Manufacturing Co. sponsors this award.

HARRY HAVERLAND CITATION AWARD

Mr. Harold Bengsch Springfield, Missouri

Mr. Harold Bengsch is this year's recipient of the Harry Haverland Citation Award for his years of dedication and devotion to the Association and its ideals and objectives.

Mr. Bengsch retired in March 2004 after 45 years of continuous service in the field of public health. The last 20 years were spent serving as Director of the Springfield/Greene County, Missouri, Department of Public Health and Welfare.

Mr. Bengsch's Membership in IAFP began in 1963. During his more than 40 years of involvement, he served on numerous work groups, has chaired and continues to serve on the editorial board for *Food Protection Trends*, and served the Association as President in 1994 while also serving his Missouri Affiliate as President. In 1977 he was

recipient of the IAFP Sanitarian Award. Mr. Bengsch has authored or co-authored 17 articles on public health, some of which have appeared in the *Journal of Food Protection*, and is recipient of numerous national and state awards.

He and his wife Darlene will celebrate their 48th wedding anniversary on August 29 of this year. They have two daughters who, as children, always accompanied them to the IAFP meetings.

Two days after his retirement in 2004, Mr. Bengsch filed papers to run for the office of Greene County Commissioner and was elected to that position in the November general election.



IAFP Vice President Frank Yiannas presents Catherine Nnoka with the 2005 Harold Barnum Industry Award. Nasco International, Inc. sponsors this award.

HAROLD BARNUM INDUSTRY AWARD

Ms. Catherine Nnoka
Washington, D.C.

Ms. Catherine Nnoka is the recipient of the Harold Barnum Industry Award for her dedicated and exceptional service to IAFP, the public, and the food industry.

Ms. Nnoka joined the International Life Sciences Institute (ILSI) in 1989. Currently, as Associate Director and Program Head for the food safety program at ILSI North America, she is responsible for directing and expanding the organization's food safety programs and creating new opportunities to improve public health in this area.

During her tenure with ILSI, Ms. Nnoka has planned and organized a broad range of programs and projects to address a variety of food safety and nutrition issues. At one time, she also managed the Allergy and Immunology Institute of ILSI, working with physicians and research scientists on a grant

program to support basic research on food allergy and efforts to improve public education and awareness of allergic diseases. Collaborations with national and international organizations and government agencies and funding basic scientific research to address key questions have been crucial components of her work.

Ms. Nnoka's affiliation with IAFP began in 1993 with the first series of Annual Meeting symposia sponsored by the ILSI North America Technical Committee on Food Microbiology. As a result of this collaboration, 35 international symposia on significant and emerging global issues in microbial food safety have been offered to IAFP Members. Through her efforts, the two organizations also collaborated on the 1998 Conference on Microbial Data Collection and Application and the 2001 Workshop on Biological and Chemical Agents of Terrorism in Food, and has several more joint projects planned for 2005.

Ms. Nnoka is an active IAFP and Local Affiliate Member who has served on a number of committees. She is currently Vice Chair of the Food Toxicology and Food Allergen Professional Development Group and a member of the 2005 Annual Meeting Local Arrangements Committee. She received an IAFP Presidential Recognition Award in 2001 and a Special Citation Award from the Director of FDA's Center for Food Safety and Applied Nutrition in 2005. Educated in the United States and abroad, Ms. Nnoka is a magna cum laude graduate of Georgetown University and a member of Phi Beta Kappa.



IAFP Secretary Gary Acuff (left) and Fritz Buss, Nelson-Jameson, Inc. present Christine Bruhn with the 2005 Educator Award. Nelson-Jameson, Inc. sponsors this award.

EDUCATOR AWARD

Dr. Christine M. Bruhn
Davis, California

Dr. Christine M. Bruhn is this year's recipient of the Educator Award. This award recognizes an IAFP Member for dedicated and exceptional contributions to the profession of the educator.

Dr. Bruhn has expertise in consumer behavior, food science, and consumer economics. Her program focuses on the interface between the consumer and the food industry. Dr. Bruhn's research is directed toward consumer attitudes, knowledge and practices related to food safety and quality. She has investigated consumer attitudes toward food processing innovations, such as food irradiation, biotechnology, and non-thermal technologies, food handling practices, attitudes toward pesticide residues, and effective message development.

Dr. Bruhn's programs for the food industry and policy makers highlight consumer trends, identify areas of concern, and describe consumer response to information. Outreach for the public, funneled through the media and health educators, describes consumer trends, explains food safety and quality issues, and provides science-based information on areas of consumer concern and misinformation.

In addition to the International Association for Food Protection, Dr. Bruhn is a member of the American Dietetic Association, California Nutrition Council, Institute of Food Technologists (IFT), Institute of Food Science and Technology (United Kingdom), Phi Tau Sigma Honorary Society, and the Society for Nutritional Education.

She serves on the Executive Committee of IFT, chaired the Food Science Communicators and the Nutrition Division, and served as a Distinguished Scientific Lecturer from 1992 to 1997 and 2002 to 2003. Dr. Bruhn is a Fellow of IFT and IFSFT (UK) and delivered the Ivan Parkin Lecture in 1998 at IAFP's Opening Session.



Cayce Warf, Ecolab, Inc., Food and Beverage Division (left) and IAFP President-Elect Jeffrey Farber (right), present Steven Sims with the 2005 Sanitarian Award. Ecolab, Inc., Food and Beverage Division sponsors this award.

SANITARIAN AWARD

Mr. Steven T. Sims
College Park, Maryland

Mr. Steven T. Sims is the recipient of the Sanitarian Award. This award honors an IAFP Member for his dedicated and exceptional service to the profession of sanitarian, serving the public and the food industry.

Mr. Steven T. Sims started work in the dairy field 47 years ago in 1958 when he began milking cows for his neighbor. He worked his way through high school working on that dairy farm and through college working in a Grade "A" milk plant. He has been a State regulator, and served as chief of Utah State's milk safety programs.

Mr. Sims currently serves on the Milk Safety Team as a peer-reviewed national expert in technical aspects of milk and milk product safety. In this position he has represented FDA on numerous NCIMS committees. He has served as chairman of what was then the IAMFES Farm Methods Committee and during their transitions to the Dairy Quality and Safety Committee and then to the Dairy Quality and Safety Professional Development Group. Mr. Sims represents FDA on the 3-A Sanitary Standards Steering Committee.

He has served as the Public Health Service Signatory for sanitary equipment standards and sanitary practices (over 70 current 3-A Sanitary Standards and Sanitary Practices bear his signature). Under the new 3-A structure, he will represent FDA on the consensus body that will accept future 3-A sanitary equipment standards and sanitary practices. Routinely he represents FDA in many ongoing projects that are precedent setting and often politically sensitive. He is a

nationally recognized expert and trainer and currently serves as lead US negotiator in US/Canadian equivalency discussions for "Grade A" milk products.

Mr. Sims first joined IAFP in 1978 and with a brief exception has been a Member since that time. He has provided articles to *Food Protection Trends* and has presented at several IAFP Annual Meetings, including this year's meeting.



Fred Weber, Weber Scientific (left) and IAFP President-Elect Jeffrey Farber (right) present Vijay Juneja with the 2005 Maurice Weber Laboratorian Award. Weber Scientific sponsors this award.

MAURICE WEBER LABORATORIAN AWARD

Dr. Vijay K. Juneja
Wyndmoor, Pennsylvania

Dr. Vijay K. Juneja is this year's recipient of the Maurice Weber Laboratorian Award. This award honors Dr. Juneja for his dedicated and exceptional contributions in the laboratory, and it recognizes his commitment to the development and/or application of innovative and practical analytical approaches in support of food safety.

Dr. Juneja is a Supervisory Microbiologist in the Microbial Food Safety Research Unit at the Eastern Regional Research Center (ERRC) of the Agricultural Research Service (ARS) branch of the United States Department of Agriculture (USDA) in Wyndmoor, PA. Dr. Juneja received his Ph.D. in Food Technology and Science from the University of Tennessee in 1991. Soon after receiving his Ph.D., he was appointed Microbiologist at the ERRC-USDA.

Dr. Juneja has developed a nationally and internationally recognized research program on food-borne pathogens, with emphasis on microbiological

safety of minimally processed foods, and predictive microbiology. He is a co-editor of the three books including the one entitled, *Control of Foodborne Microorganisms* and serves on the Editorial Board of the *Journal of Food Protection*, *Foodborne Pathogens & Disease* and *International Journal of Food Microbiology* and also, serves as an associate editor for the 'Food Microbiology and Safety Section', of the *Journal of Food Science*.

Dr. Juneja is recipient of several awards including the ARS, North Atlantic Area (NAA), Early Career Research Scientist of the Year, 1998; ARS, NAA, Senior Research Scientist of the year, 2002; and the USDA-ARS Certificate of Merit for Outstanding performance, 2004. Dr. Juneja's research program has been highly productive, generating over 110 publications including 70 peer-reviewed articles, plus 105 abstracts of presentations at national and international scientific meetings, primarily in the area of food safety and predictive microbiology.



IAFP President Kathleen Glass and Leon Gorris, Unilever, (right) present Servé Notermans with the 2005 International Leadership Award. Unilever, Safety and Environmental Assurance Centre sponsors this award.

INTERNATIONAL LEADERSHIP AWARD

Dr. Servé Notermans
Bilthoven, The Netherlands

Dr. Servé Notermans is this year's recipient of the International Leadership Award. This award is presented to Dr. Notermans for his dedication to the high ideals and objectives of IAFP and for promotion of the mission of the Association in countries outside of the United States and Canada.

Dr. Notermans began his scientific education at the Wageningen University, The Netherlands in 1967. In 1972 he graduated both in food technology and food microbiology and finished his Ph.D. study in food microbiology in 1975. Following, he was employed as food microbiologist by the National Institute of Public Health and TNO Nutrition. Recently he founded the international organization 'Food Doctors' and became visiting professor at the Lancashire University (UK).

The research activities of Dr. Notermans are primarily directed to food safety. Foodborne diseases, preservation, HACCP and risk analysis are spearheads of his activities.

His international activities include cooperation with many microbiological societies including IAFP and the UK Society for Applied Microbiology (SFAM). Dr. Notermans has organized many international scientific meetings. He was a member of the 'Workgroup on Microbiology' of the European Scientific Committee for Food and has been elected as Vice-Chair of the scientific panel on Biological Hazards of the European Food Safety Authority. He is also active in ILSI-Europe, ILSI-Korea, WHO/FAO and volunteers as an expert in developing countries.

Dr. Notermans is Editor or Co-editor of scientific journals including *Journal of Food Safety*, *Food Microbiology* and *International Journal of Food Microbiology*. He is Editor-in-Chief of the Dutch Newsletter, *Food Safety*. Dr. Notermans is first author of over 330 scientific papers.



Berne Hapke, 3M Microbiology (left) and IAFP Vice President Frank Yiannas (right) present Mohammed Heydari and David Ludwig from the Maricopa County Environmental Services Department with the 2005 Food Safety Innovation Award. 3M Microbiology sponsors this award.

FOOD SAFETY INNOVATION AWARD

**Maricopa County Environmental
Services Department, Environmental
Health Division
Phoenix, Arizona**

Maricopa County Environmental Health Division is the recipient of this year's Food Safety Innovation Award. This award is presented to an individual or organization for creating a new idea, practice, or product that has had a positive impact on food safety, thus, improving public health and the quality of life.

Maricopa County was designated (born) in 1871 named after the Maricopa Tribe that resided in the Arizona Territory. The county grew and began its professional career as a part of a new state in 1912. Territorial and county doctors proceeded the county health department that was established in the early 1960s when several municipal health departments combined. In 1993, the Environmental Services Department graduated away from the Public Health Department as a separate department.

The Environmental Health Division has 110 professionals who ensure the safety of the food supply in Maricopa County. As the 4th most populous county in the United States, these professionals regulate 28,000+ permits based out of four regional offices. The International Association for Food Protection's Food Safety Innovation Award is the crown jewel of recent awards received; others include the 2001 Samuel J. Crumrine Award and Seven NACo Food Safety Awards (1997 to 2004).

Maricopa County is honored in being the first recipient of this award.



Gale Prince, Foundation Committee Chairperson presents Brooke Whitney and Stephen Grove with the 2005 IAFP Student Travel Scholarship Award. The IAFP Foundation sponsors this award.

STUDENT TRAVEL SCHOLARSHIP AWARD

Student Travel Scholarships are awarded to full-time students enrolled in a college or university food safety related program. These students have demonstrated an interest in and commitment to food safety and quality. The IAFP Foundation Fund provides funding for these scholarships, which were developed to encourage students to participate in Association activities.

Mr. Stephen F. Grove
University of Tasmania
Werribee, Victoria, Australia

Mr. Stephen F. Grove graduated from RMIT University (Australia) in 2001 with a Bachelor of Applied Science (applied biology/biotechnology) with distinction. He was introduced to the area of non-thermal food processing the following year during his honors research project studying the effects of ultrasonics on *Campylobacter* species. The research was carried out in collaboration between RMIT University and Food Science Australia, a joint venture between the Commonwealth Scientific and Industrial Research Organization (CSIRO) and the Victorian Government.

Mr. Grove's interest in non-thermal processes continued with his Ph.D. candidature in the School of Agricultural Science at the University of Tasmania (Australia), again in collaboration with Food Science Australia. Currently in his third year of candidature, Stephen's research, entitled, "The use of high pressure processing for enhancing the safety and quality of Australian shellfish," is supervised by Dr. Alvin Lee, Dr. Cindy Stewart, Dr. Tom Lewis and Professor Tom McMeekin. The aim of the research is to develop a high pressure processing inactivation model for the hepatitis A virus that may be applied during shellfish processing, and to improve the methods of detection and quantitation of human enteric viruses from contaminated shellfish. Funding has been provided by Avure Technologies and the Australian Food Safety Centre of Excellence as well as a University of Tasmania Strategic Research Scholarship in Science and Health Science.

Ms. Brooke M. Whitney
Virginia Tech
Blacksburg, Virginia

Ms. Brooke M. Whitney is originally from Vienna, Virginia, and received her B.S. degree in biochemistry and biology from Virginia Polytechnic Institute and State University (VPI&SU). After doing undergraduate research in both biology and biochemistry, she decided to pursue a more applied field and became interested in food microbiology.

Ms. Whitney is currently finishing her M.S. degree in food science and technology at VPI&SU. Her research studies the effect of high hydrostatic pressure in conjunction with antimicrobials on *Salmonella* and *E. coli* O157:H7 in fruit juices. She will be starting her Ph.D. degree at North Carolina State University this coming fall. After graduation, Ms. Whitney plans on working in the industry where she can apply her knowledge and experience.



Craig Henry, Food Processors Association (FPA), presents Larry Beuchat with the 2005 FPA Food Safety Award. The Food Processors Association sponsors this award.

FPA FOOD SAFETY AWARD

Dr. Larry R. Beuchat
Griffin, Georgia

Dr. Larry R. Beuchat is this year's recipient of the Food Products Association Food Safety Award. This award is presented to Dr. Larry R. Beuchat for his outstanding contribution to food safety research and education.

Dr. Beuchat earned a B.S. degree in horticulture at Penn State University. His M.S. and Ph.D. degrees in food science, with a minor in microbiology and public health, are from Michigan State University. After working in research and development at Quaker Oats Company, he joined the University of Georgia in 1972, where he is now a distinguished research professor in the Center for Food Safety and Department of Food Science and Technology.

Dr. Beuchat's current research interests include the microbiology of fruits, vegetables, and nuts; methodologies for detecting and enumerating pathogenic bacteria, yeasts, and molds in foods; metabolic stress and injury of foodborne microorganisms; relationships of water activity to microbial growth; and efficacy of disinfection and preservation technologies. He has written, edited, or co-edited five books, authored or co-authored 79 chapters or monographs, 446 refereed scientific journal articles, 182 miscellaneous scientific publications, and 477 abstracts in the area of microbiological safety and spoilage of foods.

He served as a co-editor of *Journal of Food Protection* from 1994 to 2001 and is a member of the editorial boards of *International Journal of Food Microbiology* and *Food Microbiology*. Dr. Beuchat is a Fellow of the International Association for Food Protection, American Academy of Microbiology, and the Institute of Food Technologists. He is currently a member of the National Advisory Committee on Microbiological Criteria for Foods and the Food and Nutrition Board of the National Academy of Sciences in the United States.

DEVELOPING SCIENTIST AWARDS



IAFP President Kathleen Glass with the Developing Scientist Award Winners (left to right) Kendra Nightingale, Michelle Danyluk, Kevin Allen, Insook Son, and Efstathia Papafragkou. The IAFP Foundation sponsors this competition.

Affiliate Awards



Affiliate Award Winners: (left to right) Cathy Sullivan, Missouri Milk, Food and Environmental Health Association; Malcolm McDonald, Ontario Food Protection Association; Harold Robinovitch, Metropolitan Association for Food Protection; Lorraine McIntyre and Terry Peters, British Columbia Food Protection Association; and Marjorie Jones and Rick Barney, Florida Association for Food Protection.

C. B. SHOGREN MEMORIAL

Ontario Food Protection Association

BEST ANNUAL MEETING FOR AFFILIATES

Missouri Milk, Food and Environmental Health Association

BEST EDUCATIONAL CONFERENCE FOR AFFILIATES

Florida Association for Food Protection

BEST COMMUNICATION MATERIALS FOR AFFILIATES

British Columbia Food Protection Association

MEMBERSHIP ACHIEVEMENT FOR AFFILIATES

Metropolitan Association for Food Protection



New Zealand Association for Food Protection Receives Affiliate Charter at IAFP 2005

IAFP President Kathleen Glass presents Roger Cook of the New Zealand Association for Food Protection with an Affiliate Charter.

DuPont

IAFP 2005 Black Pearl Award Winner

Wilmington, Delaware

Executive Summary

DuPont was honored with the prestigious 2005 Black Pearl Award in recognition of outstanding achievement in corporate excellence in food safety and quality. This award, which is the highest honor in the area of food safety, is presented annually by the International Association for Food Protection (IAFP).

Joining the ranks of former Black Pearl Award winners Jack in the Box, Inc.; Wegman's Food Markets; Walt Disney World Company and Kraft Foods, DuPont accepted this year's award at the Association's Annual Meeting on August 17, in Baltimore, MD.

Background: DuPont Leadership in Food Safety

At DuPont, we impact people and organizations that directly impact consumers. Our food safety story begins with a seed and ends on the grocery store shelf. It encompasses a company-wide commitment to delivering safe food solutions at every link in the food value chain, to provide benefits to people everywhere.

Safety as a Core Value

DuPont is a 201-year-old science company with a clear set of core values that guide everything we do: safety and health, high ethical standards, environmental stewardship and respect for people.

"We remain committed to the core values that have sustained us for more than two centuries," said Charles Holliday, Jr., CEO and Chief Safety, Health and Environmental Officer. "Our goal is to continue to bring science and technology to address the world's most difficult and pressing needs."

In 1811, DuPont established its first safety rules, and today the company is recognized globally for world-class manufacturing safety. DuPont's pervasive focus on safety, combined with the breadth of its offering to the food industry, makes it a natural champion of food safety.

DuPont and Food Safety

For more than two centuries, DuPont has utilized fundamental discoveries in science to create value for consumers around the globe. Nearly a century of our discovery has included a focus on agriculture and food, and today DuPont has a strategic focus on serving as a world-leading enabler of healthy, safe and affordable food.

DuPont is intricately involved in many aspects of bringing high quality, safe, and nutritious food products to consumers around the world. Its products and services have transformed the safety and healthfulness of our global food system at nearly every link in the chain. For example:

- Food safety starts on the farm, and **DuPont Agricultural Solutions** starts there as well. Pioneer Hi-Bred International, Inc., supplies quality, high performing seeds, and DuPont Crop Protection provides crop protection products and the expertise to help growers use them properly. DuPont also recently introduced Acurum™ technology to help identify grain quality more accurately and to help quantify the presence of toxins such as *Fusarium* contamination.
- In the realm of **Produce Innovations**, DuPont recently launched Sweet 'N Easy™, its first branded produce product. Several DuPont businesses collaborated to ensure the Sweet 'N Easy™ production process delivers a safe consumer product.
- In the area of **Ingredient Technology**, DuPont joined forces with Bunge Limited's North American and European ingredients operations to form a joint venture that immediately became a major player in the food industry. The Solae Company™ (Solae™) focuses on plant-based, specialty food ingredients, with a particular emphasis on soy protein, soy lecithin and soy fiber. Solae works with farmers to provide "better ingredients for better living" to customers and consumers

worldwide. Solae's integrated and proactive food safety program is designed to control or eliminate hazards along the supply chain, and its effectiveness is verified by routine product analysis.

- The **Analytical Solutions** area builds on DuPont's core strength in safety and health. DuPont Qualicon, a leader in genetics-based, rapid pathogen testing, developed the BAX® system, the most advanced diagnostic tool for detecting *Salmonella*, *Listeria monocytogenes* and *E. coli* O157:H7 in a variety of foods, helping to ensure their safety and quality. DuPont Qualicon also markets the patented RiboPrinter® system, the world's only automated DNA fingerprinting instrument that rapidly pinpoints sources of bacteria in food. Haskell™ Laboratory for Health Environmental Sciences, the world's largest industrial toxicology lab, where research is conducted to ensure the safety of products applied to agricultural crops. The DuPont™ Food Risk Assessment™ group brings DuPont safety management frameworks and the best available technologies together with Six Sigma practices to resolve challenges in food safety and quality. The group's Microbial Mapping technologies are used in a variety of food processing plants as proactive tools to prevent contamination and to assist with trouble-shooting problems.
- The **Clean & Disinfect** business within DuPont™ Chemical Solutions Enterprise supplies expertise and a variety of environmentally friendly products to help customers keep food safe. The DuPont™ Clean & Disinfect System™ provides enhanced food safety and quality from "farm to fork" delivering better efficacy and microbial kill rate for food processors. Antec International, a UK-based wholly-owned subsidiary of DuPont, was involved in supplying Virkon® as a key part of Britain's bio-security program when foot-and-mouth disease struck a few years ago.
- As part of a new initiative in **Productivity Solutions**, DuPont Food Industry Solutions has adopted technologies from other industries to meet challenges in the food industry. DuPont has installed state-of-the-art process controls and sensor

technology in food processing plants to prevent microbial and quality issues and ensure the right product goes in the right package.

- **Advanced Materials** provides products and technologies to help keep food safe and fresh. From seamless antimicrobial technology, where DuPont Corian® countertop characteristics help prevent microbial growth in food served and consumer food preparation areas, to Krytox® food grade lubricants for demanding applications, DuPont materials are found throughout the food chain.
- **DuPont Liquid Packaging Systems** has developed aseptic, extended shelf life, and pasteurized packaging systems technology that has played an important role in helping food processors deliver safe food for more than 30 years, to consumers around the world. Innovative packaging solutions have given people around the world access to safe and nutritious liquid food and beverage products.
- In the area of **Safety, Health and Environment Solutions**, we believe that poor adherence to personal safety work practices should be considered a leading indicator for adherence to practices designed for food safety. The DuPont Safety Resource Business has been working to help companies reduce the rate of injuries sustained by their people and to implement a safety culture that extends to the way companies manage food safety.
- Managing cold is a key element of managing food safety. **DuPont Cold Chain Solutions** is a major supplier to the refrigeration industry with SUVA®, a safe alternative to ammonia-based cooling. Refrigerants are used in supermarkets to preserve perishable food and in the refrigerated trucks that deliver the food.

Through these collective businesses, DuPont provides the food industry with the power of science to provide consumers with safe, affordable products.

Ivan Parkin Lecture

Results Come Easy – Answers are Elusive



By Douglas L. Archer, Ph.D.

Professor and Past Chair
Food Science and Human Nutrition Department
Institute of Food and Agricultural Sciences
University of Florida
Gainesville, Florida

ABSTRACT

Under any circumstances and in any discipline, writing a scholarly review is a daunting task. In food microbiology and ecology, it becomes more difficult when one examines carefully the myriad of methods applied to a problem, the details omitted from the methods and materials section, the lack of culture standardization, and a host of other variables that make direct comparison of any two studies nearly impossible. Single studies, however, are relatively easy to conduct, and thus the facts come easy. Historically we have had faith in the tenet that if we plate on the correct medium, we can grow and count the bacteria we want to count. In the late 1970s, the “viable-but-non-culturable” theory challenged that belief. The nature of the viable, but-non-culturable phenomenon is still hotly debated, not so much as to whether it is real as to what the mechanistic basis for its occurrence is. In either case, we have not examined food systems or the ecosystems within the entirety of the food chain with the fact in mind that we may not be seeing everything that is there. If we can’t see it, should we still worry about it? Added to the other variables often omitted from the methods and materials section, what data can we trust, and should data be collected differently in the future? This question may become more important to regulatory agencies worldwide as they strive for mutual recognition of systems and as the regulatory questions become more complex. Without giving some consideration to standardization of studies on the ecology and microbiology of the food chain, the answers are sure to be elusive.

INTRODUCTION

Those of you who are very observant may notice that the title of the talk has changed. It was originally "Facts Come Easy" but my colleague Dr. Linda Harris reminded me that there are few "facts" in science and that results are not facts nor are data facts. I have not been in the lab for many years, but hopefully, from a different perspective, and influenced by a regulatory and academic background, I can give you some food for thought. One thing I did learn as a researcher, and something which is an underlying theme of my talk this evening, is that too few observations or data points may lead to erroneous conclusions.

I struggled with this talk, as I knew in my head what I wanted to say, but I was not sure how to say it, or whether to say it at all. It is something I've thought a lot about, and believe should be done, but it could be a bit controversial. How would I suggest to colleagues that they surrender some autonomy in their research for the sake of standardization of data?

Human nature dictates that we usually believe that what we do and how we do it are probably the best ways for it to be done. We don't like to admit it, but it is generally true. Scientists have egos and great scientists have great egos. That is not a bad thing necessarily if it motivates that individual. It can become a bad thing if it interferes with that individual's unbiased thinking.

A good example of this aspect of human nature occurred when I first became department chair at Florida. We needed to decrease levels of technical support in order to balance the budget. Florida, like many land grant universities, was facing cuts from the legislature that were deep, and in some cases devastating. We needed to decrease tech support, as that was the only way we could save money other than shutting down basic services. When I put forward the proposal at a faculty meeting, virtually everyone agreed the decreasing technical support was our only option.

Subsequently, practically all faculty members with technical support met with me individually to reiterate support for the proposed reductions, so long as it was not their technician. After all, their program was different. I would not have wanted any of them to behave any differently from the way they did. They should believe that their program is the most important.

In 2000, Texas A&M, University of California-Davis, and University of Florida were awarded a USDA-CSREES Initiative for Future Agricultural and Food Systems Grant: "Improving the safety of fresh fruits and vegetables: a tri-state consortium." This was a sizeable grant, and much had been promised as deliverables over a four-year period.

It was also the first grant I was involved with that essentially mandated inter-institutional cooperation.

The first thing we did was to look over the promised deliverables and attempt to split up the work. The first promised deliverable was a survey of citrus, tomatoes, cantaloupe, strawberries, and parsley for pathogens. Some of these commodities were fairly exclusive to one state, others are produced by all three states. All had been linked to outbreaks of foodborne illness. We had to decide which state would do which commodities, and we based this on production and experience.

My original view of the move by the Federal government to encourage multi-institutional grants was not a positive one. I thought that using the grant mechanism to force these intellectual shotgun marriages was the equivalent of academic extortion. Schools have individual pride; each thinks it is the best. It's important that they do, as it gives them an edge. In food safety, each school thinks that it invented any and all methods worth using and that it can do anything required better than the next guy can. I'll jump ahead a bit and tell you that I was wrong, and multi-institutional, inter-institutional grants are a vital part of getting answers to the important questions.

The fun began. We had a face-to-face meeting in October 2000 in Orlando to discuss how we could accomplish the sixteen major projects, and the countless other sub-projects encompassed by the grant, and obtain data that were directly comparable and useful. There were four major themes, Epidemiology and Surveillance, Microbial Growth and Contamination, Intervention Strategies, and Educational Materials and Delivery Systems.

So, three schools tried to agree on one standard set of procedures for sampling, handling, and testing, for *Salmonella* and *Shigella* and, for the purposes of the first-year's survey of the commodities, *Escherichia coli*. We were sampling not only the produce item, but soil and water from the growing fields and the nearby environment as well.

Everyone had his/her own "secret ingredient" for the best growth medium for a particular organism; for example, we had the Suresh Pillai McConkey agar with a dash of salsa; we had the Keith Schneider EMB agar with a dollop of manganese; and of course, Linda Harris' Rappaport with a pinch of paprika medium.

Everyone had his or her own way of sampling soil or at least knew someone at his or her school who did. How deep do you sample? How wide is the sample?

What does the sampling instrument look like? Likewise, everyone knew the best way to sample and culture water.

The discussion about removing possible contaminants from the surface of fruits and vegetables was truly something to behold. Shake, rub, stomach - which was best? Buffer - which buffer? Water - too stressful? Growth medium? - which was the best vehicle? Had aliens been listening in, they would have declared Earth not worth conquering. Actually, during the first meeting, we could not even decide which microorganisms we would test for, as some wanted to test viruses, while others had different indicators in mind.

In hindsight, I was wrong about multi-institutional grants. I think they not only work, but are essential if we are to leverage the best talent and construct large data bases upon which to make important decisions about food safety. The data collected by various individual institutions and various individual investigators must, in some circumstances, be comparable to be useful.

Well, once we knew each other better, we reached agreement. We did decide on methods, and not too much blood was shed in the process, and after all was said and done, some good friends were made and future collaborations forged through mutual trust. In fact, as the reality of the enormity of this grant set in, the tendency for each school to want to take the lead on each project took the opposite turn, and each school was far more willing to defer to another.

That was hardly my first encounter with a need for standardization. In 1983, I was transferred from a research job in Cincinnati, OH to Washington, D.C. and became Deputy Director of the Division of Microbiology in the then Bureau of Foods. In 1983-84, FDA's then Bureau of Foods was analyzing thousands of samples of various foods to establish "microbiological quality standards" with regard to standard plate count, coliforms, and *E. coli* for an array of products like dry macaroni, dry milk, breakfast cereals, etc. There was some rationale for quality standards; at least the data argued that some folks were able to keep microbial counts low, and others could not. Presumably the ones who could not were producing a substandard product.

Some believed that poor warehousing and storage practices led to contamination. In some circumstances, there was probably truth to that. In any event, the work on microbiological quality standards came to an abrupt halt when the National Academy of Sciences published the so-called Green Book in 1985, recommending HACCP over microbiological quality standards.

The point is, to assure that all sampling and microbiological methods were done the same way time after time, we opted to use one laboratory,

Minneapolis District, even though we could have used several District laboratories. We were realists, or thought we were, and believed that if you wanted something done over and over by the same method, you should use the same, single lab and the same analysts.

At FDA, I was also introduced to the world of the International Standards Organization, Standard Methods for the Examination of Dairy Products, FDA's Bacteriological Analytical Manual, and the Association of Official Analytical Chemists. All of these entities attempt to get scientists to use standard methods for sampling and analysis so that results can be compared both internationally and domestically. I was struck by one thing when I attended these various meetings: even these organizations struggled with the question of which method was best. Now, granted, the optimal method for meat analysis for a microorganism might not be the optimal method for analysis of water or soil, but there was disagreement about which method was optimal for a single foodstuff. In some of these situations, we had not only institutional pride at stake, but national pride.

In 1984, I became the Chairman of the Food Hygiene Committee for Codex Alimentarius. That's where I learned how difficult developing a consensus on anything in science truly was. Watching grass grow is incredibly exciting and sexy compared with a Codex meeting. It can take years to come to agreement on a single code of practice for a commodity. Yet these codes are extremely valuable instruments for international trade, so the work must continue.

In 2003, I began writing a paper about the selectivity of the lethal effects of freezing on foodborne pathogens, which was ultimately published in 2004 (1). Writing that review was an epiphany, of sorts, for me. Hundreds of studies on freezing had been done, but they were usually relatively small studies. Between various reports, there was no standardization of starting temperature, rate of freezing, holding temperature, freeze hold time, rate of thaw, actual composition of the matrix used, and recovery method used for the microorganism under study. It seemed that most folks had used whatever their equipment allowed, so -4°C, -10°C, -12°C, -20°C, -70°C, and so on were reported, with no reference to the rate at which the food, and the microorganism, had been frozen. Some used straight-up freezing, some blast froze with no reference as to how they did it. It seemed as though no two experiments could be compared.

A quote by John Fortesque (1395-1479) states: "Comparisons are odious." This may be

true for things like human personalities, human looks, human accomplishments, and even baseball statistics, but it is not true for science. Comparisons between studies is a good thing – even a desirable thing.

Papers would come to opposite conclusions about the effect of freezing on the same organism. The effect of freezing seemed to be food-matrix-dependent to some degree, but few concerted efforts were made to define what in the matrix it might depend upon, or even to formulate a generalization about the effect of macronutrient composition on microbial survival. I'm sure many of you who have written reviews of any kind have had similar experiences. I can't help but remember all the early-on environmental studies on *Campylobacter*, and the varying results between different studies. The prevalence of *Campylobacter* in poultry at retail was reported as varying all over the place; but maybe it did vary that much. Finding *Campylobacter* in water or other environs was a hit-or-miss proposition as well.

And with *Listeria*, in the mid- to late '80s and beyond, it was even worse. Now admittedly, the reported variation in human carriage of *Listeria* may be real. But have the various studies been compared with the method used kept in mind? Some of the data were based on refrigeration as an enrichment (cold enrichment), and other data were based on one of the many newly developed methods that were being reported monthly. In your most cynical mood, you might doubt the bulk of the data that's out there on presence or prevalence.

So why is some sort of standardization important, especially in light of the propensity of scientists to develop and espouse their own methods and to conduct their research independently of others? Because the issues today are too big for small studies to address, and individual small studies, even in large numbers, may not be comparable and therefore may not be useful. Small studies yield results, but we as a society need answers. If we do small experiments or surveys, the results come easy, but the answers are elusive.

Answers? Answers to what? What are these important answers that we need? In the area of food safety, let's start with the issue of attribution. How can we wisely target limited public health resources when we don't really know which foods are causing what proportion of disease?

It seems to me that we have talked about a foodborne disease strategic plan for years now. A simple enough concept: Put the resources where they would have the maximum impact

on reducing disease. In the 1980s, a phrase used in jest was "the bug-of-the-month club." As each new pathogen came on the scene, it seemed we chased it with no clear vision of the overall importance of it versus other pathogens. I don't think things have improved that much, as now it seems we chase vehicles-of-the-month, such as sprouts, tomatoes, green onions, etc. If we should get a new pathogen-of-the-month on top of the new vehicles-of-the-month, the result would likely be chaos.

I want to bring this paper to your attention, because it lays out one of the most urgent public health issues we face in food safety, attribution of causality (2). Attribution in this context means how many cases, or what percentage, of which foodborne disease can be ascribed to which food or foods. The paper presents the deliberations of the Food Attribution Data Workshop held in late 2003 under sponsorship of the Food safety Research Consortium. I want to commend the Consortium for focusing on this issue. They have stuck with their originally stated mission, and that mission is important. The workshop general conclusions were:

- * To design and prioritize effective interventions, we must be able to ascribe attribution.
- * There are many problems with acquiring the data necessary to ascribe attribution.

Some of these problems include:

1. Current data sources are insufficient on their own because of methodologic limitations/data gaps.
2. Data are spread over a wide range of agencies/researchers – there is a lack of focus. Is "focus" here another way of saying "standardization"? Have we defined what we want and then achieved consensus on the protocol to get the answers before work begins?
3. There is a need for quality and breadth of data. In some situations, as previously stated, the more data the better. The rarer the occurrence, the more data is needed to define the true occurrence.
4. Congruency with other data sources is key. This issue, attribution of risk among foods, is a huge public health issue. It should be the basis for assigning resources. Congruency is absolutely necessary if we are to take results and get answers.
5. Collaboration is paramount! Congruency cannot be achieved without collaboration. Even consensus is often not enough, and it is certainly no substitute for true collaboration in getting the results needed to obtain an answer.

There are good, contemporary examples of collaborations that are addressing large issues, and these examples need to be mentioned. Four member schools of the National Alliance for Food Safety and Security (NAFSS) are conducting a very large comparative survey of the presence of *Listeria monocytogenes* in luncheon meats sliced in supermarket deli(s) versus those pre-sliced in USDA facilities. Uncured poultry, cured poultry, and pork and beef products are covered by the survey. The four member schools are North Carolina State, Minnesota, Tennessee, and Georgia. A total of over 8,000 samples is planned, and sampling and analysis have been standardized, so congruent results should be obtained, and answers leading to science-based public health advice should be derived from the results. I applaud this effort and the collaboration that has made it possible. Visit the NAFSS Web site to get more information (<http://nafs.tamu.edu/>; verified August, 2005).

One of the issues that the US Food and Drug Administration is dealing with now, the public health impact of eating raw sprouts. It's an interesting issue for several reasons:

1. FDA and CDC believe that there is some evidence that *Salmonella* are in sprout seed, but very infrequently, so how do you sample the seed, how do you test for *Salmonella*, and how do you eliminate any *Salmonella*?
2. Sprouts are good source of vitamins and phytochemicals. Certain types of uncooked sprouts have potentially important anti-microbial and anti-cancer effects.
3. Sprouts are almost always eaten uncooked and have been referred to as the "stealth vehicle," as consumers may not even be aware they are eating them.

But without a national attribution study, are the resources devoted to this issue disproportionate to the illnesses caused? Many studies have been done on presence of human pathogens in sprouts and seeds, and disinfection of sprouts, but these studies are hard to compare and/or interpret.

Also, the detection methodology that should be used is under debate.

- If *Salmonella* are present in the seed, are they culturable?
- Since naturally infected seed lots are rare, and contamination may not be homogeneous, how would you set up a meaningful experiment?
- Is "spiking" the seeds a valid way to study the fate of *Salmonella*?

In seed disinfection studies, the effective concentration of chlorine has varied greatly. What factors make this so?

It seems to me that this issue, since it is of public health and economic importance, is one that qualifies for some coordinated studies whose results could give us some answers.

On May 17, 2005 FDA's CFSAN sponsored a public meeting on sprout safety. One of the speakers was Dr. Don Schaffner from Rutgers University. I want to quote from Don's presentation. "It's interesting that there are a whole lot of publications on different detection methods for sprouts. The question, however, should not be whether the test has been published but whether it has been validated with independent laboratories testing the method and not just a single publication." Later in his presentation he states: "So it's not just enough that scientist Jones publishes a study that shows a certain log reduction but it needs to be by methods that we in the scientific community and in the sprouting community agree are appropriate methods..." I agree with Dr. Schaffner, and again, we need results derived by agreed-upon methods that can give answers. There is a lot at stake, including the possible elimination of a food or foods that may have health benefits we only have begun to understand.

Another contemporary issue that cries for answers is *Salmonella* contamination associated with tomatoes, and more recently, Roma tomatoes. In the summer of 2004, 3 outbreaks occurred in the United States and Canada. Two serotypes were involved, *Salmonella* Javiana, seen before in association with contaminated tomatoes, and *Salmonella* Braenderup (5). Hundreds of cases of salmonellosis were confirmed, and Roma tomatoes used in sandwiches in a convenient store/deli chain were implicated.

Florida is focal point of several investigations. One of my fears is that the number of theories expressed as to cause will lead to studies using methods that will not easily allow comparisons. There are 21 such hypotheses on a list generated by a working group of microbiologists from academia and FDA. Thus, the number of things that need testing boggles the mind, but if everyone isn't working off the same sheet of music – wow, the potential for waste is enormous.

The recently begun Food Safety Research and Response Network (FSRRN), a consortium of schools headed by North Carolina State University, has addressed the issue of standard methods via a Microbial Detection Strategies Core (see www.fsrrn.net; verified August 2005). Its goals

include methods standardization, including compiling protocols of members, testing the protocols if necessary, and building a consensus among members as to which methods to use. This will not be an easy task, since in reality each of us is secretly convinced that the protocol we use is surely the best.

When I first gave thought to the topic for this lecture, I wondered if I was the only one who sees this lack of comparability of results and standardization of methods as a real problem. Judging from the literature, the answer was surely "no", and good examples came from an area of research in which I'm involved, the safety of fresh fruits and vegetables. A paper by Beuchat et al. (3) illustrates the point. Its title, "Development of a proposed standard method for assessing the efficacy of produce sanitizers", speaks to the issue of the need for standardization. Why was this paper necessary? It became clear that fresh fruits and vegetables were increasingly being mentioned as a source of foodborne illness, and there was a "feeding frenzy" of investigations on how to eliminate or kill microorganisms on these foods.

Challenge studies were done to place the pathogens in known numbers on the fruit/vegetable. From the literature, it became clear that there was a lack of detail on methods used in general, as well as varying procedures for preparing/applying inoculum, varying conditions of treatment/storage of the inoculated fruit, and varying procedures for enumerating the inoculated microorganisms. This paper was followed by several others with many of the same authors involved (4, 5, 6). Each paper iterated the need for standard methodology in this particular area of research, since even small variations in methodology could give very different results.

When you consider that rules and regulations are based on what we as food scientists, microbiologists and chemists publish, and that the lives and prosperity of those regulated as well as the prices of goods to consumers are affected, and when you consider all the known and unknown ripple effects those impacts may have, what we do to standardize is important! The answers are only as good as our results, which must be sufficient in number and of high quality, and demonstrate breadth and congruency. We must get it right. I would go so far as to suggest that in certain situations, such as surveys necessary for establishing rules or for microbial inactivation studies, that in conjunction with appropriate experts, funding agencies mandate the use of standard methods.

I'd be remiss if I did not bring up one extreme variable in standardization that needs to be resolved, but likely will not be in the near future,

which is the issue of "viable but non-culturable cells" (VBNC). The VBNC phenomenon has been around since the late 1970s. It pretty much started with studies on marine vibrios, and to say it has been and still is controversial is an understatement. Obviously, the impact of VBNCs, taken to the extreme, means that there may be pathogens present that cannot be recovered on standard growth media, yet can cause human illness. This would seem to render detection methods useless.

The arguments have raged for a decade over whether the data on VBNCs favor a stochastic deterioration of the cell under stress, or a programmed survival mechanism (7). That may be important, but it seems to me that how they get to that physiological state is less important than whether that state – non-culturable but infective – can be attained by pathogens.

So I have suggested that there is a great need for the use of standardized protocols in gathering large, comparable bodies of results from which to extract answers and develop public health strategies, and domestic and international rules and regulations. So what are some of the ways we could get there? Perhaps greater emphasis should be placed on multi-institutional grants with a requirement for standard protocols by funding agencies.

Perhaps funding agencies need to seek advice from academic and industry advisory panels as to what types of studies may justify mandating standardized protocols. Looking to the future data needs is an important component of this issue. There are probably other possible ways of getting to a point where we begin to agree on the ways to collect the large bodies of results that can help us get answers to the big problems.

Mark Twain once said: "There is something fascinating about science. One gets such wholesale returns of conjecture out of such a trifling investment of fact." Mark Twain could be correct if we base statements on a body of results that is too small to give us meaningful answers.

Ignorance when it comes to the safety of our food supply is unforgivable. Not making the most of scarce research resources by failing to attribute risk to specific foods and apportion resources accordingly after a decade of talking about it is also unforgivable. Thanks again to the Food Safety Research Consortium for bringing the issue of attribution to the front burner. Working cooperatively to assemble large numbers of comparable results that lead to well-founded answers is a worthwhile endeavor. Understanding can best be achieved when we can easily combine the results of many studies, and that cannot be done until we accept some degree of standardization of

methodologies. That may force us to surrender a bit of individuality, but it will be for a good cause.

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Jill Snowdon

The Capital Area Food Protection Association deserves a large round of applause for their efforts in contributing to the success of JAFPA 2005. Jill Snowdon, Local Arrangements Committee (LAC) Chairperson and the entire LAC team did an excellent job in extending the Capital Area hospitality to attendees. From the ice cream treats to the welcome packs, your work was appreciated by all.

**Thank you
Capital Area Food
Protection Association!**



John H. Silliker Lecture

Managing the Safety of Internationally Traded Food

By Michiel van Schothorst, Ph.D.
Retired Vice President, Food Safety Affairs
Nestlé
Vevey Switzerland



Michiel van Schothorst (left) and John Silliker

The magnitude of the international trade of food is vast. While highly sophisticated supply chains have opened global doors of opportunity for industrious food companies, regulations governing the fair and equitable international trade of food have lagged behind this exponential growth.

Some regulations are vague at best, favor the "home team," and invite discord among trading partners, while others largely rely on inspection procedures that are plagued by serious shortcomings (8). To remedy this, it is imperative for the international community to dismantle old regulatory barriers and embrace new concepts to advance needed change.

SPS AGREEMENT

Following World War II, many countries agreed that the international trade of commodities, including food, should be better regulated to achieve a more open, fair, and undistorted competition among exporters. The General Agreement on Tariffs and Trade (GATT), a system of rules dedicated to accomplishing this goal, was ratified in 1947.

For many commodities, the rules were quite adequate. This, however, was not the case for foods. Some countries, seeking to protect local industry, imposed unjustified safety requirements. A special agreement, the Sanitary and

Phytosanitary (SPS) agreement, was created in 1994 to address such decades-old non-tariff barriers (11).

Under SPS, countries possess the sovereign and fundamental right to protect the health and life of their consumers, animals, and plants against pests, diseases, and other threats to health. However, the basic right to protect against harmful pests and disease is tempered by several rules aimed at preventing the use of health measures in an unjustified, arbitrary, or discriminatory fashion to stifle international trade.

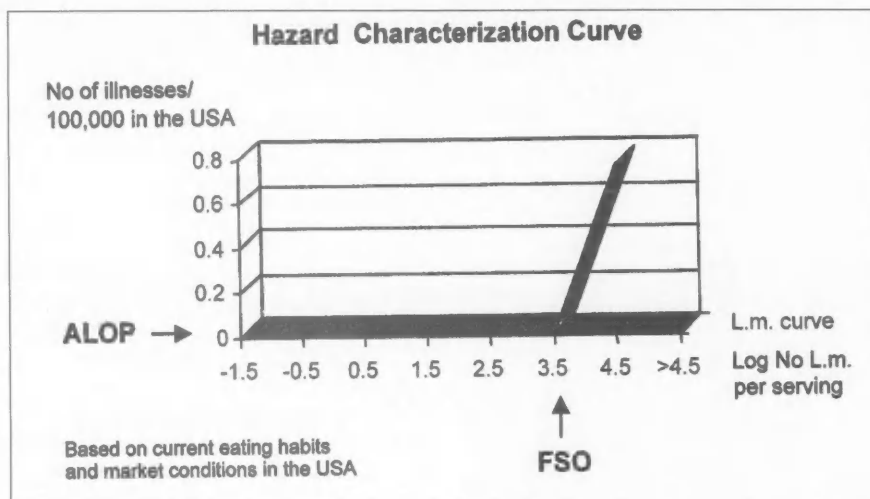
APPROPRIATE LEVEL OF PROTECTION (ALOP)

The principle behind the SPS agreement is straightforward: imported food should neither endanger a population's health nor be required to meet safety requirements that cannot be met by home-produced foods. The agreement gave birth to a new concept – Appropriate Level of Protection (ALOP), also commonly known as Acceptable Level of Risk – defined as the "level of protection that a country decides is appropriate to protect human, animal or plant life within its territory."

In an overt attempt to avoid the misuse of ALOP, the SPS agreement denotes that countries must be able to justify an assertion that an imported product poses a health risk with scientific risk assessments that are transparent, fair, and consistent. The agreement also grants GATT members the right to challenge the scientific findings of other countries that restrict the importation of foods.

This right to challenge is best illustrated by a long-running dispute between the European Union (EU) and the United States (US), whereby the EU bans beef from animals treated with hormones. Despite pointed and ongoing US protestations claiming that the ban is not based on science, the EU stands firm by its decision. With this protracted impasse serving as a vivid example, it is obvious that this system still has shortcomings for managing the safety of internationally traded food.

FIGURE 1. Relation between ALOP and FSO based on a hazard characterization curve. This curve was established using consumption and marketing data from the USA and dose response curves published in the FAO/WHO risk assessment (FAO/WHO 2004).



CODEX ALIMENTARIUS

Created in 1961 by the Food and Agricultural Organization and World Health Organization, the Codex Alimentarius Commission (CAC) has developed a number of standards, codes and guidelines to enhance the microbiological safety of food and facilitate its international trade. Important Codex documents deal with Good Hygienic Practices (2) and HACCP (3), Microbiological Risk Assessment (4) and Management (7), Validation of Food Hygiene Control Measures (5) and Principles of Food Import and Export Inspection and Certification (1).

For the most part, these documents make the use of inspectional procedures, while admittedly flawed, one of the best possibilities for managing the safety of traded foods. Within this framework, the importing country establishes targets that assure that the ALOP is not exceeded and the exporting country inspects and certifies that the requirements are indeed met. To assure effectiveness, the inspection systems of importing and exporting countries must be equivalent, and the ALOP and related targets must be acceptable to the exporting country.

INSPECTION

Codex defines inspection as "the examination of food or systems for control of food (along the food chain) in order to verify that they conform to the requirements" (1). The term equivalence is used to describe the capacity of different inspection systems to meet the same objectives.

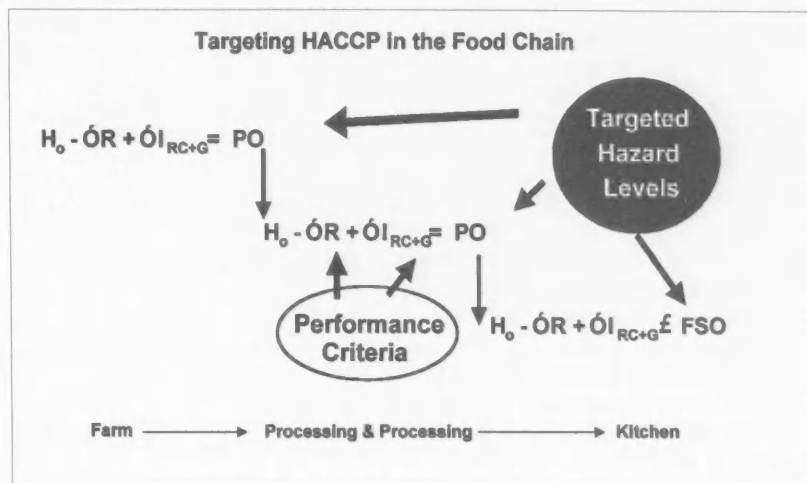
In practice, inspectors in exporting countries should conduct GHP and HACCP assessments in a manner that is acceptable to the importing country.

In the context of the SPS agreement, the Codes of Practice and HACCP as described by Codex are the standards to be used for such inspection procedures, but they still ask quite some interpretation. For instance, when an ice cream factory is inspected, the hazard analysis for *Listeria* needs to be conducted and a number of questions must be answered. Is the hazard of concern (*L. monocytogenes*) likely to be present in the raw material? Is survival at the pasteurization step possible or likely? Will survival of *Listeria* during the freezing step be likely? These questions are easy to answer.

However, for the question of whether recontamination to a level above the acceptable level is possible, or likely, the answer will depend on many different considerations and facts. An acceptable level of *Listeria* may have been established in one country, but not in another. Is there any scientific justification for this? In one factory, the likelihood of recontamination may be very low (which level will be acceptable?); in another factory, recontamination may be frequent (which frequency is unacceptable?).

The judgment of the inspector is all-important, and assuring the equal proficiency of inspectors in various countries is a difficult task. These and other aspects of inspection and certification constitute a tremendous challenge in the management of internationally traded foods.

FIGURE 2. The “unacceptable levels” in HACCP plans can be targeted using FSOs or POs. H_0 means “initial level” of a hazard, R stands for “reduction”, I means “increase”, which may be due to RC (“recontamination”) and/or G (“growth”). The Σ indicates that several event may occur and have to be taken into account.



FOOD SAFETY OBJECTIVES (FSOS)

In the system mentioned above, the importing country sets compliance standards with those in exporting countries. The ALOP is typically measured in terms of a “probability of disease” or “number of cases per year.” This is not something that can be readily used by governments for determining requirements for food safety or by processors for meeting such requirements.

For this reason, the concept of Food Safety Objectives (FSOs) was developed (9), in which the level of risk (ALOP) is converted into a level of safety, with safety in this case related to the level of a hazard in a food. In Microbiological Risk Assessment, this relationship between dose and effect (level of hazard and number of illnesses) is used to determine Risk Estimates. This relationship can also be used to convert the ALOP into an FSO (Fig. 1). The FSO is defined by Codex as: “the maximum frequency and/or concentration of a hazard in a food at the time of consumption that provides or contributes to the ALOP” (6).

It is not easy to “control” food at the time of consumption, and another term, Performance Objective (PO), has been introduced to describe levels of hazards at other points in the food chain prior to consumption. PO is defined as “the maximum frequency and/or concentration of a hazard in a food at a specified step in the food chain before time of consumption that provides or contributes to an FSO or ALOP, as appropriate” (6). FSOs and POs will become the targets set by governments for formulating safety requirements

that need to be met by industries in exporting as well as in importing countries.

The relationship between FSO and PO will differ depending on the nature of a product. The level of the hazard may be the same in a ready-to-eat, shelf-stable food. In a product that will be heated before consumption, the PO may be higher than the FSO (the pathogens will be killed), but in a ready-to-eat product that allows multiplication of the pathogen, the PO must be lower than the FSO.

It is important to mention here that in industrial practices, so-called benchmarking is used to assure the safety of a food. Products processed for safety normally have a good record, and the level of safety achieved during processing is the benchmark that should be met when new products or reformulated products are market bound. In current practice, the processing steps are well defined, but the levels of pathogens that are achieved are mostly not quantified. This may change when POs have been set as targets. In addition, having POs will also change HACCP plans. Currently, companies determine where control measures must be taken (CCPs) and how significant hazards are to be controlled.

The next step that has to be determined is to what extent the hazards need to be controlled at CCPs in order to meet POs. These required changes in levels are called Performance Criteria. The Codex definition of Performance Criterion is “the effect in frequency and/or concentration of a hazard in a food that must be achieved by application of one or more control measures to

provide or contribute to a PO or an FSO" (6). Clearly, PCs should be validated, and scrutinizing validation records should become part of inspectional procedures. This will add more science to the management of foods in international trade.

TARGETING FOOD SAFETY AND PERFORMANCE OBJECTIVES

The basis of GHP and HACCP is the prevention, elimination or reduction of unacceptable growth (G), survival (R), or spread of pathogens and (re)contamination (RC) with pathogens. This concept is the backbone of a product / pathogen / pathway concept (10).

Essentially a processing line starts with incoming raw material and the initial numbers (H_0) of pathogens that these raw materials introduce. Often there are one or more reduction (R) steps, and there may be recontamination (RC) and/or growth (G); the net effect of these processes determines the hazard level in the product. This hazard level in the product can be expressed as FSO or PO, depending on which part of the food chain and which product is considered. This is summarized in Figure 2.

When FSOs and POs are set, HACCP becomes much more targeted, and the food chain becomes more transparent. A primary producer's PO will become a processor's H_0 . What is happening with the product during commercialization and preparation becomes an integrated part of the HACCP study of a manufacturer, because what happens to the hazard during these last parts of the food chain will determine whether an FSO will be met.

CONCLUSION

Managing the safety of internationally traded foods necessitates the establishment of clear targets and, when needed, changes in food control systems. Inspecting internationally traded foods will require a much more in-depth inspection or audit of food production and processing.

HACCP plans must be assessed and answers to questions must be provided: "Which potential hazards were listed?" "Were some potential hazards overlooked?" "Why were certain hazards selected as significant?" "Can these hazards be controlled at the CCPs?" "Are the validation data available and reliable?" "Which acceptable levels are achieved?"

This requires a high level of professionalism, understanding of the processing of various food commodities, and knowledge of the requirements set by the importing countries. Consequently, adherence to regulations based on inspectional procedures may have less serious shortcomings than in the past.

ACKNOWLEDGMENT

The author wants to thank John Williams for his great help in preparing this text.

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Student Travel Scholarships

IAFP 2005

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Stephen F. Grove

University of Tasmania
Werribee, Victoria, Australia

IAFP 2005 was a very memorable and rewarding experience for me, with so many highlights packed into my short stay in Baltimore. On my first trip to the US, I couldn't resist the Welcome to Washington tour, where we were led in air conditioned comfort around America's beautiful but sweltering capital. The memorials to Thomas Jefferson and Abraham Lincoln were magnificent, as was my first taste of crab cake at Union Station. Delicious! Now I understand what all the fuss is about!

The student luncheon the following day provided a great opportunity to meet other students attending the meeting, and to form new friendships. I also met my mentor for the conference, Scott Burnett (Ecolab), whom I quickly learned knows everyone in the Association, and was definitely the right person to bug for introductions. The benefit of having Scott as a mentor during such a large meeting was enormous.

I have the IAFP Student Travel Scholarship to thank for providing my mentor for the meeting. I was honored to be awarded the scholarship, because without it, I may not have been able to meet some of the great people I met. I was even invited to the President's Reception, which proved to be a fantastic opportunity to meet some of the people who keep the Association ticking.

But of course not all my time was spent socializing. I watched many fantastic presentations, and really enjoyed hearing about the superb research from around the globe. And with so many concurrent sessions each day, I found myself, like many others, running back and forth to catch all the presentations and posters that I'd planned to see. It proved to be well worth the exercise, as my pages of my scribbled notes are testament!

My sincere thanks go to the IAFP Executive Board and IAFP Foundation for my selection for the scholarship; it was a huge honor to be selected, and I would recommend without hesitation all eligible students from all over the globe apply in future years.

Brooke Whitney

Virginia Tech
Blacksburg, Virginia, USA

As a student, the primary goal for attending a meeting such as IAFP is to learn as much as possible in the time given. It also helps when you enjoy your time there as well. I attended seminars that I felt were important to the current project I am working on, such as "Oceans and Human Health" and some that I felt would be interesting to me on a personal note, such as "Safety of Raw Milk Cheeses." Not only were these and other symposium I attended informative, but also interesting, as they bring together people who may be working on different facets of the same problem or have opposing views on hot issues.

I applaud IAFP for including all sides of the issues at their meeting. The expo floor is a wonderful tool for people to learn what there is available to them, and to have new products demonstrated, rather than just a picture in a catalog. I was also able to attend the Seafood PDG meeting, which I must admit I was a little timid about attending because I'm just beginning to get my feet wet in the subject so to speak, but by the end I felt welcome and was encouraged to give my opinion on the subjects at hand. This welcoming attitude was reflected in the many people I was able to meet through the various social events that were held. These events are so important to everyone who attends, particularly students, many of whom will be meeting people in government, industry and academia for the first time at the Annual Meetings. This personal connection is invaluable for the future of a student when seeking answers to questions on projects, clarity on an article, or when seeking a job opportunity.

I really can't stress enough how welcome I felt at the meeting. Thank you to IAFP and especially the Foundation for allowing me this opportunity.



2006 Student Travel Scholarships

The IAFP Foundation is dedicated to supporting the development of future food safety professionals from around the world. To demonstrate this commitment, scholarships will be provided for four qualified students to attend the IAFP 2006 Annual Meeting in Calgary, Alberta, Canada – August 13-16, 2006.

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Session Summaries

Members of the IAFP Student Professional Development Group assisted the convenors by serving as Session Monitors at IAFP 2005. Student Monitors prepared the following session summaries for presentation in *Food Protection Trends*.

S01 – Laboratory Response to Food Bioterrorism: How Prepared are We?

**Jackie Miles, Virginia Tech University
and Laura J. Bauermeister,
Auburn University**

With recent threats of biological terrorism, the possible widespread contamination of biological and chemical agents in food has become apparent. Dr. Authur Liang began the symposium by discussing the vulnerability that exist in foodborne bioterrorism agents and some of the advances that have been made to help detect incidents faster at the national level. The Center for Disease Control and Prevention is addressing food biosecurity by strengthening infrastructure, developing lab networks and exercising partnerships between public health. Dr. James Pearson discussed the roles that state and local health departments have in responding to food bioterrorism. Public labs work to survey food, community illness, interpret lab findings and report results and analysis. Dr. Nathan Rudgers represented the National Association of State Departments of Agriculture and spoke about their roles in responding to food bioterrorism. State and public health labs typically do not have the expertise to work on food samples. For this reason many agriculture labs are making changes for better response to food outbreaks, such as acquiring new equipment and training in new skills. Dr. Robert Buchanan talked about the capabilities of Federal Food Regulatory Agency laboratories. He discussed the different labs and their capabilities. He summed up by saying that the federal government has the capabilities needed for food biosecurity but are not yet fully prepared for a bioterroristic outbreak. Next, Dr. Patrick McCaskey talked about the Food Emergency Response Network (FERN) and the Integrated Consortium of Laboratory Networks (ICLN). FERN is made up off 114 different laboratories used for testing for the detection of threat agents in food and emphasis for surveillance for a quick response and using electronic communication. ICLN acts as a leadership structure to federal labs as well as a networking system. The final speaker, Dr. Russell S. Flowers, CEO of the Silliker Group, discussed the capability and role of industry laboratories in the event of a bioterroristic

outbreak. While industry labs have tremendous potential for identify foodborne outbreaks, action needs to be taken to fully develop laboratory capabilities. Many industry labs may not be prepared to handle select agents, in order to do this they must modify the capability and security of their facilities as well as extra personnel training.

S02 – Microbiological Predictive Models: Development, Use and Misuse

**Manpreet Singh, Iowa State University
and Pratik Banerjee, Purdue University**

Mark Tamplin emphasized the need of a simplified representation of cause and effect model which would permit better prediction of untested data. Dr. Tamplin suggested that pathogen-modeling programs should be validated for market-place foods. A limitation to this approach is the dynamic condition of the market which is often difficult to simulate, in addition to that presence of competitive microflora. Donald Schaffner stressed the need of choosing the right method for model development. He also suggested the importance of model methodology validation during design and presented the concept of growth, outgrowth, and lag (GOL) in predictive modeling of pathogens. Bradley Marks presented the importance of verifying and improving the use of microbial pathogen computer models for validation of thermal processes in the meat industry. Thermal inactivation including D and Z- values were discussed and the importance of understanding the differences between the two for industry personnel. Intrinsic products factors such as fat content, pH, and water activity were discussed as parameters that could effect a model. Lee Johnson provided an industrial perspective of the uses of predictive models for meat and poultry processors. He discussed examples such as production break down and the subsequent effects on product quality in regards to compliance with government regulations. Robert Hasiak provided a regulatory perspective of the use and misuse of predictive models when estimating shelf life of products and microbial risk. Some of the highlighted misuses were the use of static models for dynamic scenarios, extrapolation, inaccurate data input values and the lack of validating models with respect to specific foods.

Tom Ross gave an overall view of modeling programs currently utilized in Australia, specially in chilling and related modeling issues. He suggested that in Australia antibacterial compounds are incorporated in models as well as evidence-based and quality issues in a holistic approach.

503 – Food Allergens: Concerns for the Packaged Food and Food Service Industries

Joshua Gurtler, University of Georgia and Angela Laury, Iowa State University

Gale Prince presented a background of food allergen concerns. Allergens trigger an immune response in the nose, lungs, throat, skin, or gastrointestinal tract in 4 percent of the population. The *big eight* food allergens include eggs, milk, fish, peanuts, tree nuts, soy, wheat and crustacea. In 2004, 11 percent of recalled packages were due to allergens and 21 percent from labeling errors, thus suggesting the need for universal labeling and the importance to the food industry. Anne Munoz-Fulong presented a consumer perspective on food allergies, including the increasing nature of reported incidents. Milk, eggs, wheat, and soy allergies typically can be outgrown, while peanuts, tree nuts, fish, and shellfish allergies cannot. The only treatment for food allergies is epinephrine. Food allergies cause 30,000 emergency room visits/year. Common causes for anaphylaxis include: failure to read the food label, "secret ingredients," recycling foods, kitchen errors, and cross contamination. Thirty-two food allergen fatalities were reported in 2001 with the majority occurring between ages 10–19. Katherine Vierk presented the FDA's approach to food allergens. The Food Allergen Labeling and Consumer Protection Act (FALPCA) will go into effect January 1, 2006. The act includes the "big eight" food allergens and their derivatives. Mark Moorman discussed challenges to the industry and options to control allergens. These included finding a balance between promoting legitimate protein sources and preventing anaphylaxis. Challenges discussed included: ingredient statement uniformity; unknown threshold levels; non-uniform detection methods, presence of extracts and how to use science in management decisions. Frank Yiannas presented a food service perspective, providing tips for good food safety allergen programs including a *four R method*: Relay information to server; review food allergens; remember to check for cross contamination, and respond to guests. Sue Hefler discussed thresholds and detection methods explaining an egg allergen threshold study. Future research will be conducted with shrimp, peanuts, soybean flour, and milk. Each study requires 29 people and costs up to \$200,000. ELISA and ELISA-based assays are utilized.

504 – Global Water Quality Concerns

Julie McKinney, Virginia Tech University and Angela Hartman, Virginia Tech University

Water quality is a global issue that not only impacts the estimated 2 billion people without access to clean water and sanitation, it is also a concern of food manufacturers who rely on contaminant free water to keep their plants operating. Dr. Louise Fielding from the University of Wales described how climate changes, overuse of water, and population increases are creating global water shortages and contamination issues. Even when available, water supplies and systems are subject to failure or contamination. Food manufacturers should have an action plan in place in case their water supply becomes contaminated, because lack of clean water can affect nearly every area of a food manufacturing business. Clean water is essential for food ingredients, washing raw materials, cleaning surfaces, and washing hands.

Dr. Leon Gorris of Unilever presented an example of a successful selective water recycling program for a food processing company. Unilever classifies their water supplies based on chemical and microbiological suitability after use and treatment. Different categories can be matched to different applications within the plant. For example, water that has tested both chemically and microbiologically sound may be used to wash down equipment. Unilever does not use clean water every time for every application, instead they reuse good quality water whenever possible.

Christopher Braden from the CDC illustrated how fairgrounds, which typically have old or poorly maintained water systems periodically become a source of outbreaks. Although these facilities have limited use, they may occasionally be overused or misused, leading to system failure or contamination of food products.

Dean Davidson, from FDA, and Richard Nayler and Laura Dubriel of the EPA, described how water used on trains, planes, and cruise ships may have the potential to cause global concern for illness. New Interstate Carrier Coverages are needed because transient systems may have multiple water systems including foreign sources of water not subject to EPA regulation and frequent water transfer may increase cross contamination. Michael Brodsky of Brodsky Consultants spoke about source water protection implementation for the food industry. Source water is important to the food industry because contaminated water is responsible for approximately 68 percent of outbreaks. Strategies included the changing focus from water treatment and monitoring to prevention through adoption of a multi-barrier approach such as the use of a HACCP-based program. Dr. Adrian Peters of University of Wales, Cardiff, discussed the impact of distribution systems on ingredient water quality. The major problems found in the distribution system include biofilms and sediments in older systems that may lead

to microbial contamination, mechanical failure, and insufficient treatment processes. To ensure proper water safety, Supplier Quality Assurance should be used with water supplies using a risk-based program specific to each supply based on HACCP principles.

S05 – Recent Regulatory Changes and Issues Affecting Your Dairy Operation

**Emily Mathusa, Virginia Tech University
and Courtney Rheinart,
Virginia Tech University**

Ron Schmidt discussed the history of the dairy industry from 1600 to present day. He highlighted that for most of the 1900s most milk was raw and the dairy industry was extremely localized. It was not until the 1970s that many states banned the sales of raw milk. Raw milk is still an issue with many groups petitioning legislators to allow its sale. Dr. Schmidt also explained the differences between agencies that can have an effect on dairy operation including grading, uniformity and safety. Marlena Bordson provided an update on the 2005 NCIMS conference where grading, aseptic processing, safety concerns of raw milk and biosecurity were topics. Phillip Wolff, presented recent regulatory decisions from USDA. He discussed plant inspection and surveying practices for dairy plants. Allen Saylor spoke about IDFA and Codex impacts on dairy regulations. He explained why Codex is important and how standards could become individualized for each country. He concluded his presentation with potentially controversial issues coming before Codex in the future, such as food additives, protein conversion factors, and food labeling. Louis Carson concluded the session with a presentation on bioterrorism preparedness regulations. FDA's four major rules and actions for food producers were discussed. They include registering the food facilities, giving prior notice of imported foods, administration detention, an establishment and maintenance of records. Enforcement and compliance were discussed including accessing business records and the commissioning of federal officials.

S06 – Update on Foodborne Disease Outbreaks

**Vanessa Teter, Virginia Tech University and
Brooke Whitney, Virginia Tech University**

The update on foodborne disease symposium covered three separate topics: a *Salmonella* Braenderup outbreak in roma tomatoes, the emergence of *Salmonella* 14,[5], 12 :-, and an overview of outbreaks associated with lettuce. Dr. Sundeep Gupta and Capt. Thomas Hill started the symposium by discussing an outbreak associated with roma tomatoes that occurred in the summer of 2004. The total number of cases came to 125, with most occurring in Pennsylvania.

Phase one of the investigation included a case-control study which implicated cheese, lettuce and tomato as suspect ingredients, but it was not until phase two when sites were examined and managers interviewed that tomatoes were implicated as the probable vehicle. Investigations of the packing house showed good SOPs on file and in practice, and the farm implicated showed the use of GAPs. Dr. Larry Beuchat gave an overview of recent research on the survival of pathogens on and within plant tissue. One study showed that irrigating plants with inoculated water did not yield any recovery within the plant. Another study highlighted showed certain types of tomatoes could support the growth of *Salmonella* on the surface of the plant.

Dr. Lynch and Dr. David White discussed the emerging pathogen *Salmonella* 14,[5], 12 :- . In recent years, there has been an increase in cases linked with this pathogen, however, this perceived increase could be due to the increase in surveillance for this pathogen. CVM surveillance studies show that this strain is not frequently found in retail sources, and that all strains isolated were susceptible to antibiotics. Resistance to antibiotics is a concern with this strain in part because it is thought to be a variant of *S. Typhimurium*, which has several multiple drug resistant strains.

Dr. Michael Lynch also gave an overview of outbreaks of *E. coli* O157:H7 in lettuce, citing that lettuce is the top produce that causes foodborne disease with five outbreaks of O157:H7 being attributed to lettuce between 1998 and 2002. Lettuce is the second most common vehicle for *E. coli* O157 strains, causing 498 illnesses between 1994 and 2004. Dr. Michael Cooley discussed the Salinas Environmental Sampling Project that focused on a farm linked to 3 produce-related outbreaks. Phase one consisted of over 175 samples taken from many different sources on the farm. One sediment sample was positive for *E. coli* O157:H7. Because the farm flooded during the wet season, the group expanded its sampling in to the water shed area surrounding the farm in phase two, collecting 94 samples which yielded twelve positive for *E. coli* O157:H7. The team recommended that the farm consider planting non-RTE crops in areas prone to flooding.

S07 – Safety Concerns of Food Chemical Contaminants

Sudeep Jain, University of Georgia

Speakers included: Wilson Rumbelha, Lori Bestervelt, George Sadler, Stephen Olin, Charles Santerre, and Mark Nelson.

The concern about the presence of contaminants in foods is currently high among consumers. The development of sophisticated methods that enable the detection of lower amounts of contaminants in foods has further increased concern. Chemical contaminants such as acrylamides, furan, perchlorates, dioxins, PCBs, flame

retardants and mercury are in the spotlight these days. Food can potentially be contaminated by chemicals at every stage of processing be it storage, cooking, packaging, reheating or eating. The toxicological concerns about the presence of these chemicals in foods; health risks detection methods and control strategies were discussed in the symposia. Issues related to the presence or detection of these chemicals may range from food toxicological issues to legal issues. The speakers highlighted the vulnerabilities of food as vectors for chemical contaminants.

S08 – Data for Decision Making

Armitra Jackson, Iowa State and Huimin Zhang, North Dakota State

Speakers included: Bruce Tompkin, Martin Cole, Alejandro Mazzotta, Domenic Caravetta, and Gary Acuff.

During this session, approaches to access microbial control of a food operation were discussed. The importance of environmental sampling was emphasized and how this action is sometimes underestimated. Environmental samples include objects such as mop strings, floors and boots. Reasons to sample the environment were discussed. These reasons include: to verify continuing control, to detect sources of pathogens and for lot acceptance. Also discussed during the symposia were acceptable sampling plans and adequate frequency for sampling. The following points were made:

- Environmental sampling can be more sensitive for assessing control than product testing.
- Testing finished products offers no clue as how contamination occurred.
- Randomizing sample sites in a food operation is not an effective means to assess control.
- Visual inspection is a poor indicator of pathogen control.

It was concluded that environmental sampling has been an extremely useful tool to help ensure the quality and safety of food. Exactly *what is data?* was raised and it was suggested that data is not information but is just the recorded output of observations and measurements. The point was also made that data cannot talk and must be given meaning by analysts. The nature of data's existence is dependent on us, our microbiological training, wisdom and personality. The importance of transforming relevant data into meaningful information was also emphasized. The current uses of testing, such as end product, environmental, verification and validation were discussed, as well as how the lack of standardized methods is a weakness. The advances in microbiological methods as it related to variety, precision, speed and convenience were also discussed. The importance of actually reviewing the data (and not

filing it away) was highlighted, and it was stressed that by viewing data one can know what is happening in a facility. It should also not be assumed that if a sampling result is zero there are no pathogens present.

S09 – Materials for Multi-Use Food Contact Surfaces: Characteristics, Fabrication, and Evaluation

Pratik Banerjee, Purdue University and Andrea Laycock, University of Delaware

The focus of the symposium was to elaborate the sanitary design criteria and fabrication material used in multi-use food contact surfaces of dairy and food equipments. Application of different materials, hygienic construction and fabrication were highlighted. Steve Sims focused on present issues regarding food contact materials composition, sanitary design, fabrication, and finish criteria. He gave specific examples of materials used for food and dairy product equipments including parameters such as pathogen and allergen control. He stressed that design and fabrication of the processing or storage equipments can have an impact on the safety. John Tverberg discussed composition, characteristics, evaluation and application of stainless steel used in food manufacturing facilities. He addressed concerns regarding chlorine mediated rusting of stainless steel surfaces. He also recommended some useful methods to eliminate the corrosions of the food contact surface of the equipments. Jeffrey Jansen reviewed issues regarding plastic and rubber materials used as a multi-use food contact surface. He suggested that the tensile property of the plastic materials should be considered before designing equipment. He also addressed issues regarding corrosion and interaction with food ingredients with plastic surface. He also discussed the applications of rubber in for the food industry. He placed particular attention to the tolerance and reactivity of rubber materials with different food ingredients such as fats or oils. He emphasized on testing the rubber material before using it. Sara Risch spoke about evaluation methods and regulatory considerations regarding materials used in food contact surfaces. She also focused on health issues regarding degradation and residual effects as a result of food ingredient and equipment material interactions. She emphasized the need for incorporation of all attributes when testing the material for standardization purpose.

The panel discussion consisted of the speakers, regulatory officials and industry stakeholders followed the speakers and several topics were addressed. These included pathogen reduction of non-product contact surfaces; product degradation; weight gain and product corrosion.

Late Breaking Session – Avian Influenza and Managing Risk

Julie McKinney, Virginia Tech University and
Supakana Nagachinta, University of Georgia

Speakers included: David Swayne, William Hueston, Mike Robach, Bruce Stewart, Bruce Cords, and Dave Harlan.

Avian Influenza (AI) is a very serious disease of poultry worldwide. The virus causing avian influenza is an Influenza A virus of the family Orthomyxoviridae. Subtypes are based on the proteins contained on the surface of the influenza A virus (hemagglutinin [HA] and neuraminidase [NA] proteins). All 16 HA and 9 NA subtypes of influenza A can be found in avian populations. The infection can range from asymptomatic to rapidly fatal, depending on the virulence of the virus and the susceptibility of the avian host.

Two groups of viruses are recognized on the basis of genetic features and severity of the illness they cause in domesticated poultry: Highly Pathogenic Avian Influenza (HPAI) and Low Pathogenic Avian Influenza (LPAI). The main symptoms of HPAI include depression, cessation of egg laying, nervous signs, swelling, diarrhea, and blue discoloration of combs and wattles due to disturbance of blood circulation. Influenza A viruses have a segmented genome and therefore can genetically re-assort in mixed infections of the same host with different strains of influenza A viruses resulting in a novel subtype. The key outbreaks of HPAI have been caused by H5 or H7 influenza A subtypes. The first outbreak was in Hong Kong in 1997 and was stopped when all the domestic chickens were slaughtered. H5N1 reappeared in December 2003 and continues to occur across East Asia. The current strains of the H5N1 viruses possess developed features compared with the initial ones and have become progressively more pathogenic for poultry. So far, sustained human-to-human transmission has not been identified. However, the viruses demonstrate a capacity to infect species such as pig and felines.

International health organizations have been putting efforts to stop the unprecedented spread. Formation of barrier between the farms and outside environment is the best biosecurity practice to prevent exposure of flocks to the virus. These strategies include avoiding contact between domestic poultry and wild birds, all-in-all-out concept, proper disinfection of equipment or vehicles to entering or leaving the farms and control of human traffic. Inactivation of the virus occurs under temperature and chemical treatments (temperature of 56°C for 3 hours or >60°C for 30 min and use of oxidizing or acidic agents) Trade restrictions to protect animal health, in accordance with the recommendations of the OIE Terrestrial Code have been imposed in countries that import poultry and poultry products. Good hygienic practice during handling of poultry products including hand washing and normal cooking

with approximated temperature of 70°C to kill viruses is emphasized. The H5N1 situation in Asia has been closely investigated for preparation in the case of possible avian influenza pandemic that may become widely spread and transmissible from person-to-person.

SI0 – Foodborne Diseases: Discovery of Causes and Reduction Strategies

Renee Raiden, Virginia Tech University
and Jaquelyn Miles, Virginia Tech University

Representatives from FDA CFSAN and USDA FSIS, opened this symposia discussing both agencies approach to tracing foodborne outbreaks. Jack Guzewish, from FDA, stressed that discovery of causes and reduction strategies is a cycle and must include identifying what the vehicle is after an outbreak so that contributing factors and intervention strategies can be developed. The anatomy of an investigation was suggested to begin with surveillance, epidemiological investigation, lab analysis, environmental investigation and trace-back or trace-forward identifying the source of the outbreak and its contributing factors. Agencies and laboratories which must work together to investigate an outbreak successfully were also mentioned. David Goldman, from USDA, focused on the agencies emphasis on *Salmonella* outbreaks. He discussed the steps that FSIS takes to investigate an outbreak. Agencies rely on human health and foodborne outbreak surveillance to identify the beginning of an outbreak. Once the illness is reported, if an FSIS product is suspected then they are notified and begin investigation. If they discover that the FSIS product is implicated then the agency takes action. Jenny Scott from Food Processors Association introduced the industries perspective. She emphasized the importance of HACCP plans in prevention of outbreaks. In addition, she discussed the need for industry to learn from previous outbreaks, giving examples of the outbreaks involving unpasteurized juice, *Listeria*-contaminated hot dogs, and *Salmonella*-contaminated ice cream.

Carol Selman from the CDC discussed Environmental Health Specialists Network (EHSNet) and what the technology has told us about foodborne disease. This program gathers information regarding worker food safety and hygiene from food service establishments. Main goals of this project are to determine main causes of foodborne outbreak and why they occur, to translate findings into prevention efforts, to offer training opportunities for environmental health specialists, and to increase collaboration between epidemiologists, laboratories, and food protection programs.

Christopher Griffith from University of Wales Institute commented whether humans or microbe presented more significant food safety problem. He stressed the importance to continue food safety education, but also emphasized the need for strong

science-based research to continue to understand bacterial evolution and environmental conditions related to their growth. Consumer food safety education programs used to reduce foodborne disease were introduced by Trent Wakenight from Michigan State University. He discussed successful programs introduced in Michigan. Programs included producing educational CDs for food bank employees, providing a free meal and food safety educational games to educate parent and child, and others. These programs have been monitored with surveys and it has been found that they have been successful at communicating food safety to the public. In conclusion, Elisa Elliot from the FDA commented on tracking food safety using the Healthy people 2010 program. Objectives of this program include reducing infections and outbreaks from key foodborne pathogens, preventing increase antimicrobial resistance of non-Typhi *Salmonella*, reducing deaths from food allergens, increasing proportion of consumers following key food safety practices, and in improving employee food handling. Target values which the program was striving to achieve were as well as current data was introduced.

SI1 – Safety of Raw Milk Cheeses – A Global Perspective

**Brooke Whitney, Virginia Tech University
and Vanessa Teter, Virginia Tech University**

Jeff Farber described that in 1996, Canada required that all cheeses be made with pasteurized milk. However, many felt that this limited the types of cheeses that Canada had once made regularly, so a committee was created to look into the processing of raw milk cheeses. Currently, the Canadian government is looking to develop a policy to allow more raw milk cheeses to be processed while retaining a high level of safety. One means of doing this is by modifying the current 60 day storage law so that the product is tested both before and after processing and focusing programs on herd management, cheese production, and final product. Canada is also establishing education programs to educate the consumer of the hazards that are associated with raw milk cheeses. Peter Sutherland reported that within the 8 states of Australia, dairy is one of the most heavily regulated commodities. Each state has its own legislation based on the HACCP plan in the Codex. However, there is no set dairy standard as of yet. Currently, Australia allows the production of raw milk cheeses and the importation of raw milk cheeses that have been stored for 90 days, with some exceptions. Currently, Australia is looking at other methods of pasteurization of milk so that the quality of the milk is not harmed while increasing the safety level. Post-process contamination seems to be the largest problem that they face as well as some opposition from the public demanding safer food products. In 2007, Australia hopes to finalize and release a National Dairy

Standard to help create safe milk and milk products within the 8 different states. Melchior Schällibaum suggested that in Switzerland, both raw milk as well as pasteurized milk cheeses are produced, imported and exported. There are no regulations on cheeses when it comes to the selling or producing of cheese and milk type. Sylvie Lortal spoke about France producing, importing and exporting raw milk cheeses. She also reported that there have been no Listeriosis outbreaks since 1999. This can be attributed to the milk quality standards that state that only milk that is free of both *Listeria monocytogenes* and *Salmonella* in 25 g, can be used in the production of raw milk cheeses. In addition to this, the raw milk cheese must not exceed 100 CFU/g during the shelf-life storage of the cheese. Giuseppe Licitra described how Italy follows the same guidelines as France and Switzerland so that each region of Italy will be allowed to keep the individual characteristics and quality that is expected from their cheeses. Cathy Strange from Whole Foods spoke about the cheeses that are currently allowed in the United States. While following regulations, Whole Foods does its best to import a wide variety of cheeses from around the world by following a 60-day storage rule. She suggested that while this limits the types of cheeses that can be imported, there are still a wide variety of very unique and individual cheeses available.

SI2 – Yeasts and Molds: When Fungi Go Bad, Who Do You Call?

**Huimin Zhang, North Dakota State
and Joemel Quicho, Virginia Tech University**

Emilia Rico described an overview of yeast and mold contamination issues. Both the Food and Agricultural Organization of the United Nations and the US Department of Agriculture estimated great post-harvest economic loss due to microbial spoilage and insect infestation. But the precise information and the understanding of the nature of loss are limited. Post-harvest loss from mycotoxin contamination, mitigation costs and livestock loss in the United States have been estimated, but the loss from fungi is very difficult to be estimated. Paul Hall provided case studies on the spoilage of processed foods and beverages by yeasts and molds. In the review of ten cases of contamination, the spoilage phenomenon of each case, how the etiological mold and yeast being identified and intervention measures to control the spoilage were presented. This presentation illustrated reasons for spoilage caused by mold and yeast such as limitations on the use of preservatives. David Miller discussed current challenges associated with mycotoxins. These included acceptable tolerance in food at an international level and how to identify and control the widespread contamination. A case study on *Fusarium* mycotoxin was presented to illustrate the challenges. Larry Beuchat described novel approaches for controlling yeasts and molds.

These included utilizing the inhibitory effect of ethanol on mold growth by using vapor and direct additives. The ability for Lactoperoxide systems to inhibit *Bathyadiploia* fungi were also discussed. He suggested that modified atmosphere packaging could also be used to control fungi growth in wheat and rye bread. Mike Tumbleson described the preharvest control of yeast and molds. Pre-harvest control measures included varietal selection, tillage, procedures from stalks to storage bin. He suggested that establishing control programs must be scientifically sound and accurate.

Roy Bettles described rapid detection methods. He suggested that there are two approaches for the rapid detection of yeast and molds in food products: detection or enumeration. The correct choice depends on product type and test purpose. Current rapid methods included culture plate such as petrifilm, ATP bioluminescence, microscopic method, automating microscopy such as flow cytometry, conductance methods, turbidity measurement, detection of metabolites and molecular methods.

S13 - They Said What? - The Risky World of Risk Communication

**Manpreet Singh, Iowa State University and
Laura Bauermeister, Auburn University**

William K. Hallman from the food policy institute at Rutgers talked about the awareness of biotechnology and focus on the information about genetically modified (GM) foods. A comparison of the level of consumer awareness from different parts of the world was discussed with data from supermarkets in China and South Korea presented to show the extensive information available but the knowledge not being comparatively that widely spread. The importance of the manner in which the question is asked to the consumers to determine the answer and the terms used that make a difference on peoples' acceptability were discussed. Gordon Meriwether from the Uriah Group spoke about crisis management. His focus was on facilitating communication during a crisis. Before a crisis he stressed the importance of designing a crisis management plan and building relationships with individuals that will be helping you communicate during the crisis. During and after the crisis he stresses the importance of keeping calm and collected, supporting and investigations and maintaining control of the situation. Edward Groth from Groth Consulting Services presented information on organic food safety. He reviewed some of the misconceptions regarding organic foods such as the consumers perception that organic foods reduce their exposure to pesticide residues. Many different research studies can be found but when reviewing them it is important to look at the methods used to detect pesticide residues because some methods are more sensitive than others (rapid tests vs. conventional detection methods). He empha-

sized the fact that more research using comparative methods is needed in this area. Tony Flood the associate director for the International Food Information Council talked about lack of communication about trans fat to the consumers and the risk involved in the media coverage and consumer perception of food safety. Some of the factors that interfere with messages being heard by the consumers, inconsistencies and contradictory messages that can possibly be relayed while communication were discussed in the presentation. The importance of credibility and trust were also discussed as a means to overcome communication barriers. Todd Pritchard from the University of Vermont presented his opinions on the variation in the knowledge and perception of consumers from different states within the US in regards to raw milk and disease. In his talk Pritchard provided information about the history and evolution of the regulations in regards to raw milk in various states in the US. Evolving concepts of risk communication during the development and the consumer acceptance of pasteurized milk across different states in the US. William Hueston from the center for animal health and food safety at the University of Minnesota discussed the challenges in communication of the problem of BSE in the US. The global epidemic of BSE and the number of cases reported and the amplification dynamics were discussed in the talk. The pathogenesis of experimental BSE cattle, likely routes of transmission from bovines to humans, sources of infectivity into foods, prevention and control strategies, and the factors associated with increased public concerns were discussed in the talk with emphasis on the consumer perspective on BSE fear factor and the effective risk communication for scientists.

S14 - Pre-Harvest Issues Associated with the Transmission of Viruses and Parasitic Protozoa— The Problems and the Solutions

**Angela Hartman, Virginia Tech University
and Armitra Jackson, Iowa State University**

Viruses and parasites have become an emerging problem in produce shellfish, and meat; thus pre-harvest contamination of these foods must be addressed. Francoise Le Guyader of IFREMER discussed the source of viruses in shellfish. Data showed that using virus-like particles (VLPs) as a surrogate resulted in viruses persisting longer in shellfish than in seawater. In addition, increased rain elevated levels of viruses present and depuration of shellfish did not significantly decrease viruses. Although run-off from cows or pigs may contaminate shellfish, cross-transmission of viruses from animals to humans has not been detected. However, animal strains are similar to the human virus strains, so further examination of animals as contamination sources is needed. Jan Vinje of University of

North Carolina addressed the risk for cross-species transmission of Calicivirus from husbandry animals to humans. Approaches to identify cross-species transfer can be done through epidemiology outbreak investigation, identifying genetically related viruses in animals and humans, studying seroprevalence, and investigating capsid-regions and antigenic cross-reactivity. It was shown that porcine noroviruses are genetically similar to human strains and the swine saprovirus are in the same cluster of human serogroups so there may be potential for transmission to humans. However, it was stated that there is no final answer on whether there is cross-species transfer for norovirus. Danuta Skoronski, of University of British Columbia Center for Disease Control, discussed preventing the introduction and adaptation of a new avian influenza into the human population. The influenza virus is not a food-related risk but is spread through fomites or airborne spread. The influenza virus has the ability to change its strains through point mutation, recombination, and genetic reassembly, increasing pandemic potential. Therefore, early detection and intervention is needed and there should be universal pandemic preparedness on all levels. Ron Fayer of the USDA spoke about *Cryptosporidium* as a potential hazard in shellfish. Shellfish may be a potential contamination route because they concentrate oocysts when they filter feed, they may serve as contamination indicators, and are often eaten raw. In Chesapeake Bay, VA, *Cryptosporidium* was found in 20 per cent of 1590 oysters and a multi-state study showed approximately 3.7 percent oysters were *Cryptosporidium* positive. While there have been no confirmed *Cryptosporidium* shellfish infection, there may be potential for contamination because species found in shellfish are the species responsible for human infections. Brent Dixon from Health Canada spoke about past and present *Cyclospora* outbreaks. In response to increased outbreaks, the Model Plan of Excellence was implemented in 1998. This plan uses filtered water, monitoring/education, and identification of shipments for trace backs. However, with international trade increasing, future outbreaks are suspected. Therefore, there is a need for ability to do trace-backs of product, standardized methods of detection, standardized survival and control studies in foods, and rigorously enforced controls in production, harvesting, and packaging. Dr. J. P. Dubey of USDA spoke about the prevalence and risk of *Toxoplasma* on the farm. Pigs were shown to be the major source of *T. gondii* on the farm. In 1,000 Iowa sows, 22.2 percent were positive and when 123 farms were surveyed, the infected sow prevalence was 19.5 percent. It was shown that 68.3% of cats on pig farms were found to be *T. gondii* positive. Therefore, access of cats to sow farms may cause potential problems. However, *Toxoplasma* can be controlled by cooking, freezing, and irradiation.

S15 – Managing the Risk of *Listeria monocytogenes* at Retail and Restaurants

**Manpreet Singh, Iowa State University
and Angela Laury, Iowa State University**

Ann Draughon presented a background on the issue of *Listeria monocytogenes* at Retail. She analyzed *Listeria* in RTE Meats and Poultry at retail in the US and explained the alliance of University of California-Davis, Auburn University, and Michigan State in the National Alliance for Food Safety and Security. She explained that there are agencies such as FDA, FSIS, WHO, and FAO that complete risk assessments. She went into the objectives related to *Listeria* in RTE sliced deli meats compared to USDA packaging plants. They used uncured and cured beef, pork, and unopened chubs in Tennessee, Minnesota, California, and Georgia for the study using protocols from FPA, USDA, and AML. Results of this study have not yet been published because only a part of the data is collected. She adds that outbreaks are clustered, sporadic, and not seasonal.

Martin Wiedmann, from Cornell University described the use of molecular sub typing tools to better understand *L. monocytogenes* risks and transmission focusing specifically on retail and restaurants. He used pulsed field gel electrophoresis and DNA sequencing to find thirteen subtypes from three genetic lineages. He described how 214 samples were taken from two counties and common variables in environment, equipment, age of animal, and sanitation were found. Jon Woody from FDA presented control measures for *L. monocytogenes* in FDA's Food Code. He focused on sanitation, date marking, and cold holding as control measure options. Findings from a quantitative risk assessment were reported. Steven Grover presented control measures for *L. monocytogenes* at Restaurant. His spoke about factors such as environment, time control, food production control, restaurant based control, and Burger King's Clean & Safe Platform. Jill Hollingsworth discussed some of challenges that are faced in the retail such as the occurrence, survival, species, and modes of entry of *L. monocytogenes*. Emphasis was laid upon the design and implementation of action plans to minimize the risk of *L. monocytogenes* with focus on three components: retail stores, consumer, and research. It was suggested that control strategies are needed at the point of receiving, storage, and handling with effective employee training, model SOPs, and verification models. Importance of consumer education and project chill (validating that home refrigerators are at 40°F) to avoid *L. monocytogenes* contamination was discussed. Katherine Swanson summarized the complete session and stressed on the importance of sanitation as an essential element to control *L. monocytogenes*. Some examples of recontamination issues at the deli counters, recovery of

L. monocytogenes in plant environments, and persistence in the environment were also discussed. Clean equipment and following labeling instructions on the sanitizers were stressed upon as important factors to control *L. monocytogenes*.

S16 – Risk and Control of Salmonella in Raw Nuts

Michelle D. Danyluk, UC-Davis and Vanessa Kretzschmar, Auburn University

Recent outbreaks of salmonellosis associated with the consumption or raw almonds have caused concerns about the risk and control of *Salmonella* spp. in raw nut production and consumption. Bill Hoskins, of Blue Diamond Growers began with an overview of raw nuts and raw nut consumption, outlining that increased consumption, especially of raw nuts, and an increased regulatory capacity may be why outbreaks had not been previously reported. Mr. Hoskins then outlined what nut handlers or processors could do to minimize the problem. Elisa Elliot of FDA-CFSAN, then outlined the 2004 almond outbreak traceback, and reviewed the 2001 almond outbreak. Linda Harris of UC-Davis then gave a background of almond production and the huller/sheller operations, focusing on this unique dry environment. Dr. Harris focused on her lab finding on the distinct strategies necessary to clean and sanitize these environments. Karen Battista of Kraft Foods, talked on the industries experience with dry roasting of 7 different nutmeats, and the different challenges encountered with each of these nuts. Guangwei Huang from the Almond Board of California spoke on different non-traditional technologies currently being developed for the raw nut industry to achieve the proposed 5-log reduction. These technologies include moist air heating, cold plasma, high pressure and organic acids. The final presenter was Merle Jacobs from the Almond Board of California, who presented the almond industries response to the outbreaks, and their vision of the future of almond food safety.

S17 – Oceans and Human Health: Trends and Practical Tools for Seafood Safety

Richelle Beverly, Louisiana State University and Joshua Gurtler, University of Georgia

Because little is known concerning the ultimate impact that the oceans and their surrounding environs have on human health, The National Oceanic and Atmospheric Administration (NOAA), in 2004, established the OHHI (Oceans and Human Health Initiative) to address this issue. Some human health problems associated with oceanic environments include intoxication and infection by pathogenic microorganisms that spread through coastal and estuarine waters, toxic

and pathogenic water runoffs from rivers, streams, and sewers, toxic algal blooms, and the contamination of filter-feeding shellfish and other seafood with pathogenic microorganisms.

Juli Trtanj (NOAA) presented an overview of this initiative along with the research goals of the OHHI. Marlene James (Louisiana State University) detailed sanitation verification of seafood processing facilities. Processing trends, innovative bacterial inactivation techniques, and process validation for seafood and *Vibriae* was addressed by Linda Andrews (Mississippi State University). Multiple technologies have been explored to reduce pathogenic bacterial populations in oysters, the leading cause of bacterial illnesses and death from seafood in the United States. David Green (North Carolina State University) presented information regarding practical, holistic, science-based strategies used to control histamine production in fish. The utility and importance of bioluminescence and *Photobacterium phosphoreum* in seafood quality and safety was addressed by Paw Dalgaard (Danish Institute for Fisheries Research). Bioluminescence can provide a rapid means of determining microbial spoilage of fish and provide anecdotal evidence regarding the growth of pathogenic bacterial organisms.

The symposium addressed processing technologies for the detection and control of pathogens in seafood as well as HACCP-based systems and scientifically based risk assessment methods.

S18 – Risk Ranking for Foodborne Pathogens

Pratik Banerjee, Purdue University and Yifan Zhang, University of Maryland

The symposium was introduced by Dr. Greg Paoli. He outlined the major risk ranking terminology, a detailed discussion was presented on Comparative Risk Assessment (CRA). Dr. Rob Lake with Dr. Peter Cressey gave a brief overview of New Zealand's perspective of Risk ranking. This process comprises of different stages, such as, Risk evaluation, Risk management options, Implementations, Monitoring, etc. As a Food Trading nation NZ has a policy of "Risk Prioritization". This encompasses attribution of data from case control study, outbreaks, etc. The attribution of the data is done by expert consultations, like scientific community, record keeping etc. The final ranking is based upon incidence and severity. Mr. Michael Batz gave an outline of works going on in Food Safety Research Consortium. He gave an account of the Foodborne Illness Risk Ranking Model (FIRRM) – a tool, which ranks food pathogens by public safety impact. The ranking process involves several steps like, data collection, post hoc evaluation, priority setting, risk ranking, intervention assessments, health benefit assessments, combined assessments, valuation etc. Dr. Rosetta Newsome reviewed a user friendly semi-quantitative risk ranking framework prototype that the

IFT developed for the FDA to facilitate the evaluation and ranking of potential high threat microbiological agents, toxins, and chemicals. This prototype integrates chemical and microbial risks for comparative ranking. Challenges exist in the framework implementation: extensive chemical risk assessment literature; multiple health endpoints for chemical hazards; chemical hazard dose-response relationships not parallel to microbial; and rapidly developing microbial risk assessment literature. Dr. John Painter discussed the point of consumption attribution (illness associated with prepared food), based primarily on food borne outbreak data collected by CDC. For most pathogens, outbreaks are the only conclusive indication of which foods cause illness. All food borne illness represent all food borne pathogens and wide range of food vehicles and captures effect of contamination at multiple points from farm to fork. Combined with burden of illness estimates, outbreak data provide point of consumption attribution and thus, indicate most important areas to concentrate food safety resources. Dr. Deon Mahoney introduced Food Standards Australia New Zealand (FSANZ), scope of the regulatory problem, risk assessment approach, risk ranking matrix, outputs and outcomes of risk ranking. A through-chain assessment of hazards associated with seafood available in Australia (domestic and imported) has been completed. The output was a relative risk ranking – function of likelihood and severity of adverse effects. The approach was consistent with Codex principles for conduct of risk assessment. The standards are locally and internationally peer-reviewed.

S19 – Enrichment Media and Sample Preparation: What's New?

Laura Bauermeister, Auburn and Efstathia Papafragkou, North Carolina State

Speakers included: Catherine Donnelly, Jingkun Li, Lee-Ann Jaykus, Barry Pyle, Jay Ellingson, and Srinand Sreevatsan.

Traditionally, microbiologists have developed techniques in order to optimize their ability to detect foodborne pathogens directly from contaminated foods. It is usually necessary to increase the number of the target pathogen in a food sample while reducing the levels of other competitive microflora that may overgrow. In order to achieve this and, in addition to resuscitate sublethally injured cells that may exist, an enrichment step is followed. This is a step routinely executed in the beginning of the sample preparation for pathogen detection. Usually, the type of medium used for enrichment is usually highly nutritive. This step may also be useful for diluting any inhibitory compounds (i.e., preservatives) found in the food sample, as well as rehydrating cells sampled from dried or processed foods. The enrichment media need to be highly selective for the pathogen of concern, so as to reduce the general background microflora and facilitate the

subsequent pathogen detection. These background bacteria are not pathogenic but can compete with the pathogen for nutrients and may release agents toxic to the pathogen. The type of medium used for the selective enrichment steps remains nutritive but also incorporates special agents to suppress the growth of competing background microflora. The main characteristics of such media are high specificity and increased sensitivity for isolation of the pathogen of interest that will grow fast in it. The development of rapid enrichment media can incorporate various selective and differential agents. Selective agents act to suppress the growth of a specific group of competitive microorganisms, while differential agents allow the organism to be readily distinguished from other microorganisms present. The enrichment steps are usually followed by selective plating, biochemical identification and confirmation steps, which make the presumptive detection of a pathogen lasting from a few days to a week. Alternative approaches to cultural enrichments in the food samples processing can be physical (i.e., filtration, centrifugation), chemical (i.e., electrostatic desorption), physicochemical (i.e., immobilization, flocculation), as well as biological (such as antibodies bound to ligands, and fluorescent antibodies) that can enhance the concentration of the target pathogen, by separating it from competing microflora or food matrix components that can hinder its detection. On the same context, in search for the "ideal test" there are new strategies coupling immunomagnetic separation procedures with molecular nucleic acid detection methods. The same challenges in the enrichment pathways are witnessed on environmental samples. The choice (upper or lower side) and the nature of the environmental surface (rough or smooth) can be of an additional obstacle in the sampling procedure when testing for a specific pathogen as inefficient sampling and extraction can lead to false representation of the bacterial profile of that surface.

S20 – A Behavioral Approach to Performance-based Food Safety Management-Theory, Practice, and Outcome for Successful Retail Food Safety Programs

Vanessa Kretzschmar, Auburn and Joemel Quicho, Virginia Tech University

Speakers Included: Stephanie Olmsted, Paul Marra, Tom Chestnut, Frank Yiannas, Larry Cohen, Alan Tart, Harry Field, and Robert Gravani.

With food safety practices becoming a top priority worldwide, it is no surprise to find the need for behavioral modifications in the food industry. Behavior can be defined as the manner in which something or someone functions or operates, and the behavioral skills learned in a food production environment are key to the success of a company. In this symposium, speakers

discussed not only how to affect performance change, but also the rewards or reprimands. They spoke about the ways to motivate employees to do their jobs well and keep company morale high. Rewards may be as small as a simple "good job" or as much as a certificate, trophy, or monetary bonus; the repercussions of inadequate performances can be severe. After it has been determined that there is a need for change, there are several avenues that can be taken to ensure success and compliance. One option is to have a behavioral professional do a workshop with employees. This will create an atmosphere that allows team building skills, emphasizes the benefits of a job well done, and gives an opportunity to understand current issues. Another option is mandatory HACCP training. This has now become a requirement in many areas of the food industry. HACCP familiarizes a person with the importance of food safety, by encouraging the determination of critical control points, validation and verification, and record keeping. It may also be necessary to ask a cultural behaviorist for advice. The non-compliance of an employee may not be due to insubordination, but a lack of understanding about what is expected. While it may be difficult to motivate an entire company to do their best work, the rewards can be beneficial. If personnel are praised for exceptional behavior, it is likely that it will continue. It is amazing how a small grocery store chain could be voted one of the best companies to work for greatly due to the fact that staff morale was so high. They made an effort to make every employee feel like family. Another corporation chose to give trophies for compliance to food safety. If workers were able to have only good reports when their areas were inspected, there was a prize after a certain number of "clean" reports. It is important to note what will be done if a company cannot meet standard requirements. Inspections come not only from the company itself, but from the government as well. When change is needed, it may range from a warning to the closure of the facility. When a failure is reported, it is important to get the operation back on track as soon as possible. If implementation of good behavior practices can be achieved, it is likely that the operation will be a success. Company morale is the key to keeping the food production industry in good standing in the eyes of consumers, and producing a safe and wholesome product.

S21 - Produce Packinghouse Sanitation; Designing and Implementing Effective Food Safety Programs

**Emily Mathusa, Virginia Tech University,
Angela Laury, Iowa State University**

The first speaker, Jack Guzewich presented "Produce Foodborne Illness Outbreak Investigations: What Have We Learned." Guzewich started by discussing outbreaks seen in FDA regulated foods.

He reviewed the categories of foods most commonly causing illness in humans and discussed investigative considerations of farms and plants and where these sources of contamination lie. The second speaker was Juan Leon with his presentation entitled; "Clean Greens II: The Microbiological Quality of Domestic vs. Imported Produce Collected from Southern US Packing Sheds." He discussed the importation of foods from Mexico into the US and posed the question of whether these foods are less safe than domestic versions. Leon presented his research and methods for this project and showed the levels of organisms present in imported and domestic samples of the same produce were similar, with the exception of cantaloupes where domestic cantaloupe were actually higher in his samples than the amount found in imported cantaloupe. Packing processes of cantaloupe in the US and in Mexico are different which could be a possible reason. The third speaker of the symposium was Jim Gorny whose talk was "GAPs, GMPs, and Guidance: An Industry Update on Assuring Produce Food Safety." Gorny started with an industry prospective on Good Agricultural Practices and Good Manufacturing Practices. He discussed the diversity in practices seen from plant to plant. Gorny called for definitions of produce safety programs and gave his suggestions for improving safety in plants by lowering contamination. He closed with his thoughts on the importance of collaboration between government and industry. The fourth speaker, Ron Schmidt presented "Packinghouse Sanitary Design", where he explored the importance of planning a cleanable plant with cleanable equipment. He began discussing four big challenges in the packing plant: facility diversity, vague standards, cultural diversity, and economic issues. He explained that sanitation is split 50/50 between packinghouse design and cleaning alone. He went into specific details in regard to external environment (building, roofs, docks), internal considerations (lighting, water, insulation) as well as material selection like glazed ceramic tiles, instead of plywood or metal panels. The fifth Speaker, Les Lipschutz presented "Implementing Packinghouse Food Safety", in which she went through eight essential elements to food safety: field GAPs, packinghouse GMPs, HACCP plans, water quality, sanitation (cost versus risk of spreading pathogens), pest control, mock recalls, and training and resources. These sections included the importance of portal potties, clean clothes, tools and wagons, good record keeping, personal hygiene, need for prerequisite programs, equipment selection, water testing, pest control, and education of employees.

The last speaker, Juan Muniz presented "Packinghouse Food Safety Audit Requirements," in which he took an example approach to the auditing system. He works for Primus Labs.com and his company provides resource information and programs for companies to utilize in preparation for an audit. Their Web site

presents everything from safe production manuals, internal inspections guides, and links to government agencies and comparison feedback from industry with step-by-step guide online.

S22 – International Food Safety Opportunities and Challenges in the Developing World

Michelle D. Danyluk, University of California – Davis and Yifan Zhang, University of Maryland

Dr. Maria De Lourdes Costarrica reviewed challenges and opportunities the developing world faces to ensure their food safety, the approaches taken in developing countries, and FAO's perspective and recent support activities. Suggestions were also offered regarding the future of food safety in these areas, including the need for serious partners on food safety and establishment of ethic working relationship, application of basic strategies, and risk analysis framework. Dr. Malcolm McDonald introduced the Kraft-UN Unistar Program, Kraft participation in the program, Kraft mission, and two success stories in St. Lucia (2002) and Kyrgyzstan (2005). This program provides technical assistance to small food companies in developing countries aiding in development of local food businesses.

Dr. Maria Teresa Destro reviewed problems and challenges in pathogen control in South America. Food safety is not a well established concept in South American countries; The governments do not have a culture of transparency; Pathogen control seems to be a reactive, but not a proactive measure in these countries; The governments are establishing a pathogen control program without full knowledge on food borne pathogens and the monitoring systems in South America are not yet well established. Training programs and workshops are some measures being taken to improve the situation. Louis Laleye from the United Arab Emirates University addressed food safety in the Middle East. This region includes 32 countries who export primarily to the European Union. Within the region there is much variability among food safety, however voluntary use of HACCP, GAPs, and GMPs is common when food is being exported. Tom Deep then spoke on compliance standards for export of foods to developed countries, and that success is most often seen with companies that have complete control from the farm to export, and begin regionally then increase to export capacity. Finally Robert Tauxe of the CDC mentioned that control of enteric infections is a major driver of positive change in developing countries, surveillance drives the cycle of public health prevention, and that different countries at different stages of developing their food safety programs have different targets. Dr. Tauxe concluded with the need for international networks to build public health capacity for food borne disease surveillance and recognition of international outbreaks.

S23 – Recent Advances in Intervention Strategies for Pathogen Control

Armitra Jackson, Iowa State University and Julie McKinney, Virginia Tech University

Speakers included: Vijay Juneja, Katherine Swanson, John Sofos, Larry Beuchat, Joseph Meyer, and Robert Buchanan.

Conventional and new processing technologies such as UV light, high hydrostatic pressure, intense light pulses and ultrasound have been effective in eliminating pathogens in selective food products, alone and in combination with other methods. Some preservation technologies are difficult to apply because pathogenic cells may react differently to treatment. Validation and verification procedures should be implemented in order to determine if the interventions applied will and are working effectively. Methods for controlling sporeformers such as minimizing foodborne spore levels, incorporating additional barriers, thermal inactivation of foodborne pathogens and food irradiation are top priority in the food industry because of how difficult it is to eradicate spores. Sanitizers, a common intervention strategy, require validation and verification even before they can be purchased. The registration process for sanitizers involves producing antimicrobial efficacy data, product chemistry information, toxicology data, and clear label and technical RTE meat and poultry products. Other control measures, such as dips, spray, and product formulation are still being researched for effectiveness alone and in combination. Product formulation, direct addition of antimicrobials to a food product, may be an effective intervention strategy for the control of *Listeria monocytogenes*. Product formulation is operationally simple (requires no additional equipment), allows you to verify the safety of each batch as opposed to each package, and it provides additional protection once the package has been opened. Oscar Mayer currently employees this strategy to control *Listeria* in RTE food products. They have developed, and will provide free of charge to other companies, a computer model (the Opti form *Listeria* Suppression Model, available through Purac) which will calculate the required amount of lactate and diacetate required to suppress the growth of *Listeria monocytogenes* in various RTE food products. Because product formulation streamlines the control process, production costs are lower. Although *Listeria* continues to be a pathogen of interest, it is important to consider other microorganisms that may soon require the attention of the food manufacturing community. A new strain of *Vibrio parahaemolyticus* emerged in 1996 and has continued to spread globally. This new strain, O3:K6, has exhibited increased virulence and resistance to stress. *Enterobacter sakazakii* is an emerging pathogen that has been linked to infant formula. Although rare, it can cause an invasive infection with a high death rate in

neonates. Emerging pathogens pose unique challenges. New organisms need to be classified, threat levels assessed, processing strategies developed and implemented. The prevailing idea throughout these sessions was that nonthermal processing techniques are effective for killing pathogens; however, more research is needed to develop potential hurdles and to identify new pathogens of concern.

S24 – Microarray Technology: An Emerging Tool in the Food Microbiologist's Toolbox

**Julie McKinney, Virginia Tech University and
Angela Hartman, Virginia Tech University**

Microarray technology is useful for monitoring gene expression (determining which genes are turned on under given conditions) and for determining the presence or absence of a large number of genes or mutations in a single test. Martin Wiedmann of Cornell gave an overview of microarrays and how to use them. A microarray is composed of different nucleic acid probes (labeled sequences of DNA used to detect the presence of a complementary sequence) that are attached to a glass slide or microchip substrate. Microarrays have a broad range of approaches. However, the choice of appropriate design and experimental design should include the input of a biostatistician before starting. To perform a microarray the researcher needs to identify the gene of interest and then generate a probe sequence, then spot the probe sequence onto the substrate (glass slide, microchip, or bead). The sample is then prepared and added to the probe, hybridized, and the data is analyzed. Andrew Benson of the University of Nebraska discussed how DNA microarrays can be used to subtype microorganisms. Whole genome microarrays allows the researcher to learn about the genome evolution and ecology. Using microarrays for whole genome subtyping has the advantages of increased resolution, ability to see new and emerging populations and the ability to see gene transfer. However, the disadvantages of whole genome subtyping are that it provides too much information, sometimes too much resolution, and too much diversification in the genome.

Kathryn Boor of Cornell University presented data about transcriptional profiling using microarrays. Transcriptional profiling helps to determine which genes microbes express to aid in survival when on food. She spoke about the sigma B regulon in *Listeria monocytogenes*, which is a stress response factor used to increase virulence, aids survival in the host, and survival in the environment. There are two strategies to learn about sigma B. The first strategy is to use a full genome microarray to identify sigma B genes. The second strategy is to determine which genes sigma B regulates in *L. monocytogenes* and whether sigma B changes under different environmental conditions.

Finally, Claude Malibat of bioMérieux spoke about using microarrays as a diagnostic tool. Microarrays can be used as a diagnostic tool for gene expression to monitor a change in the physiology of the microbe or monitoring the microbial population diversity in a sample, strain characterization including identification, subtyping and virulence characterization, screening food for pathogens as a means of risk management, and to check for the authenticity of an animal or plant for GMOs (determine the absence/presence of certain species). While microarrays may be used for many of these applications, some of the challenges that still lay ahead are the need for better sample preparation, use of acceptable calibration methods, and the cost factor.

S25 – Pathogen Survival in Dried Fermented Meat and Partially Cooked Products

**Joemel Quicho, Virginia Tech University and
Jennifer Cascarino, University of Delaware**

The topic of this symposium focused on pathogens in dried fermented and partially cooked meat products. The speakers discussed the risk of and ways to control pathogens.

Carl Custer presented an overview of ways to reduce the risk from pathogens in dry and semi-dry fermented products. Hazards to the dry and semi-dry fermented products include *Botulinum* toxin, *Staphylococcal enterotoxin*, *Salmonella*, *Trichinella spiralis*, *E. coli* O157:H7, and *Listeria monocytogenes*. Custer summarized the "fixes" for each of these hazards. Treatments like active fermentation culture, formulation with salt and nitrite, and Method No 7+ are currently used to prevent pathogen survival in meats like sausage, pork products, and hamburger. Dry cured and dried are the two classes of dried meats, and there are two problems with treatment lethality in these classes: evaporation and formulation with sugars. Custer compared many papers where treatments were successful in reducing pathogen numbers. Mark Harrison discussed how stress enables pathogens to survive longer. Microbial stress is a condition adversely affecting microbial growth or survival. Stress may cause a cellular response in microbes where proteins can be altered, membrane fluidity can change, or spores may form. Microbes can become resistant to multiple stresses and their response can vary depending on species. Bacteria encounter many stress environments in foods and other substances. Harrison discussed dried fermented and partially cooked products of concern and their specific stress response to heat, cold, acid, oxidative, and osmotic stress. Richard Holley focused on survival of pathogens in various meats. One main point discussed was the survival of *E. coli* O157:H7 in ground beef. A few current concerns include *Listeria monocytogenes*, in cooked, cured meats and *E. coli* O157:O111 in fermented semi-dry and dry sausages. Holley

discussed the importance of plant equipment sanitation as well as natural antimicrobial testing against *E. coli* O157; such as, AIT (allyl isothiocyanate) or mustard flour in ground meat. Halley plans to continue studies involving dry cured ham and survival of *E. coli* O157 in dry sausage while working with antimicrobial testing against these pathogens. Catherine Cutter explained the approach that an extension specialist takes to convey information to the public. The training and education discussed regarded things such as HACCP, developing materials, web based courses, and publications. A variety of products were given as examples including jerky, lebanon bologna, Soudjok, Basterma and small diameter ready to eat meats. Cutter spoke of the importance of workshops that were aimed mainly toward hunters, as they often consume meat and provide meat for others on a small scale in their homes. A main point of this talk focused on new ideas for pathogen reduction in small businesses. Some of those considered were acidic marinades, increased humidity, changes in the drying period and time as well as temperatures.

S26 – Food Safety Objectives: Now That We Have Decided to Have Them, How Do We Think They Will Be Used in Food Safety Management?

**Laura Bauermeister, Auburn University
and Jesus Enrique Vizcarra Olvera,
University of Sonora**

Robert Buchanan from the FDA-CFSAN-DHHS spoke on the use of risk analysis to set food safety objectives. In the US risk assessments were designed to answer specific questions and to identify things that contribute to risk. Risk assessments have also been used to evaluate the effectiveness of intervention practices. He reported that the US has successfully addressed food safety issues in industry using these tools. The next speaker was Patricia Desmarchelier of Food Science Australia, she spoke on the influence of science and technology in determining food safety objectives. She gave several examples of the use of food safety objectives and the supporting science and technology. Her examples included the management of *Listeria monocytogenes* in lettuce and the management of *Salmonella* in orange juice. Leon Gorris from Unilever was the next speaker, he addressed the use of food safety objectives and microbial risk analysis as food safety management tools in the food industry. He defined risk analysis to include risk assessment, risk management and risk communication. However, he indicated that food safety objectives should not be the only source of risk management and other options should also be explored. For instance, performance objectives can be used in production steps to meet

food safety objectives. Industries will be required to comply with the food safety objectives and other standards determined by the government. He categorized risk assessment into two categories, deterministic and probabilistic. Deterministic refers to point estimates and probabilistic gets deeper into the data and consider variability and uncertainty to provide more realistic goals. S. Andrew Starbird from Santa Clara University was the final speaker in this symposium; he spoke on the economic incentives involved in pathogen testing to meet food safety objectives. He used a Principal-Agent Model for food safety, where the Principal was a buyer and the Agent was the supplier. He indicated that there are undesirable economic consequences of imperfect information regarding food safety. He suggested that regulations should be written so that suppliers can not make a profit unless food safety objectives are met. He indicated that, even though this is a good start, measuring and testing food safety is just the first step in meeting food safety objectives.

S27 – Current Practices and Innovations in Cold Chain Management for Food Products

Sudeep Jain, University of Georgia

Speakers Included: Kathryn Boor, Mark Salimbene, Chuck Stoffers, Stephen Nightingale, Catherine Goldsmith, and Thomas McMeekin.

Refrigeration has without doubt contributed to the expansion of food industry and in making food readily available to a wider and larger population throughout the world. As the size of population grows and demand for refrigerated food grows efficient management of cold chain becomes a top priority for any food supply management system. The progress of cold chain from the early days of harvesting ice to keep food cool to the development of multiple vapor compression refrigeration systems was demonstrated. The greatest enemy of humans, bacterial pathogens may be transmitted from food. Therefore the mechanism how the microbes may be affected by refrigeration of food was discussed. An overview of the current methods of refrigeration, innovations and new developments in the field of cold chain management were discussed. Specific discussions about the survival and growth of pathogenic and food spoilage organisms such as *C. botulinum*, *Pseudomonas*, *B. cereus*, *Listeria monocytogenes*, *Yersinia enterocolitica*, *Vibrio* and *E. coli* in foods at various temperatures were held. Innovations in control and recording of refrigeration parameters such as temperature, relative humidity, dew point etc. were also discussed. Need for the development of new strategies to combat the problems associated with cold chain maintenance were emphasized.

T01 – Produce Technical Session

Huimin Zhang, North Dakota State

Increasing attention to produce food safety led Benjamin Chapman to compare documented outbreaks with media reported ones. He suggested that trends can be determined by analyzing media coverage compared to actual documented data. The results indicated that occasionally outbreaks reported by media were misleading and large outbreaks were not reported. He also demonstrated some factors that lead to media coverage, and the predictive information could be used to determine the actual trends on-farm food safety issues. Avik Mukherjee discussed the prevalence of coliform, *E. coli*, *Salmonella* spp. and *E. coli* O157:H7 of fresh organic and conventional produce in Minnesota and Wisconsin. Produce sampled included lettuce, leafy greens, cabbage, broccoli, peppers, tomatoes and zucchini. *E. coli* prevalence was significantly higher in organic samples than in their corresponding conventional samples. Leafy greens had highest *E. coli* prevalence among the samples. *Salmonella* and *E. coli* O157:H7 were not found in the survey. Lindsay Arthur discussed the results of a microbial baseline study of Ontario grown produce. Sampling sites included distribution centers, farmers markets and organic site operations. The prevalence rate of the all the pathogens and *E. coli* was 0.17 percent and 5.3 percent respectively. Michael Cooley discussed the survival of *Salmonella enterica* and *E. coli* O157:H7 in soil and on plants may be affected by complex interactions with indigenous soil-borne and seed-borne epiphytes. The understanding of these interactions may be helpful in improving produce safety. He suggested that agricultural practices enhancing the growth of *E. asburiae* may be helpful in reducing produce contamination. Susen Chang discussed steam blanching for reducing *Salmonella* Enteritidis on almond surfaces. *Nonpareil* variety almonds were inoculated with *S. Enteritidis* and subjected to steam treatment for time intervals of 5, 15, 25, 35, 45, 55, and 65 s. More *S. Enteritidis* was reduced as the treatment time increased, but prolonged treatment time (longer than 30 to 40 s) resulted in poor almond qualities such as discoloration and wrinkles formation. Michelle Danyluk discussed potential modes of contamination in raw almond *Salmonella* outbreaks. Almond samples were submerged in the suspension of *Salmonella* Enteritidis PT 30, drained, kernels removed. The results indicated that wet conditions allow for *Salmonella* multiplication and migration through the hull and the shell and almond kernels may be contaminated during harvest from wet grounds. Iuliano Popa discussed the inactivation of bacteria, yeasts and molds on palletized highbush blueberries through the use of chlorine. The inactivation of three foodborne bacterial pathogens, five yeasts and five molds on blueberry by chlorine dioxide gas was evaluated. Blueberry samples on pallets were inoculated with the organisms and exposed to chlorine dioxide gas (18 mg/l) for 12 h.

It was found that gassing lead to significant reductions of the organisms tested and may be a effective tool.

Everardo Vega spoke about the variability of virus attachment patterns to butterhead lettuce. She investigated whether the isoelectric point (pI) of viruses played a role on their attachment to lettuce. The models did not support the hypothesis of attachment due to mixed results. Instead, the results may provide an more effective method recovering certain viruses from lettuce. David Kingsley discussed hepatitis A (HAV) virus inactivation by high pressure processing in strawberry puree and sliced green onions. The study used high pressure processing (HPP) to inactivate virus-contaminated fruits and vegetables. Results indicate that HPP is an effective tool to inactivate HAV in these foods at the pressures and times proposed. Karen Simmons spoke about a survey of biosecurity practices in produce operations in the Southeast US. 25 farms, 25 packinghouses and 7 fresh-cut produce processing operations were involved. It was found that the surveyed processors had good biosecurity practices, but the farm and packinghouse operations had little or no security measures. Jazmin Vojdani reported on the impact of regulations on juice-associated outbreaks. She suggested that the implementation of the HACCP programs may be reducing outbreak incidence. Pascal Delaquis discussed results of a lethality study involving the supplementation of vanillic acid to unpasteurized apple juice. He suggested that this addition could reduce *E. coli* O157:H7 populations after 7 days with the consequence of comprising the sensory quality.

T02 – Food of Animal Origin Technical Session

Joshua Gurtler, University of Georgia

Greg Burnam discussed evaluating microbial safety of a slow partial cooking process for bacon. A model for the growth of bacteria was validated by inoculating pork bellies before subjecting them to slow partial-cooking processes. The results suggested the safety of the model in predicting pathogen growth. Renee Raiden presented a study on the survival of *L. monocytogenes*, *Listeria innocua*, and lactic acid bacteria species in chill brines. *L. monocytogenes* populations were reduced in 0 per cent of brines with LAB present. *L. innocua* was less recalcitrant than *L. monocytogenes* in brines with and without LAB and should, thus, not be used as surrogates in place of *L. monocytogenes*. Marissa Lopes discussed alternative cutting methods to minimize transfer of specified risk material during steak preparation. Studies indicated that three cutting methods pose no risk (<0.100%/cm²) in transferring SRM to steaks when cutting subprimals before vertebral column bone removal. Courtney Heller spoke about decontamination of beef cuts, intended for blade/needle or moisture-enhancement tenderization. Five treatments used for beef cuts inoculated with *E. coli* O157:H7 were external

trim, hot water, warm 2.5% lactic acid, warm 5% lactic acid, and activated lactoferrin plus warm water and a control sample. He reported that the percentage of *E. coli* O157:H7 transferred from external surface to internal surface post-moisture-enhancement were 0.65, 0.59, 0.82, 0.53, 0.92, and 3.88, respectively. Jarret Stopforth discussed microbiological loads on subprimals and the impact on injection. Total plate count (TPC), total coliform count (TCC), and *E. coli* count (ECC) were determined to be 4.0 to 6.2, 0.8 to 2.7, and <0.8 log CFU/g, respectively. Pre-injection marinade was at 0.8 to 1.7, < 0.8 and <0.8. *E. coli* O157:H7 and *Salmonella* were present on subprimals only at 0.3 and 2.2 per cent. Post-injection marinade was at 1.9 to 5.3 (TPC) and 0.8 to 2.3 (TCC) with 1.8 percent positive for *Salmonella*. Teck Lok Wong reported the prevalence of *Campylobacter jejuni* and *C. coli* in uncooked retail meats in New Zealand. Samples were positive at 89.1% (chicken), 9.1% (pork), 6.9% (lamb/mutton), 3.5% (beef), and 9.5% (unweaned veal). Emily Jordan presented the enhancement of food safety surveillance in the Republic of Ireland. Animal foodstuffs are tested for the presence of *Salmonella*, *Campylobacter*, *Listeria*, and *E. coli* O157. Over 500,000 tests have been recorded since 2001. Fur-Chi Chen described indigenous protein makers for the evaluation of prion inactivation in processed meat tests indicated that tropomyosin may be used as a BSE marker contingent upon an immunoassay able to quantify denaturation of the protein marker. Maung S. Myint reported the distribution and prevalence of *Salmonella* serotypes in Maryland retail poultry meat. *Salmonella* was found in 22.7 percent of samples, serotypes included *S. Heidelberg* (57 percent), *S. Kentucky* (24 per cent), and *S. Typhimurium* (Copenhagen) (19%). Mark Berrang described a water spray and extended dry time methodologies to lower bacterial numbers on soiled flooring from broiler transport cages. Flooring squares (5 x 5 cm) from transport cages were contaminated with 1 g *Campylobacter*-positive gut content and sampled either unsprayed, or sprayed with water, or sprayed and dried for 0.25, 24, or 48 h. *Campylobacter* levels were at 7.3, and 4.1 CFU/g for unsprayed and sprayed at 0.25 h. No *Campylobacter* was detected after 24 or 48 h drying. Aweeda Newaj-Fyzul presented an evaluation of water quality and prevalence of bacterial pathogens and antimicrobial resistance in food fish and pond water in Trinidad. Eight ponds were found to be outside the recommended chemical standards and could lead bacterial problems. Fish slurry and water samples revealed 13 and 16 bacterial genera with 97.1 per cent and 90.4 per cent of samples resistant to one of eight antibiotics, respectively. Michael Musgrove described antimicrobial resistance in *Salmonella* and *E. coli* isolated from shell eggs. 34.1 percent and 73.2 percent of *Salmonella* and *E. coli* isolates were susceptible to 16 antibiotics, respectively, with 60.1 percent and 1 percent were resistant to 4 or more, respectively.

TECHNICAL SESSION

T03 - Pathogens

Renee Raiden, Virginia Tech University

The pathogens technical session began with several speakers presenting data collected from previous outbreaks. Elizabeth Blanton, from the CDC opened up presenting information regarding multi-state foodborne outbreaks which occurred in the United States from 1973 to 2003. Multi-state outbreaks have increased in the United States over the past 30 years indicating a need for increased coordination between states for the future. Judy Greig, from the Public Health Agency of Canada, expanded on this topic stating that between 1998 and 2004 the majority of outbreaks occurred in the USA followed by the European Union and Canada. She concluded that the most frequent causes included water deficiencies, raw produce and inadequate cooking. Caroline Smith Dewall from Center for Science in the Public Interest presented data that suggest that there are differences between foods implicated in restaurant associated outbreaks (produce most common) and home associated outbreaks (fish). She commented that different factors are related in each case. Finally, Rachel Woodruff from the CDC presented different causes of foodborne illness between children and the elderly. Children were more commonly affected by bacterial pathogens, and elderly were more commonly affected by viruses. Several presenters concentrated on *Salmonella* related outbreaks. Nytzia Perez from the CDC, showed data supporting decrease in *S. Enteritidis* related illness between 1993 and 2003. The most common phage types responsible were 8, 13a and 4. In the United Kingdom different types of eggs were surveyed for contamination with the bacteria. Christine Little from the Health Protection Agency in the United Kingdom, discussed data suggested that *S. Enteritidis* was more prevalent in Spanish eggs which are typically used in catering businesses. Examining *Salmonella* serotypes implicated in food animal carcasses and raw ground products, Priscilla Levine from USDA FSIS presented data regarding the different *Salmonella* serotypes found in different meat products including chicken, turkey, swine, and cattle to name a few.

Brandon Carlson from Colorado State presented studies evaluating chemicals and conditions to lower microbial counts on cattle hides. Average reductions in all treatments (lactic acid, acetic acid, sodium hydroxide, and sodium metasilicate) ranged from 2.2 to 2.9 log CFU/100 cm². It was suggested that organic acid sprays would be most beneficial all around since they are the least corrosive and most worker-safe. An innovative method for recovering pathogenic bacteria from air samples was introduced by Beth Crozier-Dodson from Kansas State. Researchers used an overlay onto Tryptic soy agar plates following air sampling with an impaction air sampler. Plates to isolate *E. coli*, *Clostridia* and *Yersinia*

samples were overlaid with selective enrichments. This technique resulted in significantly greater recovery of bacteria from the air. Several researchers presented data regarding detection and sub-typing on *Listeria monocytogenes*. Paul Leonard from Dublin City University discussed a sensitive biosensor-based immunoassay to detect *L. monocytogenes* in enriched samples. Several serotypes of *L. monocytogenes* have shown a decreased invasion of human intestinal cells. Kendra Nightingale, from Cornell University, found those nonsense mutations in the *inlA*, which encodes for Internalin A, resulted in the protein being truncated and having a reduced ability to invade human intestinal cells. It was found that these mutations were common in food isolates and were rarely associated with foodborne illness.

T04 – Antimicrobials Technical Session

Sudeep Jain, University of Georgia

Gianna Duran spoke about determination of minimum inhibitory concentration of sodium lactate and sodium diacetate combinations affects on *Listeria monocytogenes*. MIC of lactate and diacetate combinations was determined for slow as well as fast growing *Listeria monocytogenes* strains. The results of the study are useful to validate optimum concentrations of these antimicrobials for control of *Listeria monocytogenes*.

Oleksandr Tokarsky, presented a study comparing different combinations of lactic acid, monolaurin and nisin effects against *Listeria monocytogenes*. The results demonstrate the usefulness of these antimicrobials either singly or in combination to control *Listeria monocytogenes*. Heshma A. Elgaali described a study where *Listeria monocytogenes* were challenged against different concentrations of decanol and a combination of decanol and nisin for varying lengths of time. The results of the study indicate that decanol which is a byproduct of enteric bacteria can be used as a control measure for *Listeria monocytogenes* in meats. Karen Killinger discussed the development of antibiotic resistance in *Salmonella*. Naladixic acid mutants were developed and challenged against various other antimicrobials. It was found that the chromosomal mutations leading to nalidixic acid resistance can lead to multidrug resistance in *Salmonella* Typhimurium. Leslie K. Thompson discussed a study designed to test if dried plum mixture could be used as an antimicrobial agent to safeguard ground beef. Different forms of dried plum as plum juice concentrate, dried plum puree or prune powder were used in ground beef. The results show that dried plum can inhibit microbial growth in ground beef. Ugur Gogus discussed the effects of the use of glucose monohydrate in combination with hot water and sodium pyrophosphate on the quality of brisket were studied. The results suggest that this combination of antimicrobials can be used without loss of sensory attributes. Lindsay Chichester discussed the prevalence

and enumeration *E. coli* O157 in feedlot steers fed four different *Lactobacillus*-supplemented diets. The results suggest that up to 99 percent reduction in *E. coli* O157 concentrations can be achieved by the use of this method. Stan Bailey spoke about a study to determine if different subpopulations of *E. coli* were selected by Petrifilm in comparison to ChromAgar ECC, and to compare the relative effectiveness of these two media to enumerate generic *E. coli*. The results show that the two media select for different subpopulations of *E. coli*. Kelly Beers discussed the results of a 90 day in-plant trial designed to evaluate the microbial effects of treating inspection held visually contaminated carcasses with Cetylpyridinium chloride. The results suggest that CPC provides a viable alternative to labor intensive off-line reprocessing as well as reducing microbial load on the carcasses. Leonard Williams presented and analysis of random amplified polymorphic DNA and antibiotic resistance patterns of *Salmonella* spp. from whole broiler carcass rinses. The results show that strains with increased antimicrobial resistance may have acquired antibiotic resistance genes during the evolutionary process. Stan Bailey presented antimicrobial resistance profiles of *Salmonella*, *Campylobacter* and *E. coli* from chicken reared without exposure to antibiotics. The results show that rearing chicken without antibiotics reduces but does not completely eliminate the anti-microbial resistance in *Salmonella*, *Campylobacter* and *E. coli* isolates from chickens. Yingchang Han presented the development of a gas chamber to decontaminate cantaloupe surface using chlorine dioxide. Validation of the reduction in pathogen count was also discussed in this presentation. It was suggested that chlorine dioxide holds promise to be used as an antimicrobial agent for reducing *Salmonella* and to maintain the quality of cantaloupes.

T05 – Risk Assessment Technical Session

Sudeep Jain, University of Georgia

William Marler highlighted the importance of food safety in all the aspects of food production and processing. Education of staff in matters related to HACCP and food safety is a must in the fragile business of foods. Developing a sound relationship based on mutual respect and faith with governmental regulation agencies was emphasized.

ILSI Risk Science Institute Advisory Group on Data Collection for Microbial Risk Assessment presented a framework for identification and collection of data useful for risk assessments of microbial foodborne or waterborne hazards. The need for a wider data collection network for food borne illness is felt. Involvement of countries from developing and underdeveloped world will give a comprehensive picture of risk assessment throughout the world. Mark R. Powell presented The World Organization for

Animal Health (OIE) standard for Bovine Spongiform Encephalopathy (BSE). Differences among the various agencies about the issue of BSE were highlighted. The differences are sometimes beyond the scope of science and there are many other concerns which need to be accounted for before making policy decisions on such issues.

John Holah presented RTE food product exposure from cross-contamination vectors. The role of variables such as contact time, contact pressure, degree of surface moisture, product surface characteristics and microorganism type was studied. A guideline document will eventually be developed that will contain pertinent information about the safety issues of RTE food products. Zhinong Yan, discussed the impact of contact time and product weight on transfer of *Listeria monocytogenes* from belt surfaces to ham and bologna. It was determined that *Listeria* transfer rate was a prime function of product weight rather than contact time or contact surface. Peter J. Taormina discussed how rapid the cooling should be for meat products such as bacon. It was concluded that if bacon is cooled from 48.9 to 7.2°C within 15 h, a food safety hazard from *C. perfringens* and *S. aureus* is not likely to occur. Thomas P. Oscar spoke about variation among batches of freshly ground chicken breast meat and its impact on the modeling of *Salmonella* growth kinetics. Factors such as time and temperature were the determinants of the final counts on the chicken breast meat. Sandria Godwin spoke about the role of consumers in the spread as well as in the prevention of foodborne illness and home refrigerators roles in the spread of foodborne illness. Microbial contamination of home refrigerators were assessed by the use of aerobic plate counts, psychrotrophic plate counts and ATP bioluminescence. David Lloyd reported an evaluation of the medical screening methods used for employees and visitors to food manufacturing plants. The practices of assessing the health of workers and plant workers in the countries of interest were studied and discussed in the context of food safety and international trade. Matthew Smith discussed the use of *in situ* technology in the area of public health. These sensors can be combined with microbial growth models and RFID technology and utilized to develop biological and chemical sensors that will help ensure a safer food supply.

Sandria Godwin presented information about actual temperatures in the home refrigerators in sampling sites in four states. Wide fluctuations in the temperatures were recorded and many refrigerators had temperatures which are termed as "danger zones" for more than 2 h every day. The majority of the refrigerator door were above the recommended temperature of 40°F.

T06 - Educational Technical Session

Viviana Fino, University of Delaware

Topics in this session dealt primarily with food handling safety for all ages.

Mildred M. Cody from Georgia State University discussed the development and significance of the FightBAC program for food service workers and consumers. The program established a framework and baseline for food safety behaviors using scientific literature and proprietary research. A critical component of FightBAC is the partnership to develop, disseminate and evaluate food safety messages for current and future public health work in the US. Ema Maldonado-Simon from Universidad Autonoma Chapingo, Mexico presented results of a questionnaire survey on the factors that motivate the adoption of quality and food safety controls in meat processing plants. Four key factors were identified which included good practices, improved quality of products, reduction of wastes and efficiency, and the profitability of the plant. Christopher Griffith from University of Wales Institute-Cardiff used a questionnaire to identify specific details of consumer food hygiene education. Results showed the most common food hygiene issue was cross contamination. Efforts to educate consumers were performed by 94 percent of Environmental Health and Health Promotion departments through food handling advice for consumers though these departments reported effectiveness at only 22 percent among the consumers. Ginger D. Fenton from Pennsylvania State University presented results from a comparison of computer-based training and face-to-face training for the increased knowledge and improvement of food safety attitudes. Both focus groups showed increased knowledge and attitude of food safety processing which suggested that computer-based training could be an acceptable option to face-to-face training dependant on literacy, language barrier and time constraints within a company. Christopher Griffith from the University of Wales Institute-Cardiff presented results from a survey detailing the attitudes of users of cloth-wipes in domestic kitchens. Consumers were shown how to use many different types of cloth-wipes for a multitude of different purposes. The majority of consumers believed that cloth-wipe contain high bacterial counts but the same cloth-wipe, contradictorily, was used in meal preparation and cleaning even following high risk practices such as handling and processing raw chicken. The results showed a need for education to consumers to improve behavior related to cloth-wipes used in domestic kitchens. Judy A. Harrison from the University of Georgia presented results of the comparison of interactive computer games in addition to an animated video and workbook on foodborne illness and safe food handling principles. The short-term result showed no significant difference between both groups but the long-term results showed a significant increase in knowledge

when using computer games. Amy Simonne from the University of Florida discussed results from a survey of local farmers' market producers on the education and knowledge of food safety. A majority of vendors believe food safety is important for their operation, however only 32 percent completed food safety training. When asked about their knowledge of the FDA's publications on food safety, a majority of the vendors were unaware of the literature. Results from the study provided insight and direction for future food safety educational efforts in direct marketing groups. Julie Albrecht, University of Nebraska-Lincoln, discussed results from a survey on thermometer use and understanding among consumers for safe food preparation. A majority of participants had a variety of thermometers in their kitchens. The food item most tested for doneness was the turkey, however, 36 percent of the participants did not use any thermometer in food preparation, and only 40 percent of the participants knew the proper temperature to cook hamburgers. Sandra M. McCurdy from the University of Idaho discussed reducing risk in cooking food beef patties using food thermometer and strategies to improve consumer behavior. A telephone survey via telephone following receipt of educational material on the use of the thermometer showed positive responses to educational information resulting in improved safety and palatability when cooking thin/small meat items. Brenda Halbrook, USDA-FNS, explained the responsibility of FNS in administering the National School Lunch Program, School Breakfast Program and other nutrition assistance program. The relationships with federal agencies and private organizations to prevent foodborne diseases have resulted in improved food safety in the NSLP. Gun Wirtanen from VTT Biotechnology, Finland, discussed a survey of the Finish food industry related to food equipment hygiene on seven different topics. Results from the survey identified packing machines, conveyers, dispensers, slicing and cooling machines as the most problematic equipment due to poor hygienic design. But also the survey indicated problems with the definition of hygiene and responsibility in process line integration. The study underscores the need for communication among equipment manufacturing, food processors, equipment personnel, and chemical manufacturers. O. Peter Snyder, Jr. from the Hospitality Institute of Technology and Management discussed the need for a unified process to educate food preparers. The use of HACCP documentation and control rules would allow food preparers to work in any food process and reach the desired food safety objective.

T07 - General Microbiology Technical Session

Renee Raiden and Vanessa Teter,
Virginia Tech University University

The first section, "The Direct Detection of *Salmonella* and *E. coli* O157:H7 from Raw Alfalfa Sprouts and Spent Irrigation Water," was presented by Lynette Johnston. This study tested ways to reduce detection time when using rapid detection methods testing for *Salmonella* and *E. coli*, and found that by using methods such as bacterial separation and concentration by centrifugation, they were able to reduce the enrichment step and confirm bacterial presence in 24 hours. The next presentation given by Jarret Stopforth was "Location of Bung Bagging during Beef Slaughter Influences the Potential for Spreading Pathogen Contamination on Carcasses." The study compared bung bagging after pre-evisceration to an alternative of bung bagging before the pre-evisceration wash for the potential spread of Enterohemorrhagic *Escherichia coli*, *E. coli* O157:H7, and *Salmonella* spp. on carcass surfaces. The study found that the alternative method of bung bagging before the pre-evisceration wash was more effective in preventing bacterial spread. Lindsey A. Keskinen next presented "Impact of Bacterial Stress and Biofilm Forming Ability on Transfer of Surface-dried *Listeria monocytogenes* cells during Slicing of Delicatessen Meats." The purpose of this study was to determine the affect of injury on the formation of weak and strong biofilms on delicatessen slicing blades to examine the possible spread of cross contamination. The results found that the strong biofilms had greater survival on delicatessen blades, and that the length of time the blade was incubated did not significantly affect biofilm transfer to the luncheon meats.

Next, Elliot T. Ryser presented "Transfer of *Listeria monocytogenes* during Slicing of Turkey Breast, Bologna, and Salami Using Kitchen Knives." Two grades of stainless steel knives, 304 and 316, were inoculated with a cocktail of *Listeria monocytogenes* and used to slice salami, bologna, and roast turkey. Results found that 304 grade blades showed a greater tailing and 316 are the recommended blade for retail delicatessen use. Peter J. Toarmina presented "Evaluation of Hot Water and Sanitizer Dip Treatments of Contaminated Meat-cutting Knives." The objective of this study is to test the efficiency of hot water, warm water, and sanitizing dips for knives in meat cutting facilities. Knives were inoculated with raw pork residues and *Escherichia coli* O157:H7, *Salmonella* Typhimurium DT104, *Clostridium perfringens*, and *Lactobacillus* spp. Results found that brief treatments had limited efficacy, and longer immersions proved more effective. Louise Fielding presented "Evaluation of the VERIclean Hygiene Indicator Test, Compared with Traditional Microbiological Methods,

to Assess the Efficacy of Hand Washing." The VERIclean system is a cheap and rapid alternative to traditional microbiological methods when measuring the efficacy of hand washing. This study tested its methods and found that there is no significant difference between the VERIclean system and traditional microbiological methods. Next, David Acheson presented "Restructuring Employee Health Requirements in the FDA Food Code to Reduce the Risk of Transmitting Viral and Bacterial Pathogens from Infected Food Employees in Food." The Food Code was first developed in 1993, before the Norovirus had been seen as an important food pathogen. This presentation discussed the factors

that need studied as well as potential contamination from food workers, and the importance of protecting public health particularly when dealing with the Norovirus. The final lecture, "Rapid Determination of Bacterial Load for Assessment of Water Quality," was given by Rolf Deininger. This lecture examined different methods of determining bacterial load in the water supply by using techniques such as heterotrophic plate counts, acridine orange direct count, direct viable counts, ATP bioluminescence, and fecal coliform tests. Specifically the luminescence method is easy to use in the field with portable equipment and is also useful for laboratories and food processing plants.

Gale's Challenge Raises Over \$6,000 for the Foundation!



During the Opening Session at IAFP 2005 Gale Prince issued a challenge. Gale pledged to match donations to the Foundation up to \$1,000. We are proud to announce that this goal was not only met, but exceeded.

A special thanks to each of you who made this challenge a success.



IAFP 2005 Workshop Summaries

International Life Sciences Institute and the American Meat Institute Foundation co-sponsored a workshop on "Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed" at the International Association for Food Protection's 2005 Annual Meeting

Eric Fugett,¹ Marguerite Neill,² Kendra Knightengale,¹ Martin Wiedmann,¹ and Catherine Nnoka³

¹Department of Food Science, Cornell University, Ithaca, NY, USA

²Brown Medical School, Providence, RI, USA

³International Life Sciences Institute, Washington, D.C., USA

Nine university representatives, 14 industry professionals, seven government agency officials, and three members of trade associations participated in a workshop entitled "Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed" at the 2005 IAFP Annual Meeting in Baltimore, MD. The workshop was lead by Martin Wiedmann, Cornell University, and Marguerite Neill, Brown Medical School. Adjunct instructors included Jack Guzewich, Emergency Coordination and Response, FDA; Faye Bresler, Human Health Division, USDA/FSIS; and Randall Huffman, American Meat Institute Foundation and Robert Reinhard, Sara Lee Company. The workshop trained participants in molecular subtyping and epidemiological methods to track and control foodborne illness.

Day one of the workshop included presentations on epidemiological principals, statistics, molecular subtyping, field investigations, and the role of government agencies in foodborne illness outbreak investigations. Dr. Neill's lecture taught participants the major tenets of epidemiological studies (e.g., case definition, population at risk) and how to apply quantitative epidemiology in outbreak investigations. She explained that epidemiology is a way to organize observations so that unbiased associations or linkages can be detected. Additionally, she detailed the uses of case-control studies to determine possible foods associated with disease. She also cautioned participants about over-reliance on molecular subtyping data without accompanying epidemiological data.



Sitting/kneeling, left to right: Catherine Nnoka, Marguerite Neill, Jennifer Cascarino, Andrea Laycock, Martin Wiedmann, Frederick Gentry, Terrence Cheung, and Yuewei Hu.

Standing, left to right: Donna Rosenbaum, Viviana Fino, Sarah Radermacher, Sarita Raengpradub, Todd Rossow, Parmesh Saini, Ian Jensen, Adriano Garcez, Jackie Scialabba, Kathleen O'Donnell, Kendra Nightingale, Eric Fugett, Elena Enache, Bob Reinhard, Andrew Jaine, Peter Sutherland, Randy Huffman, and Jack Guzewich.

Not pictured: Faye Bresler, Mark Kreul, Claire Lee, Tom Moore, Nobuko Ogino, Jill Snowdon, and Suzanne Tortorelli

Dr. Wiedmann explained that molecular subtyping differentiates between bacteria of the same species based on a given bacteria's genetic information. He also defined the principles behind several prominent DNA-based molecular subtyping techniques (e.g., pulsed-field gel electrophoresis, ribotyping, and multi-locus sequence typing) and explained their strengths, weaknesses, and applications. DNA-based subtyping is useful for surveillance of bacterial pathogens and outbreak detection, and can be used to determine outbreak sources and monitor the spread of pathogens through the food production chain. Lastly, Dr. Wiedmann spoke on PulseNet, a national network that connects the CDC, state and local health departments, and other federal agencies to allow rapid exchange of DNA "fingerprints" for selected foodborne pathogens.

Adjunct faculty illustrated the benefits of collaborative approaches to food safety and outbreak detection by infusing the lectures with their expertise on a broad range of topics. Jack Guzewich described the role of local, state, federal and international agencies and their authority in foodborne illness investigations. Faye Bresler outlined the steps in the traceback process during foodborne illness investigations, and considerations for regulatory action based on investigation findings. Randall Huffman described in-plant investigations and suggested how in-plant crisis management teams can effectively manage an outbreak scenario by working closely with investigators. Overall, the lectures illustrated the need for a multi-disciplinary team approach to foodborne disease outbreak investigations.

On day two, the workshop featured mock local, and multi-state outbreak investigations, which allowed the participants to apply information provided in the lectures to a real world problem. Workshop teams reflected a broad range of skills and specializations. The diverse nature of participants' careers proved invaluable throughout the outbreak investigations because each person brought expertise related to microbiology, epidemiology, plant methodologies, and regulatory authority to the exercise.

Dr. Neill led a mock local outbreak investigation featuring a *Salmonella* outbreak that subsequently led to a national and international traceback investigation. She trained participants to "think like an epidemiologist" by working step-by-step through a local outbreak investigation that stemmed from a non-traditional source. This outbreak investigation taught participants to think broadly about plausible causes of an outbreak and devise methods to test the validity of each hypothesis. She also clearly

illustrated the responsibilities of each team member involved in an outbreak investigation and how multi-disciplinary teams bring broad expertise that is highly applicable to investigations.

Dr. Wiedmann led a mock multi-state outbreak investigation featuring a *Listeria monocytogenes* outbreak. He taught participants how molecular subtyping data is especially useful in identifying geographically widespread outbreaks by linking seemingly unrelated sporadic cases by subtype. Participants learned how to determine if an outbreak is occurring by establishing a case definition, determine the outbreak vehicle and the likely outbreak source, and determine recall and follow-up procedures. Participants gained experience in the interpretation and application of PFGE data in an outbreak investigation scenario. They also designed a case-control study to determine what foods were associated with an elevated risk for disease. Finally, the group employed traceback methodologies to identify plants as a possible source of the outbreak. At the end of the mock outbreak investigations, the two groups reconvened and were presented with outbreak investigation scenarios "gone wrong." These cases illustrated the importance of case definition in outbreak investigations and the risks associated with using molecular subtyping data without supporting epidemiological data.

The presence of a wide range of experts representing all sectors of the food industry greatly illustrated the importance of a multi-disciplinary approach to food safety. The effectiveness of epidemiological investigations and outbreak response can only be maximized when all groups involved in food safety actively work together to prevent and stop foodborne illness outbreaks. Continued food safety improvement requires strong collaboration and open data sharing between all organizations and firms involved in the food industry (i.e., industry, regulatory agencies and academia). It is vital that each participant be equally trained in epidemiological and molecular methods to facilitate a rapid and successful coordinated response to foodborne illness outbreaks. The International Life Sciences Institute of North America, the International Association for Food Protection, the American Meat Institute Foundation, and Cornell University partnered to achieve this goal. We hope this workshop will serve as a starting point for a move toward a more integrated approach to food safety for the prevention of foodborne illness.

Methods, Methods Everywhere But Which is Right for Me? Selection and Verification of Methods – A Review

This workshop, presented for the first time this year, seems to have hit its mark as indicated by the attendees' positive appraisals. With so many choices of microbiology methods, how does one decide? The topic – "Selecting analytical tools for microbiological analysis that best meets one's needs" enabled the presenters to teach about selecting a microbiological method that "fit the purpose" from their own perspectives.

Expectations of accrediting authorities from Canada and the United States for method verification were detailed. After the program all had a better understanding of the various international approaches to method validation schemes.

Deborah McKenzie, Program Manager and Maria Nelson, Technical Consultant of the AOAC Research Institute in Gaithersburg, M.D., presented a first time release and demonstration of the AOAC "online" learning center. The website demonstration proved to be not only an excellent resource but also a powerful tool in providing its viewers a comprehensive one stop center for selecting methods.

Robin Kalinowski, Senior Microbiologist for the National Center for Food Safety and Technology in

Summit Argo, IL, gave practical real life examples of how a corporate microbiologist selects appropriate methods, "fit for purpose". She emphasized the needs of the individual manufacturing sites and companies as the drivers for appropriate method selection.

Michael Brodsky of Brodsky Consultants in Thornhill, Ontario, Canada, presented the concept of uncertainty of measurement as a key component of method verification from a microbiologist's viewpoint. With the title of his talk "Is the Uncertainty of Measurement a European Conspiracy?" he brought a unique perspective to this subject.

Donna Christensen, of the Canadian Food Inspection Agency in Calgary, Alberta, Canada, used her rich experience working for the Canadian government to discuss the expectations of an accrediting body, from a Canadian perspective. This demonstrated the "true" international viewpoint of our organization, the International Association of Food Protection.

All attendees walked away from the workshop armed not only with a full day's presentation of ideas and discussion but also with a notebook collection of valuable resources to help them with the decision making process.



Highlights of the Executive Board Meeting

August 12-18, 2005

Baltimore, Maryland

Following is an unofficial summary of actions from the Executive Board Meeting held at the Baltimore Marriott Waterfront from August 12-18, 2005:

Approved the following:

- Minutes of April 18-19, 2005 Executive Board Meeting
- To establish a Food Law Professional Development Group
- To establish a Beverage Professional Development Group
- To increase maximum reimbursement limits on approved travel support for Annual Meeting presenters to \$750 for US and Canada and \$1,250 for those outside of US and Canada
- Signing of a working relations document with the World Health Organization
- An investment policy for Foundation monies (recommended by the Foundation Committee)

Discussed the following:

- E-mail votes taken since the last meeting
- Listserv vs. E-mail list for Committee Member communication – continue with E-mail list
- Foundation fundraising efforts for IAFP 2005 and beyond
- Committee recommendations to the Executive Board
- Request to hold an organizational meeting for a Beverage PDG
- Any possible consolidation of PDGs that overlap in mission
- Revision of the Foodborne Illness Investigation Booklet
- Continuing work on the Food Worker Hygiene paper
- Sponsorship for the International Leadership Award
- Board schedule of activities and commitments for IAFP 2005
- Rapid Response Series task force appointed
- Avian Influenza paper is progressing
- University Speaker Program – Iowa State University scheduled for September 2005
- Student Travel Scholarship Program – two sponsored students for IAFP 2005, four to be sponsored in 2006

- Moving forward with an effort to restructure IAFP Member dues
- Encouraging Japan to establish an Affiliate organization
- Non-compliant Affiliates have moved towards compliance
- Added table-top exhibits and poster presentations to IAFP's European Symposium
- Continue exhibiting relationship with Food Safety Summit
- Begin exhibiting relationship with Food Safety World
- Food Safety Research Coalition – Paul Hall to represent IAFP
- Establish collaboration with AOAC International
- Reappointment of representatives to the 3-A Sanitary Standards, Inc. Board
- Communicate with Association for Laboratory Automation
- Investigate online voting options and legal requirements
- Exhibitor activities outside of the Exhibit Hall
- Concurrent meetings held with IAFP's Annual Meeting
- Future Annual Meeting sites
- Future Board meeting dates

Reports received:

- *Food Protection Trends*
- *Journal of Food Protection*
- IAFP Web Site
- Membership update
- Advertising update
- Financial statements for period ending June 30, 2005
- Board Members attending Affiliate meetings
- Affiliate Newsletter
- Future Annual Meeting schedule
- Exhibiting (IAFP On the Road)
- Future Board meeting dates

Next Executive Board meeting: October 28, 2005

Minutes of the International Association for Food Protection 92nd Annual Business Meeting

August 16, 2005
Baltimore, Maryland

President-Elect Jeffrey Farber welcomed attendees and introduced President Kathy Glass.

Moment of Silence

President Kathy Glass asked those present to observe a moment of silence in memory of departed colleagues.

Call to Order

The Annual Business Meeting of the International Association for Food Protection was called to order at 12:21 p.m. at the Baltimore Marriott Waterfront Hotel in Baltimore, Maryland. A quorum was present, as defined by the IAFP Constitution.

With the approval of the Executive Board, President Glass appointed Randy Daggs as Parliamentarian for the Business Meeting.

Minutes

Minutes from the IAFP 91st Annual Business Meeting were approved as they appeared in the November 2004 *Food Protection Trends*. The motion was made by Bob Sanders and seconded by Jack Guzewich.

President's Report

President Kathy Glass reported on programs and activities of IAFP over the past year. She reported that the Association had a very successful financial year during 2004. There were 100 more attendees pre-registered for IAFP 2005 over last year, Membership has increased and we have seventy-nine Sustaining Members, including 4 Gold and 9 Silver. Two new PDGs established at this year's meeting include the Food Law PDG and Beverage PDG. Two Student Travel Scholarships were established and presented this year, one to Stephen Grove from Australia and one to Brooke Whitney from Virginia. The IAFP Foundation provides this support, which will be increased to four student scholarships for IAFP 2006 with one identified for a student from a developing country.

Both of the Association journals continue to grow in number of articles and in stature. *JFP* Online added two back volume years during the year and additional *FPT* articles are available to Members via the IAFP Web site. There are now more than one thousand users of *JFP* Online. President Glass reported the Association Web site redesign was completed in April this year and is much better organized now. Student activity continues to expand during Annual Meetings and throughout the year. In October 2005, the Association is sponsoring its first European Symposium in Prague, the Czech Republic.

Upon conclusion of her report, President Glass presented an Affiliate Charter to Roger Cook who accepted on behalf of the New Zealand Association for Food Protection.

Tellers Committee Report

Marianne Smukowski, Teller, reported there were 773 valid votes received. Stan Bailey was elected as Secretary for the 2005-2006 year. A motion by Michael Brodsky and seconded by Jack Guzewich to accept the report and destroy the ballots was approved.

JFP Management Committee Report

Chairperson Roger Cook reported that there was a 94% increase in manuscript submissions with 492 more pages and 73 more manuscripts published during 2004 over 2003. The Committee strongly recommended that a fourth Scientific Editor be added due to the increasing workload. In addition, they recommended proceeding with implementation of online review of manuscripts, reappointing Joseph Frank as Editor for another four-year term, and implementing a *JFP* Editorial Board reception at next year's meeting in Calgary as a way of thanking the reviewers for their hard work. Morrie Potter was selected as Vice Chair to begin his term at IAFP 2006. A motion to accept the report made by David Golden and seconded by David Fry was approved.

FPT Management Committee Report

Chairperson David Golden reported that Beth Johnson had been elected the new Vice Chair. The Committee discussed reinstating the "Thoughts on Food Safety" column and Doug Powell agreed to make recommendations and direct submissions. Concerns from Editor Ed Zottola regarding *JFP* articles forwarded to *FPT* were expressed with a recommendation that guidelines be established for *FPT* article submissions. A motion to accept the report made by Harold Bengsch and seconded by Carl Custer was approved.

Foundation Fund Report

Gale Prince reported that he would have to write a \$1,000 check because over \$1,000 in donations had been made in response to his challenge at the Opening Session. In total, more than \$6,000 was raised. He reminded the Membership of the Committee's goal of raising \$1 million by 2010 and noted the Foundation's increased marketing efforts during IAFP 2005. Upon conclusion of his report, the Florida Association for Food Protection (FAFP) offered an entertaining presentation, which concluded with a contribution to the Foundation Fund of \$1,000. Gale thanked FAFP for their creativity and their contribution.

Affiliate Council Report

Stephanie Olmsted reported there were 39 people representing 25 Affiliates in attendance at the Sunday Affiliate Council meeting. Affiliates reported on activities carried out during the year and elected Maria Teresa Destro, from Brazil, as the new Affiliate Council Secretary. Terry Peters, from British Columbia, received the gavel as incoming Affiliate Council Chairperson and will serve on the Executive Board this year. There are now 41 Affiliates, including the newly chartered New Zealand Association for Food Protection. Stephanie also reported good attendance at the Affiliate Reception on Saturday evening.

President's Award

Kathy Glass presented the President's Award to Mike Davidson, Joe Frank, and John Sofos for their dedicated work as Scientific Editors with the *Journal of Food Protection*. Roger Cook was also recognized with the President's Award for his efforts in establishing the new Affiliate in New Zealand.

Executive Director's Report

David Tharp reported on the financial condition of the Association and stated that as of August 31, 2004, the Association completed its best financial year ever with \$163,000 added to the General Fund balance. A financial summary for the year ending August 31, 2004 was presented. He expected fiscal year 2005 to also add to the General Fund balance with the expectation of a financially successful 2005 Annual Meeting. The financial audit for year ending August 31, 2005 will be presented to the Executive Board at its November meeting.

The European Symposium on Food Safety to be held in Prague, Czech Republic on October 11 and 12 was brought to Members' attention. David explained this was the first meeting to be organized outside of North America by the Association in its 94-year history and thanked ILSI-Europe, Leon Gorris, Anna Lammerding, Jeffrey Farber and the organizing committee for their help and guidance in planning this symposium.

David reported the Board and staff were looking into a Membership dues restructure to make IAFP Membership more affordable for everyone. The restructure is designed to allow Members to select the journals they are interested in and to select the delivery method they desire (i.e., hard copy or electronic).

The IAFP staff was recognized for sacrifices made while working extended hours leading up to and during IAFP 2005. David thanked them for their extraordinary efforts related to the Annual Meeting. He also thanked the Local Arrangements Committee (LAC) and Jill Snowden (LAC Chairperson) from the Capital Area Food Protection Association for their help with IAFP 2005. To end his report, he expressed his thanks to the Executive Board for their support and direction over the past year.

Unfinished Business

There was no unfinished business.

New Business

President Kathy Glass asked that a motion be made to approve the seven Bylaws Amendments as published in the May 2005 issue of *Food Protection Trends*. The motion was made by Ron Case, seconded by Bob Sanders and was approved.

Larry Mendes asked the Association to consider targeting companies at the executive level to promote the benefits to such companies of having their staff actively involved in IAFP.

Adjournment

A motion to adjourn made by John Cervený and seconded by Jack Guzewich was approved. President Glass adjourned the meeting at 1:01 p.m.

Respectively Submitted,

Gary Acuff, Secretary

Committee Minutes

STANDING COMMITTEES

Food Protection Trends Management Committee

Members Present: David Golden, Beth Johnson, Ed Zottola, Peter Bodnaruk, Jinru Chen, Dan Erickson, Leon Gorris, Judy Greig, Carol Selman, and Alex von Holy.

Members Absent: Roger Cook, Carl Custer, Tom McCaskey, Hussein Hussein, Mariza Landgraf, Joseph Meyer, Franco Pagotto, Tony Valenzula, and Richard Whiting.

Board and Staff Members: Kathy Glass, Jeff Farber, Frank Yiannas, Donna Bahun, and Lisa Hovey.

Guests: Fred Weber, Pete Cook, Steve Berry, Maria Teresa Destro, and Alfred Fain.

Meeting Called to Order: 2:10 p.m.

Recording Secretary of Minutes: Beth Johnson.

Old Business: Introduction of Beth Johnson as Committee Vice Chairperson. Welcome to new Committee members and thanks to departing members. No Additions or modifications to the agenda were offered. Dan Erickson asked that minutes from the 2004 meeting be corrected to show that he was present at the meeting. The minutes were accepted with the change. President Kathy Glass gave a brief report on the current status of IAFF and highlights of the past year. Ed Zottola submitted a report and noted he is having problems with reviewers disappearing and reviewer E-mail addresses that are no longer valid. Donna Bahun stated that the number of papers submitted and published were about the same as previous years.

Regarding the "Thoughts on Food Safety" column, the committee discussed what we are looking for, what and where are the guidelines and criteria, history of the column, obvious reader interest and the need to resurrect the sub-committee to pick topics and solicit authors to write and submit articles. A suggestion was made to ask each PDG to submit one article per year to use in the column.

New Business: With the Executive Board's request that we reconvene an active sub-committee to solicit columns, Chairperson David Golden asked for volunteers from the members of the committee. Leon Gorris volunteered to participate and other members will be recruited in the future.

Ed Zottola expressed concern about the types and numbers of articles being referred to *FPT* from the *Journal of Food Protection*. Articles deemed not technical enough for *JFP* are currently being sent to him for consideration. The committee discussed the need for guidelines for articles.

Recommendations to the Executive Board:

1. To move forward on implementing accommodations to accept online submission of papers for publication in *FPT*.
2. To include in the PDG Chairperson Guidelines to solicit ideas and topics along with author suggestions for the "Thoughts on Food Safety" column.
3. To give some guidance on criteria for the proposed "Feature Member" article.
4. To allow the Scientific Editor to write guidelines for *FPT* articles for authors and *JFP* to use.
5. That *FPT* be listed in PubMed or similar indexing service to encourage submissions.

Next Meeting Date: August 13, 2006.

Meeting Adjourned: 4:05 p.m.

Chairperson: David Golden.

Journal of Food Protection Management Committee

Members Present: Roger Cook (Chairperson), Maria Teresa Destro (Chairperson Elect), John Sofos (Scientific Editor), Michael Davidson (Scientific Editor), Joseph Franks (Scientific Editor), Bev Brannen (Administrative Editor), Morris Potter, Payton Pruett, Elliot Ryser, Kathryn Boor, Pina Fratamico, Lori Ledenbach, P. C. Vasavada, and Scott Burnett.

Apologies: Lone Gram, Judy Fraser-Heaps, Jennylynd James, Mark Moorman, Eric Johnson, and Randall Phebus.

Members Absent: Tina Pedroso and David Acheson.

Board Members/IAFF Staff Present: Kathleen Glass, Jeff Farber, Gary Acuff, David Tharp, Lisa Hovey, Bev Brannen, and Didi Loynachan.

Guests Present: Jack Guzewish.

Leaving: Mark Moorman, Randall Phebus, Marian Wachtel, and Elliot Ryser.

Meeting Called to Order: 10:10 a.m.

Introductions: The committee welcomed Kathryn Boor, Pina Fratamico, Lori Ledenbach, P. C. Vasavada

to the committee. Committee thanked departing members Mark Moorman, Randall Phebus, Marian Wachtel, and Elliot Ryser.

Recording Secretary of Minutes: Maria Teresa Destro.

Old Business: Minutes of the 2004 meeting were reviewed and approved (Potter/Pruett).

Review of issues arising from 2004 meeting:

1. Clarification of Web site instructions for selection of subscription solely to *JFP* Online: The newly formed Membership Committee are currently re-evaluating the structure for IAFFP membership and journal subscriptions. Online-only service will likely be accounted for in a new structure.
2. Amendment of the scope of *JFP* to discourage papers without a "food protection" context: Completed, as required.
3. Instructions to authors to be amended to add a five page limit on "Letters to the Editor" responses: Completed, as requested.

New Business:

- Amendments to agenda (Cook/Sofos):
 1. Add 10.2, Selection of new Vice Chairperson for 2006-2008.
- Report from IAFFP president: Kathy Glass provided an update of activities in 2004/05.
- Report from IAFFP Office: David Tharp provided an update of activities in 2004/05.
- Report from *JFP* Scientific Co-Editors (Boor/Potter): Joseph Frank presented a report of activities in 2004 and 2005 to-date. Volume 67 (2004) contained 492 more pages and 73 more articles than volume 66; an increase, as noted last year, that continues to reflect heavily on the Editor workloads. More importantly, and again an improvement over 2003, 79% and 94% of articles were published within 10 and 12 months respectively. The backlog continues to fall dropping from 2.13 in 2003 to 2.04 in 2004.
- 2005 (volume 67) is on track to be another record year, the number of papers published to date increasing 21% over 2004.

International authors provided 43.51% of submitted papers, similar to last year, with Spain followed by Japan submitting the most papers. The numbers on the Editorial Board remained stable in 2004, although the Committee was strongly recommended that IAFFP encourage more members.

The Editors expressed their deep appreciation for the hard work and dedication of the Editorial Board, and ad hoc reviewers for 2004.

The Committee in turn offered thanks to the Scientific Editors and the Editorial Board for a job well done in the face of the increased numbers of submitted papers.

- Report from Administrative Editor (Potter/Fratamico): Bev Brannen reported:
- Projected 700 submitted manuscripts for the 2005 year.
- Online submission of manuscripts up from 83% to 92%.
- *JFP* now popular for symposium supplements.
- Member subscribers up 353 and institutional subscribers up 34.
- Only 1/3 taking *JFP* online only. (Maybe because of difficulty in selecting online only – Chairman's comment).
- The Committee expressed their utmost appreciation to Bev Brannen and Didi Loynachan for their unfaltering hardwork during the year.

Further Business:

- **Scientific Editors:** The Committee again noted that the increase in number of submitted papers and acceptance of specific symposia had substantially, and unacceptably, increased the workload of the Scientific Editors and resulted in a decrease in quality of the Editors reviews. The workload of the Editors is now deemed unacceptable.

Board recommendation 1: That the Board immediately initiate proceedings to employ a 4th Scientific Editor (Ledenbach, Pruett).

- **Online review of papers:** Following the success of online submission of papers to *JFP*, the advantages and disadvantages of online review of manuscripts and quotations were again discussed. The Committee agreed that the online review program be implemented but only after a 4th Scientific Editor is implemented.

Board recommendation 2: That the Board progress implementation of a system for online review of papers (Pruett, Vasavada).

- **Scientific Editor:** It was agreed that the term for Joseph Frank be extended for a further 4 years (Boor, Fratamico).

Board recommendation 3: That approval be granted for extension of the term for Joseph Frank as Scientific Editor for a further 4 years.

- **Editorial Board reception:** It was agreed that the IAFFP Board be approached to assess the viability of providing a reception in thanks for members of the Editorial Board and Ad-Hoc Reviewers (Ryser, Vasavada).

Board recommendation 4: That a reception in thanks be organized for members of the Editorial Board and Ad-Hoc Reviewers.

- **Vice-Chairperson (2006-2007):** Morrie Potter was elected unopposed.

Recommendations to the Executive Board:

1. That the Board immediately initiate proceedings to add a fourth Scientific Editor.
2. That the Board progress implementation of a system for online review of papers.
3. That approval be granted for extension of the term for Joseph Frank as Scientific Editor for a further 4 years.
4. That a reception in thanks be organized for members of the Editorial Board and Ad-Hoc Reviewers at Annual Meeting.

Meeting Adjourned: 11:30 a.m.

Chairperson: Roger Cook.

Program Committee

Meeting Attendees: Alejandro Castillo, Cathy Donnelly, Linda Harris, Shelagh McDonough, Vickie Lewandowski, Susan McKnight, Indaue Mello-Hall, Tim Jackson, Ron Schmidt, Gloria Swick-Brown, and Don Zink.

Members Absent: Pascal Delaquis, Emilio Esteban, Faye Feldstein, and Margaret Hardin.

Board Members/IAFP Staff: Gary Acuff, Jeff Farber, Frank Yiannas, and Bev Brannen.

Meeting Called to Order: 4:00 p.m.

Recording Secretary of Minutes: Lee-Ann Jaykus.

Summary of Activities and Actions Taken: Cathy Donnelly, Shelagh McDonough, Margaret Hardin, and Emilio Esteban will be leaving the Committee at the conclusion of IAFP 2005. On behalf of the Program Committee, we want to thank them for their contributions during their term. Their efforts were, in part, responsible for the successful programs presented at the Annual Meetings, and we truly appreciate all their hard work and dedication.

Members who will join the Committee this year: Pascal Delaquis, Linda Harris, Susan McKnight, and Gloria Swick-Brown. Lee-Ann Jaykus will serve as vice chairperson for IAFP 2006 and will become Chairperson for IAFP 2007 in Lake Buena Vista, FL.

The Committee served as a forum for groups wishing to present symposia and workshop proposals for IAFP 2006. At the Sunday committee meeting, 45 symposia and 5 workshop proposals were submitted. Further review of all symposia will be made during the Thursday meeting.

Chairperson: Vickie Lewandowski.

SPECIAL COMMITTEES

Awards Committee

Meeting Attendees: Stephanie Olmsted, Terry Peters, and Steve Murphy.

Board Members Present: Gary Acuff.

The committee held an informal discussion. There were two topics of discussion.

1. The issue of "conflict of interest" was discussed. Generally, at least two of the three judges are members of Affiliates being considered for Affiliate awards. The current practice is for the affected judge to abstain from voting. Further research indicated that the committee structure is specified by IAFP bylaws. No change at this point in time.
2. Clarification was required to distinguish criteria between Best Affiliate Educational Conference Award and Best Affiliate Annual Meeting Award. The committee discussed the issue, and current wording is sufficient.

No other issues.

Meeting adjourned: 4:00 p.m.

Chairperson: Stephanie Olmsted.

3-A Committee on Sanitary Procedures

Meeting Attendees: Philip Wolff, Jean Delean, Dave Fry, Dan Erickson, Ken Anderson, Dan McElroy, Bob Sanders, Steve Sims, and Sherry Roberts.

Board Members/IAFP Staff: Gary Acuff.

Meeting Called to Order: 10:00 a.m.

Recording Secretary of Minutes: Sherry Roberts.

New Business: Gary Acuff, Board Liaison discussed PDGs thinking beyond symposium developments during their meetings. There are two new groups this year. PDGs should consider ways to interact with local affiliate chapters.

We need to add to the SOPs of the 3-A Sanitary Standards to have strikeouts and underlines used in each amended or update of a standard or practice.

We need to improve conference calls. Maybe there is a way to have a Web site with the standard open that everyone on the call can see the changes that are made all at the same time. We need to recommend to 3-A SSI to develop a means to accomplish this for the working groups.

Discussion of a symposium on "Verification of Sanitary Designs" followed. Ron Schmidt made a motion to present this to the Program Committee and he also agreed to Chair. This motion was seconded and passed;

the symposium was developed to have presenters from different entities speak. These may include, but not limited too, NSF, 3-A, FDA, USDA, EHEDGE, and BSI. We also need to include evaluating the design of equipment under a HACCP Program.

The question was asked if there had been any standards passed this year. To the knowledge of the group, no standards had completed the entire process at this time.

The 3-A Steering Committee is meeting on Thursday, August 18, 2005 from 7:30 a.m. to 5:00 p.m. to try and complete the changes to be made to the model document.

Recommendations to the Executive Board:

1. See what can be done to have a 3-A Standard open on the Web site and one person making changes to the document that everyone logged on the page could see on their individual computers.

Meeting Adjourned: 12:00 p.m.

Chairperson: Sherry Roberts.

Audiovisual Library Committee

Meeting Attendees: Bob Sanders, Tom McCaskey, Dorothy Wrigley, Don Schaffner, Bernadette Franco, Judy Harrison, Frank Yiannas, Purenendu Vasavada, Ema Maloowado, Nahed Kotrola, Cindy Roberts, and Nancy Herselius.

Meeting called to order: 1:02 p.m.

Recording Secretary: Dorothy Wrigley.

Old Business:

Review of AV Library Services:

1. Sixteen new acquisitions: 5 videos, 8 DVDs, 3 copies of high use videos.
2. Review of 2004 minutes.
3. Reviewed library usage: 823 requests, 812 fulfilled; unfulfilled linked with high use items; it was suggested that additional copies be purchased.
4. Committee has 38 members.
5. User evaluation of specific videos: most comments are positive in terms of audience appropriateness, material and technical merit; one problem concerns outdated information on temperature to 41 – 135 F.

New Business and Discussion:

1. Budget for 2006 was reviewed. Requested for next year a comparison of budget from year to year (2005, 2006, proposed 2007) M/S/P to recommend proposed budget of \$13,100.
2. Need to convert old slides to new format such as PowerPoint – suggestion to approach provider for updated format.
3. Opportunity to promote IAFP membership through AV Library loans – suggestion: send membership form out with each video and request user pass it on to colleagues.

4. Returning video: some concern expressed that international loans need longer time than current and the US loans may need to be longer too. Should loan be increased from 2 – 3 weeks for US; 3 – 4 weeks for non-US Discussion on communication from headquarters to delinquent users; the need for individual interactions on overseas/international loans.
5. Committee membership: if someone doesn't respond to query on whether they plan to attend meeting and/or is not active in reviewing material should they be dropped from membership?
6. Long term goals of committee: The library is doing well and should continue to build discussion on (1) how to get more videos; (2) how to get more videos in Spanish; (3) National Ag Library is not continuing video acquisition; could possibly contact Jan Singleton for extra copies.
7. Library survey conducted last year; 49 respondents; most users are associated with food quality issues (QA / QC / Microbiology / Chemistry / Lab supervisors, etc.).
 - Most users are from private industry (67%)
 - Most learned about library from IAFP Members (63%)
 - Only 28.6% were first time users
 - Only problem mentioned was adequacy of lending period (26% said inadequate)

Next Meeting Date: August, 2006.

Meeting Adjourned: 2:55 p.m.

Chairperson: Bob Sanders.

Committee on Control of Foodborne Illness

Meeting Attendees: Bert Bartleson, Trent Wakenight, Mansour Samadpour, Jeff Farber, Agnes Tan, Judy Greig, Ewen Todd, Mike Cassidy, Morgan Wallace, Jack Guzewish, Shirley Bohm, Pete Cook, Chris Griffith, and Sabah Bidawid.

Meeting Called to Order: 8:15 a.m.

Recording Secretary of Minutes: Bert Bartleson/ Judy Greig.

Members present: Aamir Fazil, Serve Notermans, Robin Forgey, Richard Arsenaull, Yuhuan Chen, Tom Ross, Deon Mahoney, Patricia Desmarchelier, Ken Malone, Marisa Caipo, Darrell Donahue, Gloria Anderson, David Baker, Jenny Scott, Anna Lammerding, Rob Lake, Bin Liu, Peyman Fatemi, Ron Osborne, Don Schaffner, Wayne Sprung, Jeffrey Varcoe, Michael Brodsky, Alejandro Amezcua, John Bassett, Lu-Ann Jaykus, Doris D'Souza, Mark Cullison, Wendy Maduff, Ewen Todd, and Barbara Lund.

Guests: Tom Schwarz and Donna Rosenbaum.

Old Business:

- (a) The new name for the committee was approved by the Board to change from Communicable Diseases Affecting Man to Control of Foodborne Illness.
- (b) The symposium Foodborne Diseases: Discovery of Causes and Reduction Strategies proposed in 2004 was accepted for 2005 Annual Meeting.
- (c) Worker Hygiene Papers: there will be three papers:
 - First paper: Line listing of outbreaks caused by infected food handlers submission Dec. 2005. This information will be posted to the IAFP Web site for the use of the members of the Association and will be updated with new outbreaks on a regular basis, managed by the committee.
 - Second paper: Analysis of the factors related to the outbreaks in paper one, submission due May 2006.
 - Third paper: Control measures to prevent foodborne outbreaks related to infected food handlers, submission due June 2006.
 - Revision of Procedures to Investigate Foodborne Illness, Fifth Edition 1999. Continued discussion on modifying this manual to include bioterrorism information.
 - Consensus of the Committee to form a subcommittee for development of a paper for publication in *JFP/FPT* concerning the intentional contamination of food (including bioterrorism, contamination by disgruntled employees and extortion) stressing the coordinated efforts of public health, law enforcement and the media.
 - In addition, the Procedures manual will be revised to include information related to deliberate contamination of food, based on the draft by Trent Wakenight, as well as updates for updates for methodology and new pathogens.

New Business:

Symposia Suggestion for 2006: Changing Patterns of Foodborne Disease and New Approaches to Investigate Outbreaks.

- Changing risk factors in foodborne disease: Chris Griffith, University of Wales Institute Cardiff.
- How are the pathogens changing (multi-drug resistant strains, acid resistance, virulence, etc). John Threlfall, Colindale, London or Tom Whittam, Michigan State University.
- Trends in food worker practices: infected food workers and control strategies: CCFI committee member.
- Application of molecular epidemiological techniques to foodborne outbreak investigations: Mansour Samadpour.
- How epidemiology leads to identification of source of community outbreaks – the Australian perspective. Agnes Tan.

- The Korean approach to foodborne disease surveillance. Korean Affiliate to be contacted.
- Improving foodborne disease surveillance in Canada: Paul Sockett, Public Health Agency.
- Local response to deliberate contamination – a needed structure. Trent Wakenight, Michigan State University.
- How does the local public health professional deal with complaints of deliberately contaminated food products? Don Kautter, FDA/CFSAN.
- How companies determine and evaluate mitigation strategies to illness complaints. Barry Michaels, Palaka, FL.

Topic/Area Epidemiology and Public Health:

Surveillance has not been covered to a great extent in 2004 and 2005. The Committee on Control of Foodborne Illness (CCFI) wants to highlight its activities and those of some of its members. The role and work of food control officers is changing in the way they collect routine inspection data to be relevant to applied food safety research. This is reviewed in the context of changing risk factors implicated in foodborne disease outbreaks. One of the key concerns is increasing antibiotic and acid resistance and virulence of food pathogen isolates; this is discussed in relation to changes in agricultural practices. There are three presentations to describe well structured enteric disease surveillance systems that alert health authorities help to identify and control dispersed common source outbreaks, Australia, Canada, and Korea. Control strategies are recommended for infected food handlers based on the CCFI's evaluation of outbreak data. There are two related but not identical talks on local response to deliberate contamination, one a planned structure involving all the agencies that could be involved, and one reporting on actual complaints that have occurred. There will be a talk on industry responses to mitigate future risks following an incident, including how to assess their total costs.

Symposia Suggestion for 2007: Foodborne Disease Issues Related to Tourism and Foreign Travel.

Recommendations to Executive Board:

- I. It is recommended that the committee have a three-day retreat in the Washington, D.C. area for six people of the two subcommittees. This will allow members in early 2006 to concentrate on the preparation of the bioterrorism documents and the completion of the second and third food handler hygiene papers.

Next Meeting Date: August 13, 2006.

Meeting Adjourned: 3:30 p.m.

Chairperson: Ewen Todd.

Constitution and Bylaws Committee

Attendees: Ron Case (Chair), Dave Fry (Vice-Chair), Bob Sanders, Randy Daggs, Michael Brodsky, Zeb Blanton, Stan Bailey (Board Liaison), and David Tharp (Staff Liaison).

Meeting Called to Order: 11:06 a.m.

Recording Secretary of Minutes: Ron Case.

Old Business: Reviewed Proposed Bylaw Amendments for this meeting. These had been discussed by E-mail before being published. The committee agrees with all proposed changes and recommends they be approved by the membership. Ron Case will make a motion to approve all proposed changes at the 2005 IAFP business meeting.

New Business: Potential change for next year: allowing electronic voting for the Association. The committee felt it as a good change and will revise the required documents to include it at the Executive Board's recommendation.

Recommended Randy Daggs as the new Vice Chair.

Ron Case is resigning as Committee Chair effective at the end of the 2005 IAFP Business Meeting. This is to provide continuity of leadership for changes proposed for 2006. Dave Fry has agreed to move to Chair and Randy Daggs to Vice-Chair pending Board approval.

Recommendations to Executive Board:

1. Appoint Dave Fry the new Chairperson and Randy Daggs the new Vice-Chairperson of the Committee.

Next Meeting Date: August 13, 2006 in Calgary, Alberta, Canada.

Meeting Adjourned: 11:37 a.m.

Chairperson: Ron Case.

Foundation Committee

Meeting Attendees: Stan Bailey, Roger Cook, Bob Gravani, Gale Prince, Jenny Scott, Susan Sumner, Fred Weber, Don Zink, Wilbur Feagan, and Anna Lammerding.

Board Members/IAFP Staff Present: Kathy Glass, Jeff Farber, Frank Yiannas, Gary Acuff, Paul Hall, David Tharp, and Lisa Hovey.

Meeting called to Order: 3:11 p.m.

Recording Secretary of Minutes: Susan Sumner.

Old Business:

1. Reviewed the income and expenses of the Foundation.
2. Reviewed the Board actions on 2004 recommendations.
3. Gale Prince reported on subcommittee to draft vision statement for the Foundation and development of marketing materials for the Foundation.
4. Review of Foundation Programs.
 - Ivan Parkin Lecture
 - Student Travel Scholarships – 2 scholarships in 2005. This will increase to 4 in 2006
 - John H. Silliker Lecture (funded through a contribution from Silliker, Inc.)

- Travel support for exceptional speakers at the IAFP Annual Meeting
- Audiovisual Library
- Developing Scientist Student Competition
- Shipments of surplus copies of publications to developing countries

New Business:

1. Wilbur Feagan and F & H Food Equipment Co. announced a \$50,000 gift to the Foundation to match Kraft's contribution.
2. Appointed a subcommittee to develop a recognition plan for the Foundation contributors.
3. Appointed a subcommittee to develop a marketing plan for the Foundation.
4. Clarified the 2004 recommendation on travel, to indicate speaker travel supported by the Foundation to be increased by up to 10% of the three year rolling average revenue.

Recommendations to the Executive Board: None.

Meeting Adjourned: 4:45 p.m.

Chairperson: Gale Prince.

Membership Committee

Meeting Attendees: John Cerveny, Don Schaffner, Susan McKnight, Gordon Hayburn, David Tharp, Gary Acuff, Jeff Farber, Leon Gorris, Lisa Hovey, and Kathy Glass.

Meeting called to order: 3:00 p.m.

Recording Secretary: Susan McKnight.

Old Business: None.

New Business: Working on mission statement – retaining and recruiting new members.

Main reasons members of committee were members of IAFP and stayed members – contacts, networking, cutting edge and often pre-published work.

Discussed areas of IAFP that impact membership such as dues structure, PDGs activities becoming symposium-only work, repetitive symposium topics, students.

Recommendations to the Executive Board:

1. Explore increasing contact time with peers in some form of discussion group versus 25 symposia.

Next Meeting Date: Conference call, hopefully in October.

Meeting Adjourned: 4:30 p.m.

Chairperson: Susan McKnight.

Nominating Committee

Meeting called to Order: 11:10 a.m.

New Business: The Nominating Committee met to discuss candidates, from IAFP Industry Membership and to stand for election to become Secretary for 2006-2007. The committee will hold a conference call later

in the fall to open call for nominations from the IAFP membership to finalize candidates. Nominations are encouraged and should be submitted to Margaret Hardin, Chairperson or through David Tharp through the IAFP office.

Meeting Adjourned: 11:50 a.m.

Chairperson: Margaret Hardin.

Past Presidents' Committee

Meeting Attendees: Henry Atherton, Robert Brackett, Ron Case, Jim Dickson, David Fry, Anna Lammerding, Gale Prince, and Jenny Scott.

Board Members Present: Kathy Glass, Paul Hall, and David Tharp.

Meeting Called to Order: 1:10 p.m.

Recording Secretary of Minutes: Anna Lammerding.

Old Business: Preparation of a draft Code of Ethics (Membership Guidelines) pending. Participation of committee members in nominations of Award candidates: Positive input was received for this year's slate, and in future, consultation with Past Presidents' Committee will continue as needed.

New Business: None.

Recommendations to Executive Board: It is recommended that:

1. Meetings of the following committees: Past Presidents, Nominating, Foundation Fund, Awards, and Constitution and Bylaws be considered for Saturday afternoon, prior to the Annual Meeting, to avoid conflicts with PDG meetings.
2. The Past Presidents' committee meeting be scheduled for one hour only.

Meeting Adjourned: 2:55 p.m.

Chairperson: Anna Lammerding.

PROFESSIONAL DEVELOPMENT GROUPS

Applied Laboratory Methods PDG

Meeting Attendees: Patricia Rule, Gary Acuff, Christine Aleski, Reginald Bennett, Catherine Bowyer, Donna Christensen, J. Philip Coombs, William Cray, Jr., Ruth Eden, Jill Gebler, Grace Hall, Jeffrey Kornacki, Claire Lee, Shelagh McDonagh, Joe Shebuski, Cynthia Zook, Pamela Wilger, Molly Mills, Lance Bolton, Tim Jackson, Fritz Lembke, Joon Wong, Michael Brodsky, Indaue Mello-Hall, Rocelle Clavero, Nahed Kotrola, Jarret Stopforth, Anli Gao, Peyman Fatemi, Ann Marie McNamara, Jim Black, Robin Kalinowski, Wendy Molman, Neal Siegel, Cynthia Zook, Vickie Lewandowski, Purnendu Vasavada, Sherri McGarry, Ton-jen Fu, Lee-Ann Jaykus, and Suresh Pillai.

Meeting Called to Order: by Patricia Rule at 9:06 a.m.
Welcome by Patricia Rule, Chairperson.

Recording Secretary of Minutes: Jeffrey Kornacki.

Introduction of Members. Rough count 32 at beginning of meeting. 10-15 additional guests came late and 24 signed the attendance record.

Pat Rule discussed the purpose of PDG for promotion of professional development related to the mission of the laboratory methods committee and also the antitrust rules

Old Business:

- A. Discussion of need for group to communicate throughout the year.
- B. Discussion of the two workshops put on this year. Despite good verbal reviews of the speakers for the "Out of the Filing Cabinet" and "Trending Workshop," better definition for the target audience of the "Trending Workshop" was discussed. More emphasis on trending tools and "hands-on" work was discussed. The value of a Webinar was discussed.

New Business:

- A. Discussion of how we can keep active thru out the year. Pat Rule/Ann McNamara discussed again the value of Webinar. This is a method to share any material on a PC via the internet while conducting a teleconference discussion.
- B. Pat will coordinate these efforts with the Subcommittee members listed below. A first trial with the subcommittee was set for Sept. 20th.
 - Pamela Wilger
 - Molly Mills
 - Nahed Kotrela
 - Ann Marie McNamara (advisory only)
 - Bill Cray
 - Jim Black
 - George Wilson
 - Neal Siegel
 - Jeff Kornacki
 - Suresh Pillai
 - Anli Gao

The committee will discuss the topics to be addressed. These will be 1-2 hour sessions with a goal of 2 or 3 thru out the year.

- C. Discussion of a number of symposia and workshops ensued including:
 - Discussion whether to do a *Campylobacter* workshop or a *Campylobacter* symposium. Laboratory portions and in-class portions were discussed. Norm Stern and Eric Line (USDA Russel Research Center, Athens) were suggested speakers along with Carlos Abeyta and Jan Hunt with FDA, Seattle.
 - Pat Rule explained the differences between workshops and symposia.
 - Another *Listeria* workshop was debated. Group decided against for 2006.
 - Repeat of "Methods" workshop discussed and approved.

- Group decided to postpone another trending workshop for 2006.
 - A proposal for a symposium on "Surrogate Microorganisms" was made by Vickie Lewandowski and was very similar to one Jeff Kornacki had prepared. The committee agreed to develop and submit this idea.
 - A proposal was made for a symposia related to controlling pathogens in dry foods. The group desired that this be developed in conjunction with the Dairy Foods PDG.
 - The need for a Dry Foods PDG was mentioned.
 - A proposal was made for a mini-symposia on practical – applications of new methods by Ann Marie McNamara and the group agreed to submit this.
 - A discussion about the need for a symposia dealing with *Alicyclobacillus* ensued and suggested to attend the PDG on Beverages to be held later in the afternoon.
 - In all the group proposed three symposia and a forth to be done jointly with the "Dairy Foods" PDG and two workshops.
- D. Pam Wilger, Sr. Scientist Cargill, was voted in as Vice Chairperson for 2006–2007.

Recommendations to the Executive Board:

1. Workshops:
 - a. Developing and Improving a Food Microbiology Testing Laboratory. Organizers: Jeff Kornacki, Kornacki Food Safety; Vickie Lewandowski, Kraft.
 - b. Methods Evaluation: Christine Aleski (repeat from last year).
2. Symposia:
 - a. The New Frontier in Emerging Methods-How to Make New Technologies Practical for You. Organizers: Lance Bolton, DuPont; Ann Marie McNamara, Silliker.
 - b. Surrogate Microorganisms: Selection Use and Validation. Organizers: Jeff Kornack, Kornacki Food Safety; Vickie Lewandowski, Kraft.
 - c. *Campylobacter*. P. C. Vasavada, UW River Falls; Pam Wilger, Cargill, a.m. McNamara, Silliker.
 - d. Controlling pathogens in dry foods (with the Dairy Foods group).
3. Establishment of a Subcommittee for the purpose of setting up and conducting a Webinar as an educational tool for PDG members. First trial is Sept. 20th. We invite member(s) of IAFP staff to sit in on the subcommittee meetings as well as the Sept. 20th trial of the process. Pat Rule will send out links and invitations.

Next Teleconference Meeting Dates: Tuesdays, November 1, 2005; March 7, 2006; and June 6, 2006.

Meeting Adjourned: 11:00 a.m.

Beverage PDG

Meeting Attendees: Phil Elliott, Kathleen Rajkowski, Peter Bodnaruk, Yuhuan Chen, C. J. Reynolds, Ken Janes, Mangesh Palecar, Larry Cohen, John Cervený, Peter Kennedy, Patricia Rule, Mansour Samadpour, Larry Beuchat, Ruth Eden, Indaue Mello-Hall, Stan Bailey, Lori Ledenbach, Pamela Wilger, and Peyman Fatemi.

An organizational meeting was held for individuals interested in forming a new PDG focused on issues facing the beverage industry. Eighteen people attended and discussed various issues, which are unique to the beverage industry. Both safety and spoilage issues were discussed for a variety of different types of beverages. At the end of the discussion it was decided that the group was in strong support of requesting the IAFP Board to approve the formation of the Beverage PDG. Indaue Mello-Hall (PepsiCo) was selected as the first chair of the PDG and Jeff Semancheck (Kraft) was selected as vice chairperson. Indaue Mello-Hall has submitted a symposium on spoilage issues with beverages.

Recommendations to the Executive Board:

1. Approve formation of Beverage PDG.
2. Approve Indaue Mello-Hall as Chairperson and Jeff Semancheck as Vice Chairperson.

Chairperson: Indaue Mello-Hall.

Dairy Quality and Safety PDG

Members Present: Jeff Bloom, Chris Remus, Dennis Gaalswyk, Loralyn Ledenbach, Steven Murphy, Vickie Lewandowski, Ron Schmidt, Philip Wolff, Sherry Roberts, Gene Frey, David Blomquist, Randy Daggs, Steven Sims, Henry Atherton, Nahed Kotrola, Allen Saylor, Molly Mills, Dawn Preston, Jamie Isonhood, Amy Remes, Tim Jackson, John Bruhn, Ken Anderson, Dan Erickson, Harvey Coles, Don Lane, Joseph Odumeru, Peter Slade, Ginny Huber, Catherine Donnelly, Don Breiner, Frank Burns, and Jean Delisi.

Visitors/Guests: Jill Gebler, Donna Christensen, Anli Gao, and Subhash Vaidya.

Board Members: Gary Acuff and Stephanie Olmsted.

Meeting Called to Order: 2:10 p.m.

Recording Secretary of Minutes: Jeff Bloom.

Old Business:

1. Committee membership currently stands at 202 and needs to be updated. John Bruhn volunteered to contact all those on the list by E-mail or direct mail to determine if they wish to remain on the committee.
2. The Task Force Committee established at the 2004 meeting to develop an awareness of IAFP and its dairy related programs will continue to work on

reaching out to IAFP affiliates and organizations such as IFT, Dairy Practices Council, etc. Stephanie Olmsted will work with the existing task force chair and report at the next meeting. (Vickie Lewandowski will not be a member on the task force going forward.)

3. Of the five proposals submitted by the DQS committee last year, four were accepted for this year's program. The committee chair stressed the need to continue to submit proposals that are of interest to the dairy industry.
4. The IAFP board agreed with the committee recommendation that was submitted last year to provide meeting space for NCIMS committees.

New Business:

1. Establish a task force to review the *Pocket Guide to Dairy Sanitation* and update as necessary. The Guide should also be available in Spanish. Steve Sims will coordinate and report at the next meeting.
2. Committee members need to communicate with one another on a more frequent basis. Space is provided on the IAFP Web site for this purpose.
3. Proposals for 2006 Symposia:
 - Gram Positive Bacteria – An Emerging Issue in Dairy Production.
 - Issues Regarding Raw Milk Sales and Consumption.
 - Dairy Security in Today's Environment.
 - Verification of Sanitary Design of Food Equipment (submitted by 3A/CSP Committee and endorsed by the Dairy Quality and Safety Committee).

Recommendations to the Executive Board:

1. Identify all topics in the program by keyword or program code so that attendees can sort by area of interest. It is not always easy to find all of the topics of interest since the program that is provided on the Web site is in PDF form.
2. Provide a means for PDG members to communicate with one another via conference calls between Annual Meetings to develop proposals for symposia and workshops.
3. Revise the Committee/PDG Sign-in Sheet to differentiate members, visitors and those who would like to join the committee. Many people are added to committee rosters when they are just visitor or guests. Revise "Committee Minutes Form" to include additional section for visitors and guests.
4. The PDG nominates Vickie Lewandowski to serve as Vice Chair.

Next Meeting Date: August 13, 2006 and conference calls (2-3) prior to Annual Meeting.

Meeting Adjourned: 4:15 p.m.

Chairperson: Ken Anderson.

Food Hygiene and Sanitation PDG

Meeting Attendees: Robert Behling, Chris Remus, Dan McElroy, Tom McCaskey, Peyman Fatemi, Dennis Bogart, Zeb Blanton, Stan Bailey, Brian Anderson, Dennis Bogart, Fred Reimers, Gloria Swick-Brown, Anna Starobin, Shira Kramer, Gary Goessel, Ken Davenport, Sid Camp, Dale Grinstead, Pete Snyder, Charles Giambone, Larry Mendes, and Mark Moorman.

Meeting Called to Order: By outgoing Chairperson – Mark Moorman – 3:00 p.m.

Recording Secretary of Minutes: Brian Anderson.

General Comments/ Discussion:

- Zeb Blanton took over chairman responsibilities and conducted the meeting.
- Stan Bailey made opening comments to the PDG stressing the importance of submitting clear / complete ideas for symposiums. Multiple submissions are appropriate if we see the need. The Program Committee will need to be selective on approvals due to the anticipated large amount of submissions. Stan will be our liaison to the Board.
- Zeb reviewed the antitrust guidelines required to follow during the PDG meeting.
- Zeb reviewed last year's meeting minutes. Minutes were approved.
- Floor was open for Vice Chair Nominations. Dale Grinstead was nominated and accepted. Dale will act as Vice Chair for 2006 and assume Chairperson role beginning 2007.
- The current list of members is at 281 and participation this year was less than 10% of those on our list. It was proposed that we send a notice to the email list on file and remove those who are no longer interested in participating on the PDG.
- It was also discussed that we look into either phone conferences or web conferences for developing symposia during the year to avoid the last minute rush to put together our symposia in the 2-hour time period.

Old Business:

- Fred Reimers made the comment that there is not enough time in (1) day during this meeting to sufficiently initiate / develop an effective symposium. Would be nice to be structured to have an earlier start. Discussion continued on possible tools to use to support this (i.e., IAFP web support to ask/discuss questions). Zeb committed to keeping people informed via E-mail throughout the year.

New Business:

- Dale Grinstead and Pete Snyder proposed a 2 part symposium. (Part 1 to be presented in '06, Part 2 presented in '07.)
- The group also proposed a 3rd symposium to be presented in '06.

Proposed Symposium are as follows: (See attached Symposium submissions for details)

1. Cleaning & Sanitation for Retail Food Safety (Part 1) – Identifying the Issues (2006).
2. Hygiene & Sanitation – New Process Innovations (Part 2) (for 2007).
3. Cleaning & Sanitation for the Food Processing Industry (2006).

Recommendations to the Executive Board:

1. The committee felt that they needed more time to organize future symposium or other avenues for training and communication.

Written by: Brian Anderson, Recorder.

Reviewed by: Zeb E. Blanton, Jr., Chairman.

Food Law PDG

Meeting Attendees: Ken Malone, Ian Jenson, Agnes Tan, Ben Chapman, Don Schaffner, Donna Rosenbaum, Manan Sharma, David Baker, Anna Lammerding, Richard Arsenault, Carl Custer, Ron Weiss, Jim Gorny, Jolyda Swaim, Rita Fullem, Margaret Hardin, Pete Cook, Jenny Scott, Louise Fielding, Brian Cecil, Wendy Maduff, Veny Gapud, and Barbara Lund.

Board Members Present: Kathy Glass, Paul Hall, and David Tharp.

Meeting Called to Order: 1:00 p.m.

Recording Secretary of Minutes: G. Hayburn.

Old Business: None.

New Business:

1. Formation of Food Law PDG with the primary aims of: Forming a discussion forum for exchange of information on all aspects of food law.
2. Promoting research in the areas of food law.
3. Education and training in food law.

Recommendations to Executive Board:

1. Formation of the Food Law PDG.
2. Proposed Chairperson, Gordon Hayburn and proposed Vice Chairperson, Anna Lammerding.

Meeting Adjourned: 4:00 p.m.

Chairperson: Gordon Hayburn.

Food Safety Network PDG

Meeting Attendees: Frank Burns, Shira Kramer, Karen Battista, LeAnn Chuboff, Bin Liu, Don Lane, and Giselle Julien-Davis.

Members Present: Giselle Julien-Davis, Shira Kramer, and Karen Battista.

Board Members/Staff Present: Paul Hall.

New Members: Frank Burns, LeAnn Chuboff, and Bin Liu.

Meeting Called to Order: 9:05 a.m.

Recording Secretary of Minutes: Giselle Julien-Davis.

Old Business: Review mission statement. Mission of the Food Safety Network PDG is to provide IAFF members with information on current trends and issues in *Food Protection Trends*.

New Business: Review progress of website project initiated at 2004 meeting. List of Web sites is being compiled by Brian Himmelbloom. Evaluation criteria for sites have to be finalized. Additions to current evaluation criteria to include quality and accuracy of the information, is it covered in sufficient breadth and depth, who the Web site is sponsored by/ associated with. Group will continue to work throughout the year via E-mail and conference calls.

Recommendation from the Executive Board to consider merging with the Outreach Education PDG. Both groups may share a common focus based on the mission statements of the groups. Members from the Food Safety Network will attend the Outreach Education PDG meeting to determine if the two groups share the same focus.

Recommendations to the Executive Board: None.

Next Meeting Date: August 13, 2006.

Meeting Adjourned: 9:35 a.m.

Chairperson: Giselle Julien-Davis.

Food Toxicology and Food Allergy PDG

Meeting Attendees: Pamela Wilger, Mark Cullison, Doris D'Souza, Rocelle Clavero, Wilson Rumbelha, Tom Schwarz, Peter Slade, Jeff Bloom, Ginny Edleman, T. J. Fu, Linda Leake, Mark Moorman, Catherine Nnoka, Sheila Cohn, Paul Gerhardt, Malcolm McDonald, Maria Nazarowec-White, Kathleen O'Donnell, Fritz Lembke, Richard Hendricks, Todd Rossow, and Ewen Todd.

Meeting Called to Order: 3:06 p.m.

Recording Secretary of Minutes: Peter J. Slade.

Old Business: A flyer was mailed to toxicologists within Society for Toxicology to garner interest in IAFF and the Food Toxicology focus. There was regrettably no feedback or communicated interest from members of SOT. Thanks to Pam Wilger and Catherine Nnoka for their hard work.

New Business: Discussed the ways this PDG can bring value to the IAFF membership and prepared numerous options:

- a. Symposium on seafood chemical contaminants.
- b. Workshop or symposium on:
 - i. Allergen control in the manufacturing environment: real-life examples; incoming, labeling, validation of test kits, cleaning, etc.
 - ii. Principles of toxicology (risk assessment).
 - iii. FALCPA regulations (USA/EU).

- c. A joint symposium with the Retail PDG focus on allergens in the retail environment. The challenges in the retail environment and defensive labeling.
- d. Symposium (FALCPA)/workshop (toxicology)/summary publications this year/whitepaper allergens (international; verification of sanitation procedures; unclean hotspots) – Linda volunteered to draft.
- e. Capture key thoughts and publish proceedings from 2005 IAFP Food Toxicology symposium.

Selected Activities

- 1. Publish this year's symposium proceedings in *Food Protection Trends*. Wilson, Rumbelha to draft with speakers and Kathleen O'Donnell, Pam Wilger and Mark Moorman to support.
- 2. Joint symposium with Retail PDG on control of food allergens to be organized by Kathleen O'Donnell. Mark Moorman to approach Joe Eifert (Retail PDG).
- a. Potential topics:
 - i. Epidemiology
 - ii. Cross-contact
 - iii. Cleaning/sanitation verification/methodology/sanitary design
 - iv. Customer/consumer communication and management – staff education/labeling/advisories (NRA)
 - v. Allergen handling; incoming materials storage
 - vi. Response to consumer reaction episode

Recommendations to the Executive Board:

- 1. The Food Toxicology and Allergy PDG would like the Board to encourage PDGs to better capture speaker concepts in proceedings to be published in *Food Protection Trends*.

Next Meeting Date: August 13, 2006.

Meeting Adjourned: 4:36 p.m.

Chairperson: Mark Moorman.

Fruit and Vegetable Safety and Quality PDG

Meeting Attendees: T. J. Fu, Peyman Fatemi, Larry Beuchat, Wendy Maduff, Niemira, Stacy Stolterberg, Keith Retsnyder, Mike Villaneva, Robert Gravani, Shelagh McDonagh, Donna Christensen, Ruth Eden, Amy Simonne, Pamela Wilger, Jena Roberts, Daniel Y. C. Fung, Barbara Lund, Donna Rosenbaum, Veny Gapud, Gordon Mowat, Jack Guzewish, Les Lipschutz, Jim Gorny, Alejandro Mazzotta, Phil Elliott, Suresh Pillai, David Abel, Toni Hofer, Avik Mukherjee, Bill Schwartz, Ernie McCullough, Christine Andrews, Steve Kenney, Paul Gerhardt, Pete Snyder, Tom Schwarz, Bashir Manji, Shirley Bohm, Sheila Cohn, LeAnn Chuboff, Amy Green, and Michelle Smith.

Meeting Called to Order: 1:05 p.m.

Recording Secretary of Minutes: Suresh Pillai.

Old Business: Jim Gorny gave an update on the FAQs of value to the fruit and vegetable industry. Jim gave an update on commodity specific G.A.P. Guidance. There was discussion of pathogens and vehicles.

New Business: 2 symposia proposed: (1) Past, current and future pathogen issues with fruit and vegetables, and (2) Novel Technologies for fruit and vegetable.

Recommendations to the Executive Board: None.

Meeting Adjourned: 3:00 p.m.

Chairperson: Toni Hofer.

Meat and Poultry PDG

Meetings Attendees: Randy Huffman, Bob Reinhard, Stephen Knabel, Rick Holley, Scott Burnett, Teresa Podtburg, Tim Gutzmann, Julian Cox, Mark Berrang, Mike Musgrove, Alejandro Mazzotta, John Mills, Roger Cook, Richard Arsenault, Margaret Burton, Lucia Rivas, Dan McElroy, Rob Lake, Maha Hajmeer, Yifan Zhang, Mark Pratt, Bob Casey, Cathy Bowyer, Carl Custer, Kurt Westmoreland, Omar Oyarzabal, Harshavardhan Thippareddi, Jitu Patel, Cynthia Dohm, Valerie Bohaychek, Tineke Jones, Lynn McMullen, Maria Nazardwel-White, Mariette D'Souza, Linda Leake, David Baker, Jeff Varcoe, Jim Bacus, Ian Jenson, Anas Al-Nbulsi, Dennis Burson, Ron Osborne, Marion Hanners, Lindsey McDonnell, Tim Dambaugh, Tom McMeekin, Shira Kramer, Jolyda Swaim, Manan Sharma, Yanbin Li, Elizabeth Tharrington, Mark Kreul, Justin Ransom, Shelagh McDonagh, Amit Pal, R. Todd Bacon, Jarret Stopforth, and Peter Bodnaruk.

Board Member Present: Stan Bailey.

Meeting Called to Order: 2:02 p.m.

Recording Secretary: Jolyda Swaim.

Old Business: Thank you to Carl for outstanding job as Chair. Incoming Chairperson is Margaret Hardin.

Review of symposia developed last year by PDG to be present at this year's Annual Meeting:

S02 – Microbiological Predictive Models: Use and Misuse

S08 – Data for Decision Making

S15 – Managing the Risk of *Listeria monocytogenes* at Retail and Restaurants

S25 – Pathogen Survival in Dried Fermented Meats and Partially Cooked Products

New Business:

Nominations and election of PDG Vice Chairperson, Dan McElroy, Gojo Industries.

Several issues, publications and regulations related to food safety over the past year provided ideas for workshops and symposia.

Workshops:

An increase in the number of recalls related to allergens in meat and poultry and new regulations surrounding this issue led to discussion and a proposed workshop on allergens.

Another idea was a hands-on workshop: *Listeria* testing – “search and destroy.” The Chairperson will follow up on a proposal to use a food plant or pilot plant for the workshop.

Symposia:

The PDG chair and members discussed lessons learned and best practices for developing symposia. The committee reviewed and suggested two proposed symposia. One is related to bacterial resistance to antimicrobials and the other to the food safety risks of organic meat and dairy products. The suggestion was made to contact the dairy PDG regarding the potential for a joint symposium in this issue.

Further discussion of current topics impacting meat and poultry food safety resulted in additional ideas for symposia. These included revisiting the *Campylobacter* session pulled back from last year for a lack of new information, egg safety, food security during transportation, multi-drug resistant *Salmonella* and technical and scientific food safety standards for international trade.

Additional issues for discussion included:

- Continuous inspection in Canada. How to come up with something concrete to measure effectiveness outside of current continuous in-plant inspection.
- Access to outbreak strains for scientific research – particularly those held by USDA FSIS – at present very difficult
- Neural tissue testing and where is the science with regards to BSE? How do we find out what's available domestically and internationally?
- Low-temperature survival of *C. perfringens*.
- Interest in slaughter methods for other meats – deer, ostrich, etc.

Recommendations to the Executive Board:

1. To accept the nomination of Dan McElroy as committee Vice Chairperson.

Chairperson: Margaret Hardin.

Microbial Risk Analysis PDG

Meeting Attendees: Alejandro Amézquita, Gloria Anderson, Richard Arsenault, David Baker, John Bassett, Michael Brodsky, Mike Cassey, Yuan Chen, Marisa Caipo, Mark Cullison, Patricia Desmarchelier, Derrell Donahue, Doris D'Souza, Payman Fatemi, Aamir Fazil (Vice-Chair), Robin Forgey, Leon Gorris (Chair), Rob Lake, Anna Lammerding, Bin Liu, Barbara Lund, Wendy Maduff, Deon Mahoney, Ken Malone, Servé Notermans, Tom Ross, Don Schaffner, Wayne Sprung, Jenny Scott, Ewen Todd, Ron Osborne, Jeffrey S. Varcoe, and Lee-Ann Jaykus.

Meeting Called to Order: 10:04 a.m.

The Chair welcomed all present and explained the purpose and scope of the PDG. All attendees were asked to briefly introduce themselves, giving their affiliation and interest in Microbial Risk Analysis. Sign-in

forms were circulated. The agenda proposed by the chair was accepted by the meeting, no further items were added. The chair presented the minutes from the last meeting which were approved, and adopted.

Recording Secretary of Minutes: Aamir Fazil.

Old Business: The chair recalled the workshop and symposia that have been successfully put together for the current Annual Meeting by the PDG members and their collaborators:

- Workshop (Friday) Statistics as a Tool for the Microbial Evaluation of Foods. Organizer: Ron Osborne, Guelph, Ontario Canada.
- Session 13. They Said What? The Risky World of Risk Communication, Organizer: John Bassett and Gordon Mowat.
- Session 18. Risk Ranking for Foodborne Pathogens. Organizers: Peter Cressey and Tanya Roberts.
- Session 26. Food Safety Objectives — Now That We Have Decided to Have Them, How Do We Think They Will be Used in Food Safety Management? Organizer: Leon Gorris.

Members involved in the workshop and symposia provided some feedback and background.

Workshop

Ron Osborne provided feedback from the workshops that had taken place and in which he was an organizer:

- The Friday Statistics workshop had been well attended, with 35 participants. While the evaluations had not as yet been reviewed, the general feeling was that the workshop was well received. This workshop was linked to 2 additional workshops on Saturday.
- He noted that while the workshops were put together as a series, and that this is a good idea, there needs to be more focus on ensuring continuity between the workshops – perhaps through more focus on joint planning between the organizers.
- He also raised the issue of the difficulty in getting a workshop/symposia done within the time allocated from the PDG meeting to afternoon form submissions and subsequently from being notified of acceptance during the year to the Annual Meeting.
- He suggested that perhaps ideas should be proposed ahead of time electronically, and those ideas firmed up prior to the PDG meetings at which time most of the work is done and concepts discussed and refinements made at that time. So that the proposals are already partially developed.
- Yuan Chen who had participated in the workshops noted that some of the workshop participants had felt they needed more practical decision making information from the workshop. Ron however noted that the intent of the workshops was not really focused on that aspect and perhaps the title and descriptions associated with the workshops should be more carefully constructed so as to avoid

misunderstandings and so that attendees know clearly ahead of time what the coverage will be.

- The issue of FSOs was raised as an important issue that needs to be dealt with and should be considered for future workshops/symposia since it is a concept that is often mentioned but the practical illustrations of its implementation are lacking.
- Gloria Anderson suggested that workshop organizers would specify the required pre-knowledge or pre-experience level in the workshop announcement.
- The chair welcomed those suggestions and pointed out that this year an attempt was made to encourage members to think about symposia and workshops prior to the meeting and either bring formulated ideas with them or, if they would not be in attendance they could send them in electronically. Only very few responses were received and none worked out to any level of detail.
- Michael Brodsky agreed with Ron's earlier comment that integration between workshops needs to be better handled and perhaps the program committee when they suggest integration should take a bigger role in ensuring that this is effective.
- Paul Hall, who provides liaison between the PDG and the executive board, noted the suggestions voiced and commended all the workshop organizers for their efforts on behalf of the Executive Board.

Symposia:

- John Bassett spoke about the Risk Communication symposium (S13), which actually was merged with a second proposal of the Outreach PDG upon request of the Program committee. This had changed the focus slightly from its original submission but was likely to be a very interesting symposium.
- Aamir Fazil spoke about the risk prioritization symposium (S18). He noted that Peter Cressey and Tanya Roberts had done an excellent job of getting a very strong symposium together that would be very informative.
- Leon Gorris described the Food Safety Objective symposium (S26) that was scheduled for Wednesday afternoon and commented that it may serve to take a first step along the lines of the request Ron Usborn noted at the workshops to feature more information on FSOs.

Leon also briefly described several other sessions that were likely to be of interest to the members.

Paul Hall mentioned that there were 2 additional PDG meetings today that may be of interest to the members: one on Food Law and the other on Beverage safety and spoilage issues.

The chair informed members present of the roster evaluation that had been started just before the end of 2004. In total, there were 250 members on the roster

previously. E-mails were sent out to determine if that reflected the current interest level. Of the 250 member list, 115 positive responses were received, 30 negative responses were received and no responses were received from the remaining. Nevertheless, this at least has helped update the current membership as well as ensure the contact information for the members is current.

New Business: Microbial Risk Analysis Developments around the world.

Leon gave a PowerPoint presentation summarizing the activities that he was aware of that were going on around the world in RA and mentioned that he would circulate the PDF of his presentation (embedded) to the PDG members so that they have access to all the web links. Some topics covered:

- WHO, FAO, Codex developments of MRA studies, MRA and MRM guidelines, and MRA and Risk Analysis education/training material.
- Cost Action 920. Bringing together MRA interested parties across Europe.
- Clearinghouse – a one stop shop for RA, MRA, MRM and risk communication resources.
- Risk Ranking initiatives in the USA.
- ILSI-Europe publications on FSOs.
- IAFP workshop on "recontamination in food industry" in Europe.
- ILSI-IAFP-ICMSF meeting on "relating micro testing to micro criteria and public health goals."
- JIFSAN summer and distance learning courses on RA aspects.
- Society for Risk Analysis Annual Meeting early December, Orlando.

Michael Brodsky and Robin Forgey both mentioned that a lot of the information presented by Leon was very useful and it would be helpful to have those links available perhaps through the IAFP Web site. Leon agreed to have the presentation listed on the PDG Web site. He also will make a small overview available of good www entry points into RA and provide their links on the PDG Web site.

Deon Mahoney then made a presentation on the RA activities in Australia.

- In Australia they are developing mandatory thru chain standards (e.g., in seafood, poultry, etc.) looking at multiple hazards including micro and chemical. They have completed a poultry risk assessment, using the FAO/WHO work as a starting point but then customized it to better reflect the Australian situation. This RA has gone through peer review.
- In Dairy, they were currently working on a risk profile for raw milk and the issues associated with that as well as looking at pasteurization and what pasteurization actually achieves. They are working

on a comprehensive review of pasteurization from its beginnings that should be a useful resource for all. Deon also mentioned that they recently looked at an application by the French to import Roquefort cheese.

- They will soon begin working on eggs and plant products.
- Deon also mentioned the upcoming 2nd Intl Conf on Micro RA, scheduled for Feb 2006, which should have an exciting and interesting agenda.

Trish Desmarchelier added that the Australian conference was going to have workshops in addition to symposia. Some workshops would be driven by WHO/FAO. They would cover both basic introductory materials as well as more advanced topics, thereby, appealing to a broader RA audience.

Rob Lake described briefly the activities going on in NZ. Several activities are underway including their risk ranking exercises, risk assessments and progress in moving from qualitative to quantitative approaches.

Aamir Fazil noted that the final report of the Canadian strategic initiative "Needs, Gaps and Opportunities Assessment in the area of microbial contamination of food and water", had been published. He had copies for the PDG members. <http://www.uoguelph.ca/OAC/CRIFS/>.

Yuan Chen mentioned that FPA had been using their expertise to represent industry by reviewing US governmental MRAs and providing comment. She mentioned that this was an activity that many in industry might not be able or prepared to do individually.

Proposals for new initiatives of the PDG:

The Chair opened the floor for discussion on things to do / activities / projects / symposia / workshops.

Don Schaffner raised the issue that the PDG should keep in mind that in addition to proposing symposia and workshops, that there indeed are other things that the PDG could consider putting forward.

On that note, Leon Gorris reminded the PDG that a number of years ago an initiative was taken by Ewen Todd to start drawing up guidelines for risk management which were intended not to be conceptual but would give practical pointers. This project had been supported by a number of PDG members in the past but was stopped because there seemed to be related activities on this elsewhere. These other activities may not have delivered as expected. Leon raised the possibility to revive this PDG project and ask for the support of the Executive Board. Ewen was willing to have the manuscript circulated so that the PDG members interested could have a look and comment back with ideas for focus and personal contributions.

Servé Notermans brought up the need for risk assessments that are integrated, for example when dealing with milk you need to consider many hazards. He also suggested the need to explore the application

of RA for decision-making. David Baker supported this idea and Yuan Chen mentioned that it is being used but needs to be used more. She gave the example of the *Salmonella* performance standards in the US.

John Bassett brought up the idea of a symposium highlighting examples of industry using MRA to make decisions. Perhaps also looking at how this varies for industries of different sizes. John and Trish Desmarchelier volunteered to spearhead the development and submission of this symposium.

Ewen Todd brought up the idea of having a symposium where various governmental leaders in the role of risk managers could talk about how they make food safety decisions (highlighting MRA application). Perhaps the issues of acceptable and tolerable risk could also be addressed, as these may vary strongly between nations. It was pointed out that this would have to have a panel discussion session so that more details could be drawn out. Ewen and Leon volunteered to lead this submission. Ron Osborne raised the issue that not only risk managers in government on a daily basis manage risks. Also in practice, management of risks is done especially in the operational context. This might be an aspect to bring up in the panel discussion.

Yuan Chen suggested that a session looking at government setting performance standards using MRA outcomes and industry translating this into practice might be something that would be useful. It was suggested that this was an idea that she would develop further and present at the next PDG meeting as a symposia topic for the following meeting.

Leon, prior to closing the meeting introduced Aamir Fazil as the next chair and encouraged members to either volunteer for the vice-chair position which would be voted on at the next meeting or to submit names of candidates who might be suitable candidates. In any event, there would be an email circulated to the PDG roster with the minutes and the PDF of the presentation which would call for volunteers/nominees as well.

Aamir Fazil also echoed the need for names for the Vice Chairperson position and congratulated Leon for his excellent leadership and hard work as Chair of the PDG.

Recommendations to Executive Board:

1. To advise the Program Committee to assure good communication between organizers (and lecturers) responsible for different workshops, in the case where these are explicitly linked as was done for the 2005 workshops for the first time.
2. To inform initiators of PDG projects such as the compilation of particular guidelines, opinions or recommendations whether financial support for such initiatives can be requested from the Board or any other particular body in IAFF.

Next Meeting Date: August 13-16, 2006.

Meeting Adjourned: 12:05 p.m.

Chairperson: Leon Gorris.

Outreach Education PDG

Meeting Attendees: Veny Gapud, Christine Bruhn, Linda Harris, Tony Flood, Purnendu Vasavada, Amy Simonne, Ben Chapman, Renee Raiden, Leann Chuboff, Daniel Y. L. Fung, Giselle Julien-Davis, Karen Buttista, Sandra McCurdy, Gordon Mowatt, and Julian Cox.

Meeting Called to Order: 3:11 p.m. by Gordon Mowatt.

Recording Secretary of Minutes: Sandra McCurdy and Gordon Mowatt.

Old Business (arising from minutes of 2004 meeting):

- Allergen pamphlet – general discussion and willingness to complete project. Christine Bruhn and Tony Flood agree to undertake. They will approach Food Toxicology and Food Allergens PDG to see if they wish to co-produce.
- 2005 Symposium – scheduled for Tuesday (August 16th) 8:30 a.m. to noon. Title – They Said What? – The Risky World of Risk Communications. Co-developed with the Microbial Risk Analysis PDG. Organizers/Moderators – John Bassett and Gordon Mowatt.
- Recommendations to the Executive Board – request to provide PDF versions of previously authored pamphlets on the IAFP Web site. Agreed to and completed. Both pamphlets are now on the Web site.

New Business:

Election of new Vice-Chairperson.

- Christine Bruhn was elected by consensus.

Thank you to Veny Gapud for 4+ years of outstanding service to PDG.

Proposed Activities for 2005/2006:

- Proposed Symposium – Challenges in Animal Biotech: Effective Communications.
- Tony Flood & Christine Bruhn presented outline of speakers and topic areas. They will complete a proposal and submit to Program Committee by the end of the day.
- Allergen Pamphlet – discussed under Old Business.
- Outreach Education articles for *Food Protection Trends*.
- Extensive discussion regarding focus of articles, deadline failure syndrome, and availability of journal.
- Gordon Mowatt to contact *Food Protection Trends* regarding the details and then to contact interested PDG members who have identified interest.
- Contact from Executive Board.
- Recommended that Food Safety Network PDG and Outreach Education PDG discuss and explore consolidation into a single PDG. Gordon Mowatt to explore with the chairperson of Food Safety Network PDG.

Recommendations to the Executive Board: None.

Next Meeting Date: August 13, 2006, Telus Convention Centre, Calgary, Alberta.

Meeting Adjourned: 4:15 p.m.

Chairperson: Gordon Mowatt.

Retail Food Safety and Quality PDG

Meeting Attendees: Harshavardhan Thippareddi, Alex Von Holy, Peter Snyder, Veny Gapud, Joe Eifert, Al Fain, Sheila Cohn, Chirstine Andrews, Peter Slade, Larry Mendes, Bill Schwartz, Ken Davenport, Tom Schwarz, Gordon Mowatt, Jason Dickhaut, Charles Papa, Milinda Dwyer, Steve Kenney, Zeb Blanton, Todd Rossow, Kathleen O'Donnell, Fred Reimers, Anna Starobin, Alejnadro Mazzotta, Shirley Bohm, Mansour Samadpour, Sid Camp, Carl Custer, Rocelle Clavero, Joell Eifert, Gloria Swick-Brown, Suresh Pillai, Mike Villaneva, Jon Woody, Nahed Kotrola, Maha Hajmeer, Theresa Graham, David Abel, Toni Hofer, Brian Cecil, and Tom McCaskey.

Meeting Called to Order: 10:02 a.m.

Recording Secretary of Minutes: Al Fain.

Old Business: Chairman Joe Eifert announced that Symposium S-20, – A Behavioral Approach to Performance-based Food Safety Management Theory, Practice and Outcome for Successful Retail Food Safety Programs sponsored by the Retail Food Safety and Quality PDG will be 8:30 a.m.–12:00 p.m. will be on Wednesday in the Harborside C room.

Executive Board representative Stan Bailey reviewed the executive committee's recommendation to include international speakers when possible in planning symposia. He stated that changes to the symposium planning process were being considered to allow symposium proposals to be submitted after the Annual Meeting.

Joe Eifert reviewed the Anti-Trust Guidelines, the ongoing International Food Safety Icon Project, and announced the 4:00 p.m. meeting for a proposed Food Law and Beverage PDG.

New Business: Joe Eifert notified the PDG that Al Fain (current co-chair) would become Chair of this PDG at the 2006 meeting in Calgary. A new Co-chair will be elected at or before the 2006 Annual Meeting. Vinny Gapud has volunteered to be Co-Chair. We may hold an E-mail election this fall for the position.

Discussion of symposia for future Annual Meetings: Pete Snyder proposed a two-year joint symposium with the Hygiene and Sanitation PDG for the 2006 meeting in Calgary Canada and 2007 in Lake Buena Vista, FL. The symposium addressed cleaning and sanitation of surfaces to reduce biological hazards, cleaning and sanitizing chemicals available at retail and their effectiveness, controlling cross-contamination in kitchens, establishing standards and measuring microbiological and chemical

contamination, and management of sanitation and hygiene prerequisite programs in retail food operations.

Additional symposia for the 2006 meeting in Calgary were discussed. Pre-meeting polling of the members indicated most interest in two topics: Produce safety issues at retail and allergen management in restaurants. Much discussion ensued, including the inclusion of microbial indicators, the need to address international programs (speakers from Europe), how to get suppliers to adopt GAPs, factors involved in outbreaks involving produce, review of cleaning and sanitizing processes, an EPA perspective on cleaning and sanitizing chemicals, international standards and best practices for industry.

Alejandro Mazzotta agreed to organize a symposium on produce issues for the 2006 meeting.

Strong interest was expressed by several members in a symposium on allergen management. Alejandro Mazzotta agreed to consider combining the allergen and produce topics in one symposium proposal (possibly a round-table format).

Pete Snyder requested help in forming a subcommittee to work on HACCP for common retail food processes. Persons interested should contact Pete.

Several other topics were discussed by the Group, including: what is "contamination" or what is a "hazard" at retail, appropriate tests and sampling plans to determine temperature abuse in warehouses and during truck transportation, food defense concerns and exercises, and Conference for Food Protection participation.

Recommendations to Executive Board: None.

Next Meeting Date: August 13, 2006.

Meeting Adjourned: 12:00 p.m.

Chairperson: Joseph D. Eifert.

Seafood Safety and Quality PDG

Meeting Attendees: Peter Hibbard (Chairman), Rocelle Clavero, Joe Frazier, Richelle Beverly, Stephanie Drake, Brooke Whitney, Kathleen O'Donnell, Douglas Marshall, Marlene Janes, Wilson Rumbelha, Susan McCarthy, Amy Smith, Alfred Fain, Gloria Anderson, Kathleen Rajkowski, Stephen Grove, and Gary Richards.

Board Members Present: Paul Hall.

Meeting Called to Order: 1:00 p.m.

Approval of Agenda 2004 Agenda approved – Marshall moved, Richards second. Alfred Fain read Anti-Trust Guidelines for Association.

Recording Secretary of Minutes: Douglas Marshall.

Old Business:

1. Minutes of 2004 Meeting – available on IAFP Web site: Rajkowski moved, McCarthy second – approved.

2. SSQPDG Membership Roster – provided to attendees for updates – attached.
3. Announcement of IAFP 2005 Symposium #17, "Oceans and Human Health" 8/16/2005 1:30 – 5:00 p.m. Brief summary given listing topics and speakers.

New Business:

1. Election of PDG Vice Chair (will serve as Chairperson 2007-2008) – Marlene Janes.
2. Discussion of topics for proposing a symposium(s) at IAFP 2006.
 - a. Harmonization of Methodologies – Richards – (org.)
 - b. Risk-based Harmonization of Global Seafood Safety Standards – Hibbard – (org.)
 - Aquaculture chemicals (Plakus, FDA Dauphin Island).
 - Antibiotics (Kleasis, USDA Auburn).
 - Environmental chemicals (Santerre, Purdue).
 - Allergens (Taylor, Nebraska or TBD by Richards).
 - Microbial contaminants (Richards, USDA)
Note: Each topic will focus on Canadian, US, EU, and Asian perspectives.
 - c. Identification of Risks Associated with *Vibrios* in Raw Molluscan Shellfish – Janes – org.
 - Industry Practices (Bell, LSU).
 - Quantification of Virulent *Vibrios* (DePaola, FDA, Dauphin Island).
 - Classification of Virulence (Jaykus, NC State).
 - Strain Differences on Growth (Janes, LSU).
 - Rapid Antibody Methods (Simonson, LSU).
 - Relaying (Supan, LA SeaGrant).
 - d. Practical Solutions to Seafood Quality and Safety Problems – Clavero – (org.)
 - Transportation temperature abuse (Marshall, MSU).
 - Handling of scombroid species (Green, NC State).
 - What regulations apply (Tim Hansen, FDA).
 - What to test for (Clavero, Silliker).
 - Species substitution (Garrett, NMFS).
 - Cooking process verification procedures for RTE seafood (Frazier, Food Products Association).

Note: If the Program Committee approves this symposium, the organizer Clavero will attend the World Congress on Seafood Safety, Quality and Trade Conference Sept. 14-16, 2005 in Sidney Australia to scout potential speakers.

Recommendations to Executive Board: None.

Next Meeting Date: August 13, 2006.

Meeting Adjourned: 2:45 p.m.

Chairperson: Peter Hibbard.

Student PDG

Meeting Attendees: Linda Leake, Anas Al Nabuls, Pedro Chacon, Jesus Vizcarra, Brandon Carlson, Catie Simpson, Pratik Banerji, Linda Harris, Juli McKinney, Paul Leonard, Lorraine McIntyre, Todd Gore, Bin Liu, Laura Bauermeister, Jennifer Cascarino, Li Kndra, Steve Kenney, Ben Chapman, Renee Raiden, Peter Higgaes, Amanpreet Brar, Jackie Miles, Susan Sumner, Lucia Rivas, Angela Hartman, Vanessa Teter, Jamie Isanhood, Dawn Preston, Brooke Whitney, Andrea Laycock, Aweeda Newaj-Fuzul, Christina Stam, Stephenie Drake, Richelle Beverly, Wendy Maduff, Aisha Abushelaibi, Arron Uesugi, Wen-Xiao Du, Yifan Zhang, Courtney Rheinhardt, Emily Mathusa, Stephen Grove, Scott Burnett, Montserrat Holec, Vabessa Kretzschmar, Zeb Blanton, John Bruhn, Vivrana Fino, Angela Laury, Leopoldo Orozco Ramirez, Kali Kniel, Christine Bruhn, Kathy Glass, Jeff Farber, Frank Yiannas, David Tharp, Terry Peters, and Anna Lammerding.

Meeting Called to Order: 1:00 p.m.

Recording Secretary of Minutes: Vanessa Kretzschmar.

Old Business: Recommendation was made to consider if the Student Professional Group needed to stay a Professional Development Group or become an affiliate. Decision was made to stay a PDG.

New Business: SPDG web site for discussion groups and message boards.

IAFP President-elect, Jeff Farber spoke at the Student Luncheon about job hunting, the interview process and keeping your job.

Recommendations to the Executive Board:

1. Student representation on the new membership committee.

Meeting Adjourned: 1:30 p.m.

Chairperson: Ben Chapman.

Viral and Parasitic Foodborne Disease PDG

Meeting Attendees: Lee-Ann Jaykus, Sabah Bidawid, Doris D'Souza, Peter Cook, Julie Jean, Uresh Pillai, Gary Richards, and Thomas Schwarz.

Board Member Present: Frank Yiannis.

New Members: Tim Dambaugh, Tineke Jones, Adrian Parton, Michael Scott, Frank Burns, Mansour Samadpour, Lorraine McIntyre, Mark Willson, and Martin Wiedmann.

Meeting Called to Order: 9:10 a.m.

Recording Secretary of Minutes: Sabah Bidawid.

Old Business: Reviewed minutes from last year's meeting. Announced this year's symposium sponsored by the PDG.

New Business: A total of 17 people were present. Lee-Ann Jaykus introduced Sabah Bidawid as the incoming chair of the Viral and Parasite PDG. This was

followed by a round table introduction of participants (old and new members). Discussion on developing a symposium for next year was initiated. Martin Wiedmann from Cornell indicated ILSI's proposal to co-sponsor, with the PDG, next year's symposium. Discussion lead to the development of a proposal for the symposium. The submitted symposium proposal identified names of potential speakers from US, Canada, Europe and Australia to address such topics as the burden of viral foodborne illness, epidemiological surveillance and the potential use of newly established food and environmental virology networks, virus survival, inactivation and transfer in foods, and attribution of outbreaks to responsible foods. Sabah Bidawid spoke of the different types of food and environmental virology networks currently established and the need to link these networks. He also raised the aspect of standardization of methodologies for virus detection and sequence analysis, sampling size and procedures. Gary Richards brought up the issue of needing to look at alternative methodologies to differentiate between detection of live virus as opposed to relying on PCR to detect just the nucleic of the virus. Suresh Pillai suggested considering the inclusion of a speaker from the food industry possibly addressing industry's needs and how to transfer new technologies. Lee-Ann Jaykus announced the session on Avian Influenza and the white paper draft currently in progress. Julie Jean reminded participants of this year's virus and parasite symposium.

Recommendations to the Executive Board:

1. One participant suggested holding the PDG meeting later in the day which might allow others to participate.

Next Meeting Date: August 13-16, 2006, Calgary, Alberta.

Meeting Adjourned: 10:20 a.m.

Chairperson: Sabah Bidawid.

Water Safety and Quality PDG

Meeting Attendees: Kathleen Rajkowski (Chair), Ken Malone, Ian Jenson, Agnes Tan, Ben Chapman, Don Schaffner, Donna Rosenbaum, Manan Sharma, David Baker, Anna Lammerding, Richard Arsenault, Carl Custer, Ron Weiss, Jim Gorny, Jolyda Swaim, Rita Fullem, Margaret Hardin, Pete Cook, Jenny Scott, Louise Fielding, Brian Cecil, Wendy Maduff, Larry Cohen, Veny Gapud, and Barbara Lund.

Board Members Present: Paul Hall.

Meeting called to Order: 2:05 p.m.

Recording Secretary of Minutes: Larry Cohen.

Old Business: Kathleen Rajkowski read the rules to the committee on the conflict of interest. Meeting notes discussed from 2004. Updated symposium this year. Susan McKnight 2005. Symposium global discussion this year. Everything is set for Monday morning.

Membership Meeting, (Susan McKnight) updated our PDG as to alternate venues to Symposia as round table, poster symposium or workshops.

New Beverage PDG meeting at 4:00 p.m.

Kathleen Rajkowski poster sessions with more students involved in existing PDG (need advice from headquarters whether space is available).

New Business: Proposals submitted:

1. The 2 submitted proposals Susanna Knockel, Denmark, L. Gorris, Continuation of Theme of Global Water – Neil Webb. Discussed for 2006.
2. Water regulatory with a variety of options FDA-EPA cruise ships, airplanes, being discussed this year.
3. Bring in more students.
4. Water and Re-Use Water Options heavily discussed.
5. Water HACCP and regulation on a global basis discussed for future topics.
6. Submitted one round table (Global Water HACCP Issues) and one symposia (Water the Common Commodity).

Paul Hall brought to the committee's attention that organizational meetings will be held for a Food Law PDG and a Beverage PDG at 4:00 p.m. He invited committee members to attend.

Recommendations to Executive Board: None.

Meeting Adjourned: 4:00 p.m.

Chairperson: Kathleen Rajkowski.

Affiliate Council Minutes

IAFP 2005 – August 14–17, 2005

Held at the Baltimore Marriott Waterfront Hotel
Baltimore, Maryland

Affiliates Present:

Alabama	Tom McCaskey
Alberta	Lynn McMullen
Arizona	Mohammed Heydari
Brazil	Maria Teresa Destro
British Columbia	Terry Peters
California	John Bruhn
Capital Area	Carl Custer
Florida	Peter Hibbard
Georgia	David Fry
Kentucky	Tony White
Korea	Seong-Jo Kim
Metropolitan	Fred Weber
Michigan	Brian Cecil
Missouri	Cathy Sullivan
Nebraska	Harshavardhan Thippareddi
New York	Steve Murphy
New Zealand	Roger Cook
Ohio	Gloria Swick-Brown
Ontario	Malcolm McDonald
Pennsylvania	Eugene Frey
Quebec	Julie Jean
Texas	Fred Reimers
United Kingdom	David Lloyd
Upper Midwest	Dan Erickson
Washington	Stephanie Olmsted
Wisconsin	Randy Daggs

Members Absent: Illinois, Carolinas, Connecticut, Idaho, Indiana, Iowa, Kansas, Mexico, Mississippi, North Dakota, Portugal, South Dakota, Southern California, Tennessee, and Wyoming.

Board Members and IAFP Staff Present: Kathy Glass, Jeff Farber, Frank Yiannas, Gary Acuff, Paul Hall, Stan Bailey, David Tharp, Lisa Hovey, and Nancy Herselius.

Guests: Lorraine McIntyre, British Columbia; Sid Camp, Georgia; Zeb Blanton, Florida; and Sang-Do Ha, Korea.

Meeting Called to Order: 7:20 a.m.

Recording Secretary: Terry Peters.

- I. Call to Order: The meeting was called to order at 7:20 a.m. by Affiliate Council Chair Stephanie Olmsted. A sign-up form for attendees was distributed to delegates and guests. There were 39 members and guests present.

- II. Roll Call: A roll call of the Affiliates was conducted. Stephanie recognized the presence of the newest Affiliate Delegate, Roger Cook from New Zealand. The official charter will be presented to Dr. Cook during the Association business meeting.
- III. Minutes: The minutes of the 2004 Affiliate Council Meeting were reviewed by the delegates present. Motion by John Bruhn, seconded by Fred Weber, to approve the minutes as presented. Motion carried.
John Bruhn, California Affiliate, recommended that all action items be included in the minutes.

Executive Board Report:

Kathy Glass, Executive Board President, reported on the activities of the past year. In summary:

- Membership is stable.
- The Association is "financially in the black" and therefore new programs can be defined.
- A Membership Committee has been established to talk about the issues of retention and attracting new members.
- A dues restructuring is being discussed.
- There are 79 Sustaining Members, including 9 Silver Sustaining Members and 4 Gold Sustaining Members.
- There are now 10 Affiliates outside of the United States. New Zealand is the most recent, and groups in India and Japan have expressed interest in becoming Affiliates.
- This year about 75% of manuscripts were submitted online, as well as about 75% of all Annual Meeting registrations were completed online.
- Two new committees are being explored this year, one on food law and the other on beverages.
- The Foundation Fund has assets of \$320,000 and the goal is to have \$1,000,000 by the year 2010, to support more programs.
- Student scholarships will be increased in the next year with one more scholarship being given to a student from the US or Canada, and another being given to a student from a developing country.
- The first full symposium sponsored by IAFP outside of the US will be held in Prague in October 2005.

All Affiliates were reminded of the Officer Speaker Program and that they should take advantage of this as much as possible.

Stephanie Olmsted acknowledged the great work and dedication from Kathy Glass in the past year.

IAFP Office Report:

David Tharp reminded the delegates that in order for an Affiliate to be compliant, both the President and Delegate must be members of IAFP. There must also be five other members of the Affiliate who are IAFP members. Also, each Affiliate must submit an annual report. The office staff works with the Affiliates to see that they are compliant.

David also reported that the numbers of registrants for this annual meeting are estimated to go over 1,700. He commented that the association is in the best financial shape it has ever been in and that the fund raising efforts for the Foundation will work to benefit the entire association and will help "bring more people into our world of food safety." The good financial position will allow more flexibility in programs and activities in the future.

Nancy Herselius stated that she would like to see more information from Affiliates to include in future newsletters. Suggested was information from Affiliate meetings, as well as pictures. Also, if there are topics that are of interest to Affiliates that can be covered in the newsletter, those should be passed along.

Election of the Affiliate Council Secretary:

Terry Peters nominated Maria Teresa Destro, Brazil Association for Food Protection, as the new Affiliate Secretary. This nomination was seconded by Fred Weber.

Stephanie Olmsted asked for nominations from the floor. Hearing none, nominations were closed.

Motion by John Bruhn, seconded by Carl Custer, to approve the nomination of Maria Teresa Destro. By voice vote, the motion was carried.

Affiliate Educational Reception: There was a different format this year due to the withdrawal of a possible speaker late this spring. This was viewed as an opportunity to have more of an international flavor and an opportunity to learn about other Affiliates at the meeting. The question posed to the Delegates was whether they would like to repeat this format or if they would like to have a speaker on an educational topic next year. Two Delegates, Fred Weber and Peter Hibbard, stated that they definitely would like to continue to have an educational speaker, and this appeared to be the desire of the Council.

Questions about securing a speaker arose.

David Tharp commented that when this program was started, it was to be the Affiliate local to the meeting site that would be responsible for finding the speaker as

well as securing funds for the reception.

The Affiliate Chair and IAFP staff can work on this, but they need the input from the local area.

Maria Teresa Destro, Brazil, suggested that it could assist Affiliates in building membership if IAFP provided a link to the JFP's Table of Contents and abstracts.

David Tharp commented that there is no need for special permission, that Affiliates may add this link to their site at will.

All sponsors of the Affiliate Educational Reception – Capitol Vial, TetraPak, Warren Taylor Services, and Weber Scientific – were thanked.

Unfinished Business:

Fred Reimers, Texas, stated that he would like to see information and pictures from each Affiliate's meeting at the IAFP Annual Meeting to help increase membership within the Affiliates. He also suggested that pictures of the officers, individual or group, as well as pictures of events, be added to Affiliate Web sites. This would provide, says Reimers, a more personal feel to membership with an Affiliate. Nancy Herselius is to work with the Affiliates to facilitate this.

Brian Cecil, Michigan, stated that he would like to be able to E-file annual reports, sending pictures of meetings and such with them.

Motion by Fred Weber that the Affiliate Council recommends having digital pictures and information regarding Affiliates available on the IAFP Web site and that Affiliates provide the pictures are part of their annual report. Seconded by John Bruhn.

The question brought up was whether or not this would be mandatory for all Affiliates. John Bruhn suggested that there be options presented to the Executive Board on how to approach this idea. Carl Custer, Capital Area, suggested that some Affiliates may need help with building their own Web sites.

Motion by Carl Custer that an amendment be added to the previous motion stating that the submission of pictures and Affiliate information to IAFP be on a voluntary basis. Seconded by Hashavardhan Tippiareddi, Nebraska.

The amendment passed unanimously. The original motion also was passed unanimously.

New Business:

David Tharp commented on the dues collection process. The IAFP office collects dues for some Affiliates, but not all. He stated that while this practice can be continued, it can be confusing for some Affiliates who do not collect dues on the same time frame as the office does. Therefore, it is up to each individual Affiliate whether or not they wish to have the office continue collecting dues.

Those Affiliates outside the United States may also wish to have the office collect their dues, but they would be collected in US dollars.

John Bruhn stated that he would like to have the two Affiliates from California listed together so as not to confuse prospective members. David stated that he would see that this is done.

Fred Reimers, Texas, suggested that the IAFP office continue dues collections as has been done in the past.

Tom McCaskey, Alabama, asked that Affiliate program information be included in annual reports. It was stated that this is being done at this time.

Investigate moving the New Member Reception to another day. It appeared that there were very few new members at the reception on Saturday evening.

It was suggested that papers that are not accepted for oral or poster presentation during the annual meeting be noted as "accepted, read by title" so the authors can get recognition. This will be forwarded to the Program Committee.

Awards: Stephanie Olmsted announced the award winning Affiliates for 2005. Steve Murphy, New York and chair of the Awards Committee, stated that there were an excellent number of candidates. He suggested that there be some restructuring of the criteria for the Annual Meeting versus the Educational Conference, so as to better be able to establish a difference between the two.

Affiliate Reports: Affiliate delegates present gave a brief summary of their activities over the past year reflecting membership, scholarships, educational and annual meetings, newsletters, web sites, and association with IAFP and other organizations.

Recommendations to the Executive Board:

1. Add pictures of Affiliate officers and other pictures to the IAFP Web site.
2. Hotel accommodations for future annual meetings to be increased to accommodate the increase in registrants when making arrangements in cities in the future.

Passing of the Gavel: Chair Stephanie Olmsted passed the gavel to Terry Peters signifying the beginning of his term as Affiliate Council Chair.

Next Meeting Date: August 13, 2006, Calgary, Alberta.

Adjournment: Motion by David Fry, seconded by Malcolm McDonald, to adjourn the meeting.

Meeting Adjourned: 10:07 a.m.

Chairperson: Terry Peters.

CONGRATULATIONS!

At IAFP 2005, we offered a drawing for a one-year Membership with our Association and a free registration to our Annual Meeting. We are pleased to announce the following winners of the drawing:

IAFP Membership

Fone Mao Wu

New Jersey Dept. of Health & Senior Services

Trenton, New Jersey

IAFP 2006 Annual Meeting Registration

Beth A. Crozier-Dodson

Kansas State University

Riley, Kansas

Committee and Professional Development Group

Recommendations to the Executive Board as Taken
from Committee Minutes of Meetings Held in Baltimore, Maryland

Executive Board Response as Discussed at the Executive Board Meeting
Baltimore, Maryland
August 18, 2005

STANDING COMMITTEES

Food Protection Trends

Recommendations to the Executive Board:

1. To move forward on implementing accommodations to accept online submission of papers for publication in *FPT*.
Board Response: Staff will move forward with establishing a system for electronic submission.
2. To include in the PDG Chairperson Guidelines to solicit ideas and topics along with author suggestions for the "Thoughts on Food Safety" column.
Board Response: Doug Powell volunteered to head the effort to organize authors for the "Thoughts on Food Safety" column.
3. To give some guidance on criteria for the proposed "Feature Member" article.
Board Response: Postpone this effort for now until the "Thoughts on Food Safety" column is firmly reestablished.
4. To allow the Scientific Editor to write guidelines for *FPT* articles for authors and *JFP* to use.
Board Response: Guidelines may be written and submitted to the Board for approval. Coordinate with *JFP* Scientific Editors where necessary.
5. That *FPT* be listed in PubMed or similar indexing service to encourage submissions.
Board Response: Staff will check into this again. PubMed turned *FPT* down about three years ago.

Journal of Food Protection

Recommendations to the Executive Board:

That the Board immediately initiate proceedings to add a fourth Scientific Editor.

Board Response: Board agrees.

1. That the Board progress implementation of a system for online review of papers.
Board Response: The Board will make a decision on the online review system after financial results for the year ending August 31, 2005 are available (approximately November 15).
2. That approval be granted for extension of the term for Joseph Frank as Scientific Editor for a further 4 years.
Board Response: Board agrees.
3. That a reception (at Annual Meeting) in thanks be organized for members of the Editorial Board and Ad-Hoc Reviewers.
Board Response: Staff will study and review options, then report to the Board.

Program

Recommendations to the Executive Board: None.

SPECIAL COMMITTEES

3-A Committee on Sanitary Procedures

1. See what can be done to have a 3-A Standard open on the Web site and one person making changes to the document that everyone logged on the page could see their individual computers.
Board Response: Work with the 3-A SSI office to coordinate this effort.

Audiovisual Library

Recommendations to the Executive Board: None.

Awards

Recommendations to the Executive Board: None.

Control of Foodborne Illness

Recommendations to the Executive Board:

1. It is recommended that the committee have a three-day retreat in the Washington, D.C. area for six people of the two subcommittees. This will allow members in early 2006 to concentrate on the preparation of the bioterrorism documents and the completion of the second and third food handler hygiene papers.
Board Response: A teleconference will be scheduled with the Committee Chair to discuss this working retreat.

Constitution and Bylaws

Recommendations to the Executive Board:

1. Appoint Dave Fry the new Chair and Randy Dags the new Vice-Chair of the Committee.
Board Response: Board agrees.

Foundation Fund

Recommendations to the Executive Board: None.

Nominating

Recommendations to the Executive Board: None.

Past Presidents'

Recommendations to the Executive Board:

1. It is recommended that meetings of the following committees: Past Presidents, Nominating, Foundation Fund, Awards, and Constitution and Bylaws be considered for Saturday afternoon, prior to the Annual Meeting, to avoid conflicts with PDG meetings.
Board Response: Board agrees
2. The Past Presidents' committee meeting be scheduled for one hour only.
Board Response: Board agrees.

PROFESSIONAL DEVELOPMENT GROUPS

Applied Laboratory Methods

Recommendations to the Executive Board:

1. Proposed Workshops:
 - a. Developing and Improving a Food Microbiology Testing Laboratory. Organizers: Jeff Kornacki, Kornacki Food Safety; Vickie Lewandowski, Kraft.
 - b. Methods Evaluation: Christine Aleski (repeat from last year).

Board Response: Program Committee will review your proposed workshops and communicate with the organizers.

2. Proposed Symposia:

- a. The New Frontier in Emerging Methods—How to Make New Technologies Practical for You. Organizers: Lance Bolton, DuPont and Ann Marie McNamara, Silliker.
- b. Surrogate Microorganisms: Selection Use and Validation. Organizers: Jeff Kornacki, Kornacki Food Safety; Vickie Lewandowski, Kraft.
- c. *Campylobacter*. P. C. Vasavada, UW River Falls; Pam Wilger, Cargill, A. M. McNamara, Silliker.
- d. Controlling pathogens in dry foods (with the Dairy Foods group).

Board Response: Program Committee will review your proposed symposia and communicate with the organizers.

3. Establishment of a subcommittee for the purpose of setting up and conducting Webinars as an educational tool for PDG members. First trial is September 20. We invite member(s) of IAFF staff to sit in on the subcommittee meetings as well as the trial of the process. Pat Rule will send out links and invitations.
Board Response: Staff will participate on both the subcommittee and the trial.

Beverage

Recommendations to the Executive Board:

1. Approve formation of Beverage PDG.
Board Response: Board approves.
2. Approve Indaue Mellow-Hall as Chairperson and Jeff Semancheck as Vice Chairperson.
Board Response: Board agrees.

Dairy Quality and Safety

Recommendations to the Executive Board:

1. Identify all topics in the program by keyword or program code so that attendees can sort by area of interest. It is not always easy to find all of the topics of interest since the program that is provided on the Web site is in PDF format.
Board Response: Each Committee or PDG Chair should sort the program and provide presentations of interest to their members.
2. Provide a means for PDG members to communicate with one another via conference calls between Annual Meetings to develop proposals for symposia and workshops.
Board Response: PDG E-mail addresses are provided to each Chairperson for communication purposes. Teleconferences may also be arranged through the IAFF office.
3. Revise the Committee/PDG sign-in sheet to differentiate members, visitors and those who would like to join the committee. Many people are added to committee rosters when they

are just visitor or guests. Revise "Committee Minutes Form" to include additional section for visitor and guests.

Board Response: Staff will revise minutes form.

4. The PDG nominates Vickie Lewandowski to serve as Vice Chair.

Board Response: Board agrees.

Food Hygiene and Sanitation

Recommendations to the Executive Board:

1. The committee felt that they needed more time to organize future symposium or other avenues for training and communication.
Board Response: Keep in contact with PDG Members throughout the year, especially leading up to the Annual Meeting. A lot of symposium discussion can be accomplished prior to the group meeting at Annual Meeting.

Food Law

Recommendations to the Executive Board:

1. Formation of the Food Law PDG.
Board Response: Board agrees.
2. Proposed Chairperson, Gordon Hayburn and proposed Vice Chairperson, Anna Lammerding.
Board Response: Board agrees.

Food Safety Network

Recommendations to the Executive Board: None.

Food Sanitation

Recommendations to the Executive Board: None.

Food Toxicology and Food Allergy

Recommendations to the Executive Board:

1. The Food Toxicology and Allergy PDG would like the Board to encourage PDGs to better capture speaker concepts in proceedings to be published in *Food Protection Trends*.
Board Response: Please clarify this recommendation to the Board.

Fruit and Vegetable Safety

Recommendations to the Executive Board: None.

Meat and Poultry

Recommendations to the Executive Board:

1. To accept the nomination of Dan McElroy as committee Vice Chair.

Board Response: Board agrees.

Membership

Recommendations to the Executive Board:

1. Explore increasing contact time with peers in some form of discussion group versus 25 symposiums.
Board Response: The Annual Meeting schedule will be studied to see if some revisions as mentioned can be accommodated.

Microbial Risk Analysis

Recommendations to the Executive Board:

1. To advise the Program Committee to assure good communication between organizers (and lecturers) responsible for different workshops, in the case where these are explicitly linked as was done for the 2005 workshops for the first time.

Board Response: Board agrees.

2. To inform initiators of PDG projects such as the compilation of particular guidelines, opinions or recommendations whether financial support for such initiatives can be requested from the Board or any other particular body in IAFF.

Board Response: Resources are available for PDG projects. The Board welcomes and will review any proposal for use of Association funds for such projects.

Outreach Education

Recommendations to the Executive Board: None.

Retail Food Safety and Quality

Recommendations to the Executive Board: None.

Seafood Safety and Quality

Recommendations to the Executive Board: None.

Student

Recommendations to the Executive Board:

1. Student representation on the new membership committee.

Board Response: Board agrees.

Viral and Parasitic Foodborne Disease

Recommendations to the Executive Board: None.

Water Safety and Quality

Recommendations to the Executive Board: None.

Affiliate Council

Recommendations to the Executive Board:

1. Add pictures of Affiliate officers and other pictures to the Web site.

Board Response: Because of the ever-changing officer make up of the Affiliate boards, it is

recommended that each Affiliate organization post the pictures of their own officers. IAFF provides links to each Affiliate Web site.

2. Hotel accommodations for future Annual Meetings to be increased to accommodate the increase in registrants when making arrangements in cities in the future.

Board Response: Each city and Annual Meeting location is unique as hotel contracts are signed three years or more preceding the actual meeting date. Growth has exceeded projections and there are high penalties for not filling commitments to hotels in filling rooms. Staff continues to monitor and make adjustments accordingly while protecting the Association

*IAFFP would like to extend
a special thank you to Ron Case
for his photography services
during IAFFP 2005!*

IAFP Foundation Fund Silent Auction Results

Over \$5,000.00 Raised!

High Bidder	Item	Donated by
Laura Allen	Black & White Inflatable Cow	Wisconsin Association of Milk and Food Sanitarians
Susan Allen	New York State Cheddar Cheese-3 Pounds	New York State Association for Food Protection
Donna Bahun	Mickey Mouse Statue	Walt Disney World Company
David Baker	1956 FDA First Day Cover	Tom Schwarz
Marcia Baker	Miniature Chair	Quality Flow
Larry Beuchat	Blue Wrens Bone China Wall Plate	Murray Goulburn Co-op
Jeff Bloom	Original Cheese Head	Wisconsin Association of Milk and Food Sanitarians
Jeff Bloom	Cheese Bow Tie	Wisconsin Association of Milk and Food Sanitarians
Brandi Bok	Alaska Salmon and Trout Flies	Pete Cook
Cathy Bowyer	Walking Equipment	Experience Columbus
Pat Brown	Food Safety and Security T-Shirt	Weber Scientific
Jennifer Burnham	1983 Commemorative Coke-NCAA Champion	North Carolina State
Margaret Burton	New York State Maple Syrup	New York State Association for Food Protection
RJ Causey	"Got Ripped Off" Poster	California Association of Dairy and Milk Sanitarians
Donna Christianson	Corn on the Cow Parade Figurine	Fred Weber
Harvey Coles	Stuffed Weinermobile	Kraft Foods North America
Beverly Cook	Holstein Oven Mitts	Wisconsin Association of Milk and Food Sanitarians
Bob Coyne	St Julian Wine	Michigan Environmental Health Association
Sandra Craig	Stress Cow	Wisconsin Association of Milk and Food Sanitarians
Carl Custer	Food Safety and Security T-Shirt	Weber Scientific
Eric DeLaubenfels	Cherry Cream Ridge Wine	Metropolitan Association for Food Protection
Ed Donnell	Ebony Wood Carved Coasters-Kenya	WITS University
Ed Donnell	Stadium Jacket	Ohio Association of Food and Environmental Sanitation
Denise Eblen	Signed Baseball from 2004 AMI Hot Dog Lunch	American Meat Institute Foundation
David Engelskirchen	Minimally Processed Fruits and Vegetables	Weber Scientific
David Engelskirchen	University of Wisconsin-River Falls T-Shirt	P. C. Vasavada
Harold Ewell	Got Milk? Hat	Wisconsin Association of Milk and Food Sanitarians
Wilbur Feagan	Georgia Product Gift Basket	Georgia Association for Food Protection
Wilbur Feagan	Signed 1917 "Disease in Milk"	Steven Sims
Louise Fielding	Food Safety and Security T-Shirt	Weber Scientific
Louise Fielding	Pikesville Rye Whiskey	Carl Custer
Joe Frank	Johannisberg Riesling	New York State Association for Food Protection
Charles Giambrone	Microbial Safety of Minimally Processed Foods	Don Schaffner/Rutgers University
Theresa Graham	Sheldrake Point Heritage Wine	New York State Association for Food Protection
Bob Gravani	1956 FDA First Day Cover	Tom Schwarz
Paul Hall	Sortilege: Liqueur of Canadian Whisky and Maple Syrup	Quebec Food Protection Association
Paul Hall	Spotted Cow Beer - 6 Pack	Wisconsin Association of Milk and Food Sanitarians
Paul Hall	FAFP Golf Package	Florida Association for Food Protection
Paul Hall	The Sayings of the Vikings	Food Diagnostics Scandinavia
Paul Hall	Wind-up Crab	SGA Associates
Paul Hall	PepsiCo Gift Bag	PepsiCo
Wanda Honeyblue	Foodborne/Waterborne Booklets	International Association for Food Protection
Wanda Honeyblue	IAFP Bath and Hand Towel	Jack in the Box
David Horowitz	Baltimore Coffee Table Book	Tom Schwarz
David Horowitz	Wild Africa Cream Liqueur-South Africa	Consulting Microbiological Laboratory
David Horowitz	3-Month Membership "Cheese of the Month Club"	Washington Association for Food Protection
David Horowitz	Signed Baseball from 2005 AMI Hot Dog Lunch	American Meat Institute Foundation
LeeAnne Jackson	Old Bay Gift Pack	McCormick and Co., Inc.
Crystal Johnson	HAHN Monterey Chardonnay	California Association of Dairy and Milk Sanitarians
Vince Kramer	Jack Daniels Commemorative Bottle	Tennessee Association of Milk, Food and Water Protection
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Monday Afternoon Coffee Break



Exhibit Hall Reception



Committee Day Refreshments



Strategic Diagnostics Inc.

Badge Holders w/Lanyards

IAFP 2005 Sponsors

- 3M Microbiology
ABC Research Corporation
Accugenix
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Strategic Diagnostics Inc.
Unilever (SEAC)
VWR International
Walt Disney World Co.
Warnex Diagnostics
Warren Taylor Services
Weber Scientific
Wild Bill's Foods
Zep Manufacturing Company



Award Nominations

The International Association for Food Protection welcomes your nominations for our Association Awards. Nominate your colleagues for one of the Awards listed below. You do not have to be an IAFP Member to nominate a deserving professional. To request nomination criteria, contact:

International Association for Food Protection
6200 Aurora Ave., Suite 200W
Des Moines, Iowa 50322-2864
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655
Web site: www.foodprotection.org
E-mail: info@foodprotection.org

Nominations deadline is March 13, 2006. You may make multiple nominations. All nominations must be received at the IAFP office by **March 13, 2006.**

- ◆ Persons nominated for individual awards must be current IAFP Members. Black Pearl Award nominees must be companies employing current IAFP Members. FPA Food Safety Award nominees do not have to be IAFP Members.
- ◆ Previous award winners are not eligible for the same award.
- ◆ Executive Board Members and Awards Committee Members are not eligible for nomination.
- ◆ Presentation of awards will be during the Awards Banquet at IAFP 2006 – the Association's 93rd Annual Meeting in Calgary, Alberta, Canada on August 16, 2006.



Nominations will be accepted for the following Awards:

Black Pearl Award — Award Showcasing the Black Pearl

Presented in recognition of a company's outstanding commitment to, and achievement in, corporate excellence in food safety and quality.

Sponsored by Wilbur Feagan and FEH Food Equipment Company

Fellow Award — Distinguished Plaque

Presented to Member(s) who have contributed to IAFP and its Affiliates with distinction over an extended period of time.

Honorary Life Membership Award — Plaque and Lifetime Membership in IAFP

Presented to Member(s) for their dedication to the high ideals and objectives of IAFP and for their service to the Association.

Harry Haverland Citation Award — Plaque and \$1,000 Honorarium

Presented to an individual for many years of dedication and devotion to the Association ideals and its objectives.

Sponsored by Zep Manufacturing Co.

Harold Barnum Industry Award — Plaque and \$1,000 Honorarium

Presented to an individual for dedication and exceptional service to IAFP, the public, and the food industry.

Sponsored by Nasco International, Inc.

Educator Award — Plaque and \$1,000 Honorarium

Presented to an individual for dedicated and exceptional contributions to the profession of the Educator.

Sponsored by Nelson-Jameson, Inc.

Sanitarian Award — Plaque and \$1,000 Honorarium

Presented to an individual for dedicated and exceptional service to the profession of Sanitarian, serving the public and the food industry.

Sponsored by Ecolab, Inc., Food and Beverage Division

Maurice Weber Laboratorian Award — Plaque and \$1,500 Honorarium

Presented to an individual for outstanding contributions in the laboratory, recognizing a commitment to the development of innovative and practical analytical approaches in support of food safety.

Sponsored by Weber Scientific

International Leadership Award — Plaque, \$1,000 Honorarium and Reimbursement to attend IAFP 2006

Presented to an individual for dedication to the high ideals and objectives of IAFP and for promotion of the mission of the Association in countries outside of the United States and Canada.

Sponsored by Cargill, Inc.

Food Safety Innovation Award — Plaque and \$2,500 Honorarium

Presented to a Member or organization for creating a new idea, practice or product that has had a positive impact on food safety, thus, improving public health and the quality of life.

Sponsored by 3M Microbiology

FPA Food Safety Award — Plaque and \$3,000 Honorarium

This Award alternates between individuals and groups or organizations. In 2006, the award will be presented to a group or organization in recognition of a long history of outstanding contributions to food safety research and education.

Sponsored by Food Products Association



Call for Abstracts

IAFP 2006

The Association's 93rd Annual Meeting
August 13-16, 2006
Calgary, Alberta, Canada

General Information

1. Complete the Abstract Submission Form.
2. All presenters must register for the Annual Meeting and assume responsibility for their own transportation, lodging, and registration fees.
3. There is no limit on the number of abstracts registrants may submit. However, presenters must present their presentations.
4. Accepted abstracts will be published in the Program and Abstract Book. Editorial changes will be made to accepted abstracts at the discretion of the Program Committee.
5. Photocopies of the abstract form may be used.
6. Membership in the Association is not required for presenting a paper at IAFP 2006.

Presentation Format

1. Technical – Oral presentations will be scheduled with a maximum of 15 minutes, including a two to four minute discussion. LCD projectors will be available and computers will be supplied by the convenors.
2. Poster – Freestanding boards will be provided for presenting posters. Poster presentation surface area is 4' high by 8' wide. Handouts may be used, but audiovisual equipment will not be available. The presenter will be responsible for bringing pins and velcro.

Note: The Program Committee will make the final decision on presentation format.

Instructions for Preparing Abstracts

1. Title – The title should be short but descriptive. The first letter in each word in the title and proper nouns should be capitalized.
2. Authors – List all authors using the following style: first name followed by the surname.
3. Presenter Name & Title – List the full name and title of the person who will present the paper.
4. Presenter Address – List the name of the department, institution and full postal address (including zip/postal code and country).
5. Phone Number – List the phone number, including area, country, and city codes of the presenter.
6. Fax Number – List the fax number, including area, country, and city codes of the presenter.
7. E-mail – List the E-mail address for the presenter.
8. Format preferred – Check the box to indicate oral or poster format. The Program Committee makes the final decision on presentation format.
9. Category – Check the box to indicate which category best fits the subject of the abstract.
10. Developing Scientist Awards Competitions – Check the box to indicate if the paper is to be presented by a student in this competition. A signature and date is required from the major professor or department head (Online submission only requires typed name). See "Call for Entrants in the Developing Scientist Awards Competitions."
11. Abstract – Type abstract, double-spaced, in the space provided or on a separate sheet of paper, using a 12-point font size. Use no more than 300 words.

Abstract Submission

Abstracts submitted for IAFP 2006 will be evaluated for acceptance by the Program Committee. Please be sure to follow the format instructions above carefully; failure to do so may result in rejection. Information in the abstract data must not have been previously published in a copyrighted journal.

Abstracts must be received no later than February 8, 2006. Return the completed abstract form through one of the following methods:

1. Online: Use the online abstract submission form located at www.foodprotection.org. You will receive an E-mail confirming receipt of your submission.
2. E-mail: Submit via E-mail as an attached text or MS Word™ document to abstracts@foodprotection.org.

Selection Criteria

1. Abstracts must accurately and briefly describe:
 - (a) the problem studied and/or objectives;
 - (b) methodology;
 - (c) essential results, including statistical significance when applicable; and
 - (d) conclusions and/or significant implications.
2. Abstracts must report the results of original research pertinent to the subject matter. Papers should report the results of new, applied research on: safety and microbial quality of foods (dairy, meat and poultry, seafood, produce, water); foodborne viruses and parasites, retail food safety, epidemiology and public health; non-microbiology food safety issues (food toxicology; allergens; chemical contaminants); advances in sanitation, laboratory methods, quality assurance, and food safety systems. Papers may also report subject matter of an educational and/or non-technical nature.
3. Research must be based on accepted scientific practices.
4. Research should not have been previously presented nor intended for presentation at another scientific meeting. Papers should not appear in print prior to the Annual Meeting.
5. Results should be summarized. Do not use tables or graphs.

Rejection Reasons

1. Abstract was not prepared according to the "Instructions for Preparing Abstracts."
2. Abstract does not contain essential elements as described in "Selection Criteria 1a-1d."

3. Abstract reports inappropriate or unacceptable subject matter.
4. Abstract is not based on accepted scientific practices, the quality of the research or scientific approach is inadequate, data does not support conclusions, or potential for approach to be practically used to enhance food safety is not justified.
5. Work reported appears to be incomplete and/or data and statistical validity are not presented (percentages alone are not acceptable unless sample sizes are reported). Indication that data will be presented is not acceptable.
6. Abstract was poorly written or prepared. This includes spelling and grammatical errors.
7. Results have been presented/published previously.
8. Abstract was received after the deadline for submission.
9. Abstract contains information that is in violation of the International Association for Food Protection Policy on Commercialism.
10. Abstract subject is similar to other(s) submitted by same author. (The committee reserves the right to combine such abstracts.)
11. Abstracts that report research that is confirmatory of previous studies and without justification of relevance and originality will be given low priority for acceptance.

Projected Deadlines/Notification

Abstract Submission Deadline: February 8, 2006.
Submission Confirmations: On or before February 9, 2006. Acceptance/Rejection Notification: March 10, 2006.

Contact Information

Questions regarding abstract submission can be directed to Tamara P. Ford, 515.276.3344 or 800.369.6337; E-mail: tford@foodprotection.org.

Program Chairperson

Vickie Lewandowski
Kraft Foods
801 Waukegan Road
Glenview, IL 60025
Phone: 847.646.6798; Fax: 847.646.3426
E-mail: vlewandowski@kraft.com



Abstract Form

DEADLINE: Must be Received
by February 8, 2006

(1) Title of Paper _____

(2) Authors _____

(3) Full Name and Title of Presenter _____

(4) Institution and Address of Presenter _____

(5) Phone Number _____

(6) Fax Number _____

(7) E-mail _____

(8) Format preferred: Oral Poster No Preference

The Program Committee will make the final decision on presentation format.

(9) Category: Produce Meat and Poultry Seafood Dairy and Other Food Commodities
 Risk Assessment and Epidemiology Education/ Other Non-Technical General Microbiology and Sanitation
 Pathogens and Antimicrobials Advances in Applied Laboratory Methods
 Food Toxicology/Non-Microbial Food Safety

(10) Developing Scientist Awards Competition Yes No Graduation date _____
 Full-time student Part-time student

Major Professor/Department Head approval (signature and date) _____

(11) TYPE abstract, DOUBLE-SPACED, in the space provided or on a separate sheet of paper, using a 12-point font size. Use no more than 300 words.

Call for Entrants in the Developing Scientist Awards Competitions

Supported by the International Association for Food Protection Foundation

The International Association for Food Protection Foundation is pleased to announce the continuation of its program to encourage and recognize the work of students and recent graduates in the field of food safety research. Qualified individuals may enter either the oral or poster competition.

Purpose

1. To encourage students and recent graduates to present their original research at the Annual Meeting.
2. To foster professionalism in students and recent graduates through contact with peers and professional Members of the Association.
3. To encourage participation by students and recent graduates in the Association and the Annual Meeting.

Presentation Format

Oral Competition – The Developing Scientist Oral Awards Competition is open to graduate students (enrolled or recent graduates) from M.S. or Ph.D. programs or undergraduate students at accredited universities or colleges. Presentations are limited to 15 minutes, which includes two to four minutes for discussion.

Poster Competition – The Developing Scientist Poster Awards Competition is open to students (enrolled or recent graduates) from undergraduate or graduate programs at accredited universities or colleges. The presenter must be present to answer questions for a specified time (approximately two hours) during the assigned session. Specific requirements for presentations will be provided at a later date.

General Information

1. Competition entrants cannot have graduated more than a year prior to the deadline for submitting abstracts.
2. Accredited universities or colleges must deal with environmental, food or dairy sanitation, protection or safety research.
3. The work must represent original research completed and presented by the entrant.
4. Entrants may enter only one paper in either the oral or poster competition.
5. All entrants must register for the Annual Meeting and assume responsibility for their own transportation, lodging, and registration fees.
6. Acceptance of your abstract for presentation is independent of acceptance as a competition finalist. Competition entrants who are chosen as finalists will be notified of their status by the chairperson by May 29, 2006.
7. Entrants who are full time students, with accepted abstracts will receive a complimentary, one-year Student Membership with *JFP* Online.
8. In addition to adhering to the instruction in the "Call for Abstracts," competition entrants must check the box to indicate if the paper is to be presented by a student in this competition. A signature and date is required from the major professor or department head.
9. You must also specify full-time student or part-time student.

Judging Criteria

A panel of judges will evaluate abstracts and presentations. Selection of up to ten finalists for each competition will be based on evaluations of the abstracts and the scientific quality of the work. All entrants will be advised of the results by May 29, 2006. Only competition finalists will be judged at the Annual Meeting and will be eligible for the awards.

All other entrants with accepted abstracts will be expected to be present as part of the regular Annual Meeting. Their presentations will not be judged and they will not be eligible for the awards.

Judging criteria will be based on the following:

1. Abstract – clarity, comprehensiveness and conciseness.
2. Scientific Quality – Adequacy of experimental design (methodology, replication, controls), extent to which objectives were met, difficulty and thoroughness of research, validity of conclusions based upon data, technical merit and contribution to science.
3. Presentation – Organization (clarity of introduction, objectives, methods, results and conclusions), quality of visuals, quality and poise of presentation, answering questions, and knowledge of subject.

Finalists

Awards will be presented at the International Association for Food Protection Annual Meeting Awards Banquet to the top three presenters (first, second and third places) in both the oral and poster competitions. All finalists are expected to be present at the banquet where the awards winners will be announced and recognized.

Awards

First Place – \$500 and an engraved plaque
Second Place – \$300 and a framed certificate
Third Place – \$100 and a framed certificate

Award winners will receive a complimentary, one-year Membership including *Food Protection Trends*, *Journal of Food Protection*, and *JFP* Online.

Policy on Commercialism

for Annual Meeting Presentations

1. INTRODUCTION

No printed media, technical sessions, symposia, posters, seminars, short courses, and/or other related types of forums and discussions offered under the auspices of the International Association for Food Protection (hereafter referred to as Association forums) are to be used as platforms for commercial sales or presentations by authors and/or presenters (hereafter referred to as authors) without the express permission of the staff or Executive Board. The Association enforces this policy in order to restrict commercialism in technical manuscripts, graphics, oral presentations, poster presentations, panel discussions, symposia papers, and all other type submissions and presentations (hereafter referred to as submissions and presentations), so that scientific merit is not diluted by proprietary secrecy.

Excessive use of brand names, product names or logos, failure to substantiate performance claims, and failure to objectively discuss alternative methods, processes, and equipment are indicators of sales pitches. Restricting commercialism benefits both the authors and recipients of submissions and presentations.

This policy has been written to serve as the basis for identifying commercialism in submissions and presentations prepared for the Association forums.

2. TECHNICAL CONTENT OF SUBMISSIONS AND PRESENTATIONS

2.1 Original Work

The presentation of new technical information is to be encouraged. In addition to the commercialism evaluation, all submissions and presentations will be individually evaluated by the Program Committee chairperson, technical reviewers selected by the Program Committee chairperson, session convenor, and/or staff on the basis of originality before inclusion in the program.

2.2 Substantiating Data

Submissions and presentations should present technical conclusions derived from technical data. If products or services are described, all reported capabilities, features or benefits, and performance parameters must be substantiated by data or by an acceptable explanation as to why the data are unavailable (e.g., incomplete, not collected, etc.) and, if it will become available, when. The explanation for unavailable data will be considered by the Program Committee chairperson and/or technical reviewers selected by the Program

Committee chairperson to ascertain if the presentation is acceptable without the data. Serious consideration should be given to withholding submissions and presentations until the data are available, as only those conclusions that might be reasonably drawn from the data may be presented. Claims of benefit and/or technical conclusions not supported by the presented data are prohibited.

2.3 Trade Names

Excessive use of brand names, product names, trade names, and/or trademarks is forbidden. A general guideline is to use proprietary names once and thereafter to use generic descriptors or neutral designations. Where this would make the submission or presentation significantly more difficult to understand, the Program Committee chairperson, technical reviewers selected by the Program Committee chairperson, session convenor, and/or staff, will judge whether the use of trade names, etc., is necessary and acceptable.

2.4 "Industry Practice" Statements

It may be useful to report the extent of application of technologies, products, or services; however, such statements should review the extent of application of all generically similar technologies, products, or services in the field. Specific commercial installations may be cited to the extent that their data are discussed in the submission or presentation.

2.5 Ranking

Although general comparisons of products and services are prohibited, specific generic comparisons that are substantiated by the reported data are allowed.

2.6 Proprietary Information (See also 2.2.)

Some information about products or services may not be publishable because it is proprietary to the author's agency or company or to the user. However, the scientific principles and validation of performance parameters must be described for such products or services. Conclusions and/or comparisons may be made only on the basis of reported data.

2.7 Capabilities

Discussion of corporate capabilities or experiences are prohibited unless they pertain to the specific presented data.

3. GRAPHICS

3.1 Purpose

Slides, photographs, videos, illustrations, art work, and any other type visual aids appearing with the printed text in submissions or used in presentations (hereafter referred to as graphics) should be included only to clarify technical points. Graphics which primarily promote a product or service will not be allowed. (See also 4.6.)

3.2 Source

Graphics should relate specifically to the technical presentation. General graphics regularly shown in, or intended for, sales presentations cannot be used.

3.3 Company Identification

Names or logos of agencies or companies supplying goods or services must not be the focal point of the slide. Names or logos may be shown on each slide so long as they are not distracting from the overall presentation.

3.4 Copies

Graphics that are not included in the preprint may be shown during the presentation only if they have been reviewed in advance by the Program Committee chairperson, session convener, and/or staff, and have been determined to comply with this policy. Copies of these additional graphics must be available from the author on request by individual attendees. It is the responsibility of the session convener to verify that all graphics to be shown have been cleared by Program Committee chairperson, session convener, staff, or other reviewers designated by the Program Committee chairperson.

4. INTERPRETATION AND ENFORCEMENT

4.1 Distribution

This policy will be sent to all authors of submissions and presentations in the Association forums.

4.2 Assessment Process

Reviewers of submissions and presentations will accept only those that comply with this policy. Drafts of submissions and presentations will be reviewed for

commercialism concurrently by both staff and technical reviewers selected by the Program Committee chairperson. All reviewer comments shall be sent to and coordinated by either the Program Committee chairperson or the designated staff. If any submissions are found to violate this policy, authors will be informed and invited to resubmit their materials in revised form before the designated deadline.

4.3 Author Awareness

In addition to receiving a printed copy of this policy, all authors presenting in a forum will be reminded of this policy by the Program Committee chairperson, their session convener, or the staff, whichever is appropriate.

4.4 Monitoring

Session convenors are responsible for ensuring that presentations comply with this policy. If it is determined by the session convener that a violation or violations have occurred or are occurring, he or she will publicly request that the author immediately discontinue any and all presentations (oral, visual, audio, etc.) and will notify the Program Committee chairperson and staff of the action taken.

4.5 Enforcement

While technical reviewers, session convenors, and/or staff may all check submissions and presentations for commercialism, ultimately it is the responsibility of the Program Committee chairperson to enforce this policy through the session convenors and staff.

4.6 Penalties

If the author of a submission or presentation violates this policy, the Program Committee chairperson will notify the author and the author's agency or company of the violation in writing. If an additional violation or violations occur after a written warning has been issued to an author and his agency or company, the Association reserves the right to ban the author and the author's agency or company from making presentations in the Association forums for a period of up to two (2) years following the violation or violations.



NEW MEMBERS

AUSTRALIA

Louis Petrin
Arrow Scientific Pty Ltd.
Lane Cove, New South Wales

CANADA

Mike B. Cassidy
Ontario Ministry of Agriculture,
Food & Rural Affairs
Guelph, Ontario

Ivan R. Vulicevic
Destination Products International Ltd.
Mississauga, Ontario

GERMANY

Thomas Zander
Profos Ag
Regensburg

HONG KONG

Rosane Chui
Hong Kong Disneyland
Shatin, N.T.

MEXICO

Maria Araceli Ruiz Avalos
Universidad Autonoma de Queretaro
Queretaro

Virginia H. Arriaga Lopez
Universidad Autonoma de Queretaro
Santiago, Queretaro

Refugio Torres Vitela
Universidad de Guadalajara
Guadalajara, Jalisco

TAIWAN

Tsung-Yu Tsai
National Taiwan University
Taipei

THE NETHERLANDS

Lonneke Van Dijk
PURAC
The Netherlands

TURKEY

Muhammed Yuceer
Istanbul Technical University
Istanbul

UNITED STATES

FLORIDA

James C. McDowell
Learn Something, Inc.
Tallahassee

Tricia A. Metts
East Tennessee State University
Pensacola

GEORGIA

Douglas E. Cosby
USDA-ARS-PMSRU
Arnoldsville

Mike Cunningham
BPI Technology
Alpharetta

Kimberly K. Rice
Crider, Inc.
Stillmore

ILLINOIS

Celeste D. Gulley
Proviant Technologies, Inc.
Champaign

Ikro Joe
University of Illinois
Champaign

Hoshin Park
University of Illinois
Champaign

Scott S. Pollina

PaPa Charlie's
Chicago

INDIANA

Balamurugan Jagadeesan
Purdue University
West Lafayette

IOWA

Joseph G. Sebranek
Iowa State University
Ames

Nancy J. Woltman

Tyson Deli
Cherokee

NEW JERSEY

Brian McNally
Stryka Botanics
Hillsborough

NEW YORK

Susan L. Safren
Springer
New York

NORTH CAROLINA

Yolanda M. Harrison
Avendra, LLC
Charlotte

OHIO

Mark Case
Montgomery County
Dayton

SOUTH DAKOTA

Marie Yeung
South Dakota State University
Brookings



NEW MEMBERS

TEXAS

Ivahn Garcia
Latin Specialties
Houston

Rebecca A. Pfundheller
Analytical Food Laboratories, Inc.
Grand Prairie

WASHINGTON

Masami T. Takeuchi
Washington State University
Pullman

WISCONSIN

Roy E. Cartwright
Schreiber Foods Inc.
Green Bay

Heidi Lammers

McCain Foods
Rice Lake

NEW GOLD SUSTAINING MEMBER

Rhona S. Applebaum
The Coca-Cola Company
Atlanta, GA

UPDATES

Steven Lloyd Appointed Director of Sales for Multisorb Technologies

Multisorb Technologies, Inc., has appointed Steven M. Lloyd as director of sales. In this new capacity, Mr. Lloyd will manage company sales efforts and customer service for Multisorb's global customer base. Regional business development leaders will report to Mr. Lloyd on account maintenance and sales growth. Multisorb's sorbent products service diverse industries including food, pharmaceutical, nutraceutical, diagnostics, electronics, and logistics.

Prior to Multisorb, Mr. Lloyd most recently spent six years working at ATTO Technology Inc., in Amherst, NY. Previously, he spent 18 years with Moore Business Forms and Systems as district sales manager, major accounts in Chicago, IL. Mr. Lloyd holds a bachelor of arts degree from Brown University.

FKI Logistex Appoints Vice President of Manufacturing

FKI Logistex® has announced the appointment of Dick Braatz as vice president of manufacturing for the company's North American business unit.

Mr. Braatz, who holds a bachelor of science in industrial engineering from Purdue University, comes to FKI Logistex from positions at industry leaders L-3 Communications, Ingersoll-Rand, Wilcox Electric, and Allen-Bradley.

Heldman Elected IFT President-Elect

Food scientist Dennis R. Heldman, principal of the food science consultancy Heldman Associates of San Marcos, CA, and professor emeritus at University of Missouri, has been named president-elect of the Institute of Food Technologists as determined by a vote of its members.

Mr. Heldman succeeds Margaret Lawson as IFT president-elect. Ms. Lawson assumed the responsibilities of the IFT presidency on September 1, at the conclusion of Herbert Stone's one-year term. Mr. Heldman will follow Ms. Lawson as IFT president beginning Sept. 1, 2006.

Mr. Heldman earned his bachelor's and master's degrees in dairy technology from Ohio State University, and his doctorate in agricultural engineering from Michigan State University.

A&B Ingredients Appoints Kiran Krishnan Midwest Regional Sales Manager

A&B Ingredients has appointed Mr. Kiran Krishnan as Midwest regional sales manager. He will have technical, marketing and sales responsibilities for A&B Ingredients' full line of diverse products in the Midwest.

Before joining A&B Ingredients, Mr. Krishnan served as a national sales and marketing representative for Amano Enzyme USA for four years. Prior to this experience, he worked as a conference sales manager for Marcus Evans and as a research associate at the University of Iowa's College of Medicine. Mr. Krishnan earned a bachelor of science degree in microbiology from the University of Iowa at Iowa City and took some graduate level courses there as well.

Chr. Hansen Focuses on Evolving Process Cheese Market with New Marketing Director Appointment

Chr. Hansen announces that it is focusing on the process cheese segment, which is evolving and growing in correlation to the foodservice market, another prime focal point of the company.

To concentrate on the dynamic process cheese market, Chr. Hansen appoints Nachi Adaikalavan to the

new position of director of marketing, process cheese. With an emphasis on dairy flavors, his responsibilities are to develop and implement strategies for the global process cheese market, and to ensure the availability of products that meet reactive and proactive customer needs.

Mr. Adaikalavan has been with Chr. Hansen for 10 years, holding application, technical sales, sales management, business development, and marketing management positions in Australia, Denmark, and the United States.

Flowserve Corp. Names Lewis M. Kling as President and CEO

Flowserve Corp. has announced that its board of directors has selected Lewis M. Kling as president, chief executive officer, and a member of the board of directors, effective Aug. 1, 2005.

Mr. Kling currently serves as chief operating officer at Flowserve and will become president and CEO succeeding interim-chairman, president and CEO Kevin E. Sheehan, who was appointed by the board in April. Mr. Sheehan, a director since 1990, was named non-executive chairman of the board. The company said it does not currently plan to name a successor to Mr. Kling in the COO role.

Mr. Kling brings more than 35 years of experience with companies such as General Electric, SPX, Harris and AlliedSignal. He has extensive experience in successfully growing profitable industrial businesses, acquiring and integrating businesses, and rapidly driving results. Prior to joining Flowserve in July 2004, he was a group president and corporate officer for SPX Corp. In his role as COO at Flowserve, Mr. Kling was responsible for the three operating divisions as well as the supply chain and continuous improvement functions.

2005 Food Code Updates Food Safety Guidelines

The Food and Drug Administration (FDA) is issuing the 2005 edition of the Food Code, which contains the latest science-based information on food safety for retail and food service industries. The Food Code is used as a reference by nearly 3,000 regulatory agencies that oversee food safety in restaurants, grocery stores, nursing homes, and other institutional and retail settings.

"This year's Food Code not only includes the best practices for the retail and food service industries but it also provides valuable resources on food defense that will assist in protecting Americans against threats to the food supply," said FDA's Center for Food Safety and Applied Nutrition Director Robert Brackett.

In collaboration with the Conference for Food Protection, the Centers for Disease Control and Prevention, and US Department of Agriculture, the updated Food Code focuses on enhancing food safety practices based on new scientific and programmatic information. The most significant changes include:

A definition for major food allergen that is consistent with the Food Allergen Labeling and Consumer Protection Act of 2004. The person in charge of a food establishment must demonstrate knowledge about the major food allergens (milk, egg, fish, crustacean shellfish, tree nuts [e.g., almonds, pecans, or walnuts, wheat, peanuts, and soybeans]).

An amended definition of potentially hazardous food (also

known as time/temperature control for safety [TCS food]) to reflect those that could allow pathogenic microorganism growth or toxin formation; Added new controls and operations for reduced oxygen packaging; Summarized available resources on food defense and links to useful publications from the FDA, Centers for Disease Control and Prevention, US Department of Agriculture and industry groups;

Refocused date-marking provisions on foods that present a higher risk of contamination. Date marking is the practice of indicating the date or day by which a ready-to-eat, potentially hazardous food should be consumed, sold, or discarded; and Updated Employee Health provisions to include better ways to protect public health, based on new science on pathogens that are most likely to be transmitted from an infected food worker through food to consumers.

Local, state, tribal, and federal regulators voluntarily use the Food Code as a model to develop or update their own food safety rules and to maintain consistency and uniformity with national food regulatory policy. The Association of Food and Drug Officials reported in June 2005, that 48 of 56 states and territories have adopted food codes patterned after the Food Code. Those 48 states and territories represent 79% of the US population.

Copies of the 2005 Food Code are available at <http://www.cfsan.fda.gov/~dms/fc05-toc.html>. In approximately 8 weeks, copies of the Food Code can be purchased from the National Technical Information Service, US Department of Commerce, Springfield, VA 22161.

From Trigger to Toxin — *Clostridium botulinum* Exposed

A discovery by Institute of Food Research (IFR) scientists is set to improve the food industry's ability to predict foodborne botulism. Botulism is a severe and often deadly disease caused by toxin-producing spores of the bacterium *Clostridium botulinum*. The spores remain harmless until they find a suitable, anaerobic environment in which to germinate. After germination, there is a short "lag time" until rapid cell division begins.

Lead author of the newly published study Dr. Sandra Stringer said: "We set out to unravel the various stages within lag time leading to the production of deadly neurotoxin. This is like looking at the time between loading a gun and actually pulling the trigger." Spores are the time travellers of the bacterial world. They are produced at times of environmental stress and exist in a state of suspended animation.

In the protective pod of a spore coat, they resist temperature extremes and dehydration and can survive for millions of years until conditions are ripe for germination.

A single spore of *Clostridium botulinum* can lead to neurotoxin production in food. Previous studies have found that the lower the number of spores, the more difficult it is to predict growth patterns. However, prediction of lag time has until now been based on the belief that the first spore to germinate will be the first to produce actively dividing cells and start toxin production.



The IFR study is the first to investigate each stage within lag time and the relationship between them. "The only way to study each stage in detail is by using microscopy and image analysis," said Dr. Stringer. "We developed a novel imaging system and made microscopic observations of 1,739 spores. We tracked their irreversible progress through germination and rehydration to shedding the spore coat, emerging as a young cell, maturing and finally beginning cell division."

"We found that each stage from germination to growth is variable between individual spores and none of the stages are related. Germination is therefore not a good predictor to use in risk assessment work as it underestimates the time to growth and toxin production," said Dr. Stringer. Images of individual spores were captured every five minutes for 15 hours then analyzed.

"This was painstaking work, but worth it," said Dr. Stringer. Mathematical biologist Dr. Gary Barker says the findings have immediate practical benefits: "This fundamental science can be incorporated into real risk assessments for real products. Food companies can approach us for microbial risk assessments of specific products based on a model we have developed that reflects on the variability of spore lag time."

Combined Testing Methods May Rapidly Detect Hepatitis A in Strawberry and Green Onion Rinses

Two testing methods combined may be able to rapidly identify hepatitis A contamination in strawberries and green onions say researchers from Canada. Their findings appear in the

September 2005 issue of the journal *Applied and Environmental Microbiology*.

Hepatitis A virus (HAV), which is endemic worldwide, is often transmitted to humans through contaminated food. Shellfish, fruits, and vegetables are commonly infected through contaminated water, surfaces, and food handlers and recent outbreaks have been specifically associated with strawberries and green onions. Detecting HAV in food has previously proven difficult due to the presence of inhibitory substances and low concentration of virus recovered.

In the study researchers combined real-time reverse transcription-PCR (a promising method for detecting HAV due to its sensitivity, specificity, speed, and ability to deliver quantitative data) and immunomagnetic separation (IMS) treatment (a method capable of addressing the limitations listed above) to detect for HAV in rinses from strawberries and green onions. Researchers were able to capture 20 times more HAV particles from both green onion and strawberry rinses receiving IMS treatment and complete the entire testing process within a six hour period.

"This study demonstrated for the first time the application of IMS combined with real-time RT-PCR for quantification of HAV in food rinses," say the researchers. "This procedure can be completed within six hours and has the potential to be applied for routine surveillance of HAV in fresh produce and environmental samples."

Hand Sanitizer Gel Reduces Spread of GI Infections

Using an alcohol-based hand sanitizer gel significantly reduces the spread of

gastrointestinal infections in the home, according to a study in the September issue of *Pediatrics*. In a study of 292 Greater Boston families—half of which were given hand sanitizer—those that used the gel had a 59 percent reduction in the spread of GI illnesses.

"This is the first randomized trial to show that hand sanitizer reduces the spread of germs in the home," says Dr. Thomas J. Sandora, a physician in the Division of Infectious Diseases at Children's Hospital Boston and lead author of the study, dubbed "Healthy Hands, Healthy Families."

The families were recruited through day care centers, and all had a least one child in day care. Families already using hand sanitizer were excluded from the study. Half the families were randomly assigned to receive hand sanitizer and educational materials on hand hygiene. They were told to place bottles of the gel around the house, including bathroom, kitchen and baby's room, and to apply it to their hands after using the toilet, before preparing food, after diaper changes, etc. The remaining families, serving as controls, received only materials about nutrition, and were asked not to use hand sanitizer. The two groups reported similar rates of handwashing on an initial questionnaire.

For five months, investigators tracked the families, phoning every other week to record how much hand sanitizer had been used, whether someone had developed a respiratory or GI infection, and whether the illness had spread to others in the home. The families given hand sanitizer had a 59 percent lower incidence of secondary GI illnesses as compared with the control group, after adjustment for other factors such as the number of young children in the



household. In addition, families reporting higher amounts sanitizer usage (more than 2 oz in 2 weeks, indicating 4–5 uses per day) were about 20 percent less likely to transmit respiratory illnesses, but this effect didn't reach statistical significance.

"We think that's probably because people were more diligent about using the sanitizer after a GI-related incident, such as using the bathroom or vomiting, than after a respiratory incident, such as nose-wiping or sneezing," says Sandora, also an instructor at Harvard Medical School.

A related study from Harvard Medical School and Children's Hospital Boston, published in the April issue of *Pediatrics*, did observe a protective effect against respiratory illness among families who used hand sanitizer gels at their own initiative.

The alcohol-based gels, widely available in stores, do not require water and rapidly kill most bacteria and viruses on the skin. They are a convenient alternative for busy parents who are unable to get to a sink while caring for sick children.

According to the US Census Bureau, more than 7.5 million children under age 5 are enrolled in day care, placing them at high risk for respiratory and GI infections, which they readily transmit to household members.

Although handwashing with soap and water is effective in reducing the spread of most infections, it requires access to a sink. In addition, there is evidence that rotavirus, the most common GI infection in the child-care setting, is not removed effectively by soap and water but is reliably killed by alcohol.

For more information about the hospital visit: www.childrenshospital.org.

'Mad Cow' Proteins Successfully Detected in Blood

Researchers at the University of Texas Medical Branch at Galveston (UTMB) have found a way to detect in blood the malformed proteins that cause "mad cow disease," the first time such "prions" have been detected biochemically in blood.

The discovery, reported in an article in *Nature Medicine*, is expected to lead to a much more effective detection method for the infectious proteins responsible for brain-destroying disorders, such as bovine spongiform encephalopathy (BSE) in cattle and variant Creutzfeldt-Jakob disease (vCJD) in humans. The blood test would make it much easier to keep BSE-infected beef out of the human food supply, ensure that blood transfusions and organ transplants do not transmit vCJD, and give researchers their first chance to figure out how many people may be incubating the disease.

"The concentration of infectious prion protein in blood is far too small to be detected by the methods used to detect it in the brain, but we know it's still enough to spread the disease," said UTMB neurology professor Claudio Soto, senior author of the *Nature Medicine* paper. "The key to our success was developing a technique that would amplify the quantity of this protein more than 10 million-fold, raising it to a detectable level."

Soto and the paper's other authors, UTMB assistant professor of neurology Joaquin Castilla and research assistant Paula Saá, applied a method they call protein misfolding cyclic amplification (PMCA) to blood samples taken from 18 prion-infected hamsters that had devel-

oped clinical symptoms of prion disease. PMCA uses sound waves to vastly accelerate the process that prions use to convert normal proteins to misshapen infectious forms.

Successive rounds of PMCA led to the discovery of prions in the blood of 16 of the 18 infected hamsters. No prions were found in blood samples that were taken from 12 healthy control hamsters and subjected to the same treatment.

"Since the original publication of a paper on our PMCA technology, we've spent four years optimizing and automating this process to get to this point," Soto said. "The next step, which we're currently working on, will be detecting prions in the blood of animals before they develop clinical symptoms and applying the technology to human blood samples." Tests for infectious prions in cattle and human blood are badly needed.

Because current tests require post-slaughter brain tissue for analysis, in the United States only cattle already showing clinical symptoms of BSE (so-called "downer cows") are tested for the disorder. This is true even though vCJD potentially can be transmitted by animals not yet showing symptoms of the disease. (Only two cases of BSE have been found in American cows so far.) And although British BSE cases have been in decline since 1992, scientists believe the British BSE epidemic of the 1980s could have exposed millions of people in the UK and Europe to infectious prions. The extent of the vCJD epidemic is yet unknown. So far the disease has killed around 180 people worldwide, but numbers could reach thousands or even hundreds of thousands in the coming decades. Prions have also been shown to be transmissible through blood transfusions and organ transplants.



"Who knows what the real situation is in cattle in the United States? And with people, we could be sitting on a time bomb, because the incubation period of this disease in humans can be up to 40 years," Soto said. "That's why a blood test is so important. We need to know the extent of the problem, we need to make sure that beef and the human blood supply are safe, and we need early diagnosis so that when scientists develop a therapy we can intervene before clinical symptoms appear — by then, it's too late."

FDA Launches New Education Campaign: Food Safety for Moms-to-Be

As part of the US Food and Drug Administration's (FDA's) ongoing commitment to educate expectant mothers about the potential risks of food-borne illness, the agency is launching a new bilingual public health education campaign entitled Food Safety for Moms-to-Be.

This broad education campaign in English and Spanish features a new comprehensive Web site (www.cfsan.fda.gov/pregnancy.html) and an educator's kit for healthcare professionals designed to educate pregnant and soon-to-be pregnant women about the food safety risks of *Listeria monocytogenes*, Methylmercury, and Toxoplasma.

The easily-navigated website offers food safety information for women before, during, and after pregnancy, including timely, seasonal articles on food safety and health tips. The site also offers women's health educators and medical professionals an educational online tool-kit with: Downloadable Educator's

Resource Guide; Downloadable PowerPoint presentation; Downloadable and printable handouts, poster, and flyer. Links to other FDA and CDC sites on folic acid, food safety, baby food preparation and storage, etc.

In addition to addressing the food safety risks of *Listeria*, Methylmercury, and Toxoplasma, the kits also provides information for expecting mothers on basic preventive steps known as: Clean, Separate, Cook, and Chill, to reduce the spread of potentially harmful germs. This approach is based on the premise that educating pregnant and soon-to-be pregnant women about safe food selection, storage, preparation, and cleanliness can reduce the opportunity for food-borne illness to occur.

Johanns Awards More Than \$12 Million in Food Safety Grants

Agriculture Secretary Mike Johanns said that USDA has awarded more than \$12 million in grants to universities nationwide. The grants will focus on addressing priority food safety issues by integrating applied research, classroom education and outreach to consumers and industry through the National Integrated Food Safety Initiative (NIFSI).

"The research funded by these grants will help us to find new and innovative ways to ensure we continue to have the safest food supply in the world," Johanns said. "The research projects will address food safety issues ranging from on-farm production, post-harvest processing and distribution, to food selection, preparation and consumption." Johanns made the announcement prior to hosting the twentieth in a series of Farm Bill Forums in

which members of the public are invited to express their views about farm and rural policy, in preparation for the development of the next farm bill in 2007.

The NIFSI grant program, administered through USDA's Cooperative State Research, Education, and Extension Service (CSREES), is an annual grant program open to faculty from all four-year colleges and universities.

Researchers and educators may apply for up to \$600,000 per grant. This year, an average of \$500,000 was awarded to support integrated food safety projects at 16 US colleges and universities.

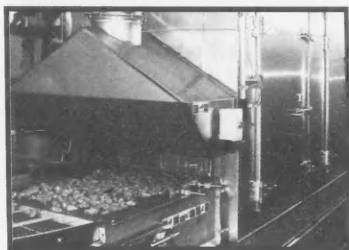
Each year, NIFSI awards these funds so that valuable research, education and extension knowledge is transferred to teachers, scientists, health professionals, researchers, farmers, food processors, food-service workers, consumers and all others making crucial decisions about the safety of the US food supply.

In addition to standard grants, special emphasis grants were made available to Colorado State University, the University of Minnesota, and Rutgers University in the amount of \$2 million. These grants are given to researchers studying high priority areas such as food defense and food biosecurity.

Descriptions of grant winners can be found in the attached fact sheet or online at: http://www.csrees.usda.gov/real/food/sri/safety_sri_cp05.html.

CSREES advances knowledge for agriculture, the environment, human health and well-being, and communities by supporting research, education, and extension programs in the Land-Grant University System and other partner organizations. For more information visit <http://www.csrees.usda.gov>.

INDUSTRY PRODUCTS



ALKAR RapidPak, Inc.

ALKAR Introduces the New Cyclone™ Linear Belt Oven

The new Cyclone™ linear belt oven, an innovative engineering approach that combines the high-performance cooking and browning of conventional linear ovens with the high-volume capacity of spiral ovens was introduced by ALKAR.

ALKAR engineers designed a cyclonic air circulation system to uniformly sweep air across the conveyor belt, resulting in superior cross-belt cooking conformity. This patented air-handling design lets the Cyclone go beyond the standard 40-inch belt limit. It's available in higher volume widths of 60", 80" and up to 100".

The ALKAR Cyclone is not limited by the conventional design of impingement ovens – narrow belt widths, low throughput and uneven temperatures. Cyclone also offers advantages over spiral ovens, too, such as lower maintenance costs and better browning/color development and similar production rates.

The simple design makes the ALKAR Cyclone easier to clean. No plenums or duct work above or be-

low the belt to remove for cleaning. A built-in belt washer and CIP system make cleaning fast and trouble-free.

ALKAR RapidPak, Inc.
608.592.3211
Lodi, WI
www.alkar.com

CUNO Incorporated Introduces the Aqua-Pure® Commercial Family of Water Filtration Products

Revolutionary IMPACTechnology™ helps foodservice operators meet higher volume and flow rate specs, reduce operating costs. The typical restaurant customer may not think about sediment, chlorine, *Giardia*, *Cryptosporidium* or *E. coli* while drinking soda, coffee or tea.

CUNO knows that water quality is top priority for the operators of the restaurants, fast food establishments, convenience stores and institutions that diners trust.

Because foodservice operators seek capacity, product quality and protection for their customers, the water filtration systems they choose must effectively reduce sediment and chlorine, and reduce the threat of biological contamination from bacteria and cysts.

For these reasons, CUNO developed the new Aqua-Pure® Commercial family with IMPACTechnology™, offering industry-leading volume and flow rates with unprecedented sediment holding, chlorine taste and odor reduction, bacteria reduction and scale prevention capabilities for all beverage and ice applications.

The Aqua-Pure family of products offers simple, effective and easy-to-install solutions for Recipe Quality Water® that meet the volume, pressure, purity and maintenance specifications of restaurant owners, fast food chain and convenience store operators, equipment specifiers and institutions.

CUNO's proprietary IMPACTechnology (Integrated Membrane Pre-Activated Carbon Technology) combines two of CUNO's patented assemblies—an outside membrane pre-filter and carbon block core filter—into one high-performance cartridge. The Aqua-Pure systems with IMPACTechnology media virtually eliminate the need for a separate pre-filter, providing sediment, cyst, bacteria and scale reduction with chlorine taste and odor reduction.

A pro-rated six month life/throughput guarantee accompanies each new Aqua-Pure cartridge with IMPACTechnology.

A graded-density multi-zone pharmaceutical-grade pleated nylon pre-filter with a 12-square-foot surface area forms the outer layer of the cartridge assembly. It filters water first through its larger openings to capture larger particles, then through smaller holes to trap smaller contaminants.

The pleated filter is wrapped around CUNO's patented polycarbon block, which reduces chlorine taste and odor and prevents corrosive chlorine from reaching downstream equipment. The block releases virtually no carbon fines, eliminating the need for pre-activation.

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INDUSTRY PRODUCTS

Engineered to meet the needs of an entire restaurant or address specific applications, a new top-of-the-line one cartridge Aqua-Pure system guarantees delivery of over 40,000 gallons (151,000 liters) of Recipe-Quality Water at a flow rate of up to 5 gallons per minute (18.9 liters per minute).

The single-cartridge Aqua-Pure system replaces three- or four-cartridge manifolds, offering foodservice operations lower capital and operating costs. A further cost saving is the elimination of the need for a separate pre-filter.

In addition, Aqua-Pure offers dual-port and dual-flow systems that simultaneously deliver Recipe Quality Water® to multiple applications.

The Aqua-Pure system will help foodservice operators ensure beverage consistency and safety, while controlling costs by reducing cartridge changeouts and protecting equipment from the harmful effects of scaling and corrosion.

The Aqua-Pure line makes cumbersome and difficult-to-service multi-cartridge and sump systems a thing of the past. CUNO's Sanitary Quick Change (SQC™) technology allows for fast cartridge changeouts at the turn of the wrist. The cartridges are easily connected to existing plumbing lines with FNPT horizontal inlet and outlet ports.

Certified by NSF International to Standard 53, Aqua-Pure systems with IMPACT technology and the nylon membrane filter offer cyst reduction and remove over 99.99% of waterborne heterotrophic bacteria such as *E. coli*.

The entire Aqua-Pure family is FDA CFR-21 and NSF Standard 42 compliant to assure that all materials are safe for food contact. Their encap-

sulated design prevents any contact with contaminated media. The cartridges' environmentally-friendly polypropylene construction allows for incineration after use.

For beverage applications that require scale inhibition, all Aqua-Pure ice and hot-beverage systems include proprietary scale inhibiting media. By removing abrasive hard particles and sediment that can rapidly degrade pumps, valves, o-rings and seals, the cartridges can extend equipment life and prevent costly downtime and service calls.

CUNO Incorporated
800.243.6894
Meriden, CT
www.cunofoodservice.com

Biolog Announces First Phenotype MicroArray™ Panels for Use with Mammalian Cell Lines

Biolog, Inc. has announced its first Phenotype MicroArray™ (PM) cell-based assays for use with mammalian cell lines. The mammalian cell capability is added to the expanding list of uses of PM technology for a variety of research applications including drug discovery, functional genomics, and cellular toxicology. PM technology has already been applied for use with a variety of microbial cells important in disease and industrial use, specifically bacteria, yeast and filamentous fungi. The PM mammalian cell panels also have very broad utility. They have already been optimized for use in a wide variety of human cell lines, including liver cell lines (HepG2, C3A), leukemia cell lines (CRF-CEM, HL60), a colon cancer line (Colo 205), a non-

small cell lung cancer line (A549), a prostate cancer cell line (PC-3), a mouse cell line (TK-1) and non-immortalized mammalian cell lines. The new mammalian cell PM technology is being exhibited for the first time at the Society for Biomolecular Screening (SBS) conference this week in Geneva, Switzerland.

The mammalian cell assays are an important advance in this innovative and unique technology platform. The first PM mammalian panels to be released provide 384 assays that probe different metabolic energy-producing pathways of cells. "I expect these assays will become an essential research tool for all pharma companies working on drugs to treat diabetes, obesity, or other disorders of energy metabolism," says Barry Bochner, chairman and CSO at Biolog.

"We have found that cells from different organs have a different range of biochemicals from which they can derive energy. There is a lot more to cellular energy production than just glucose metabolism. Our PM panels allow scientists, for the first time, to simultaneously measure rates of metabolism of many other catabolic pathways including other sugars, amino acids, and carboxylic acids. You can add a drug or a metabolically active hormone to a cell and comprehensively measure its impact on all of these energy-producing pathways in that cell. When used with Biolog's OmniLog® instrument, one can measure rates in nearly 5,000 assays at a time. The colorimetric technology format is compatible with the widely accepted 96-well and 384-well configurations and therefore can fit with robotic automation already in place in pharma and biotech

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INDUSTRY PRODUCTS

companies as well as university and government research laboratories."

A second important use of the new PM mammalian panels is as a tool to fingerprint cell lines. Cells from different organs have different energy metabolism pathways active. For example, liver cells have a large number of these pathways and are easily differentiated from blood cells, which are relatively limited. Cells from other organs are intermediate. Therefore, the new PM panels allow scientists a simple way to characterize and fingerprint the cell line that they are using. There appears to be subtle changes in the catabolic metabolism of cells when they become cancerous, or when they age and senesce.

Therefore the technology is also expected to draw interest from researchers working on cancer and aging, and also as a QC tool for anyone working with cell lines that wants to check the metabolism of their cells to verify that the cells are not changing over the course of experiments in which the cell lines are repeatedly passaged.

Phenotype MicroArrays represent a fundamental technology platform that allows scientists to easily and efficiently test hundreds to thousands of cellular traits simultaneously. The company's Phenotype MicroArray technology and OmniLog PM System can be used in the discovery and development of new drugs and other bioactive agents for human, animal and plant health applications. The technology has the promise of determining cellular phenotypic expression in many areas of basic and applied research. The two most important near term applications are using PMs to determine

the effect of genetic changes on cells and to determine the effect of drugs on cells, both mode of action and toxicology.

Biolog, Inc.
510.785.2564
Hayward, CA
www.biolog.com



Advanced Instruments

Advanced Instruments Introduces Model 4250 Cryoscope

Advanced Instruments has introduced its Model 4250 Cryoscope. The diagnostic instrument, which dairy labs use to measure the water content in milk, incorporates new design and electronic technologies that enhance usability, accuracy, and reliability.

In addition, Advanced Instruments will exhibit two other new instruments for food and dairy applications. The Fluorophos® ALP Test System is the fastest, most accurate milk pasteurization testing instrument on the market and meets the new FDA ALP testing criteria that went into effect on March 31, 2005. The new

Spiral Biotech Color QCount™ colony counter, with its ColorCount™ recognition technology, utilizes the latest chromagenic agars becoming popular for high-productivity colony counting applications in food laboratories. It has the easiest color set-up and operation and eliminates the necessity for manual color adjustments.

Advanced Instruments, Inc.
800.225.4034
Norwood, MA
www.aicompanies.com

Dickson's Temperature/Humidity Mapping Guide for Dairies Now Available

Dairies seeking to minimize environment-related product spoilage can now access a free-of-charge "Temperature and Temperature/Humidity Mapping Guide" from Dickson Company. This best practices guide to warehouse and production facility temperature and humidity mapping can potentially save users of the Guide thousands of dollars annually by protecting inventory quality.

Dickson's "Temperature and Temperature/Humidity Mapping Guide" provides step-by-step instructions on how to create and maintain effective facility mapping programs, including practical advice on how to determine critical mapping points, appropriate sampling rates, data logger selection criteria, and how to approach data analysis, remediation considerations, among other topics.

Dickson Company created this non-commercial guide to temperature and humidity mapping in order to help

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INDUSTRY PRODUCTS

the many thousands of worldwide users of temperature/humidity logging technology to gain maximum economic benefit from correct warehouse and production facility mapping techniques.

Tommie Spears, Dickson tech support manager, explains, "Whether one is using temperature and humidity data loggers for regulatory compliance or simply to minimize losses due to inventory spoilage, the Guide has many practical tips on how to save both time and money with effective warehouse and production facility mapping techniques. Overly aggressive sampling, for example, can create mountains of unnecessary data that is both time consuming and expensive to process. In the other extreme, inadequate data sampling means that your data is not meaningful and insufficient to identify necessary remedial actions. Deciding how to strike a proper balance in sampling frequency is just one of the topics that the Guide addresses."

Dickson Company
800.757.3747
Addison, IL
www.dicksonweb.com

FKI Logistex Incorporates Voxware's Voice Recognition Engine into EASYpickVoice

FKI Logistex® announces that it has incorporated the Voxware Integrated Speech Recognition Engine (VISE™) into its EASYpick® Voice order fulfillment system. EASYpick Voice complements the full line of EASYpick pick-to-light and EASYput® put-to-light technologies from FKI Logistex, a product suite of integrated order fulfillment solutions.

The integration of VISE with EASYpick allows FKI Logistex to offer customers a wider range of order fulfillment solutions designed to work in different operational situations. Implementation of EASYpickVoice significantly reduces costs and increases accuracy by enabling workers to utilize audible commands and voice responses to perform a variety of order fulfillment tasks.

The VISE engine is considered the most powerful speech recognition engine on the market, proven in head-to-head competitions to deliver the

best recognition rates and greatest ease-of-use in the industry. VISE operates without difficulty in even the most noisy, problematic environments. The advanced technology automatically ignores "out-of-vocabulary" words, allowing workers to communicate seamlessly with the system and their co-workers.

"The EASYpick brand is well-known in the logistics market for its efficiency and value," notes Thomas Drury, CEO, Voxware. "We are pleased that FKI Logistex has added our industry-leading voice recognition engine to its already strong product line."

"Adding VISE to EASYpick Voice makes it the most powerful voice-directed order fulfillment system available in the warehouse and distribution center environment," says John Westendorf, president, FKI Logistex Warehouse and Distribution North America. "With this new technology, FKI Logistex now offers the broadest selection of order fulfillment technologies for our customer applications."

FKI Logistex
510.985.6316
Cincinnati, OH
www.fkilogistex.com

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COMING EVENTS

DECEMBER

- **1-2, The Essentials of Food Safety for Hotel Commercial Kitchens, Banquet Centers, Restaurants, and Lounges**, Las Vegas, NV. For more information, contact Jeanette Hugé at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **5-7, Microbiology and Engineering of Sterilization Processes**, University of Minnesota, in King of Prussia, PA. For more information, contact Ms. Ann Rath at 612.626.1278.
- **6-8, HTST Pasteurization Training Seminar**, Nashville, TN. For more information, call Randolph Associates at 205.595.6455; E-mail: us@randolph-consulting.com.
- **9, Agro-Food Technologies: Opportunities and Barriers to Improving Health**, Feringapark Hotel, Munich, Germany. For more information, E-mail lipgene@nutrition.org.uk.
- **10-14, American Public Health Association 133rd Annual Meeting**, Philadelphia, PA. For more information, contact Lynn Schoen at 202.777.2479; E-mail: lynn.schoen@apha.org.
- **12-14, Microbiology III: Foodborne Pathogens**, GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **13-14, Infratec 1255/1265**, Eden Prairie, MN. For more information, call 952.974.9892; E-mail: info@foss-northamerica.com.

JANUARY

- **10-11, Milk Pasteurization & Process Control School**, University of Wisconsin-Madison, Madison, WI. For more information, contact Dr. Scott Rankin at 608.263.2008 or go to www.cdr.wisc.edu.

- **16-18, Principles of Microbiological Troubleshooting in Your Factory: Real Problems/Real Answers**, San Diego, CA. For more information, call Robert Behling at 608.772.2992; E-mail: rbehling@msn.com.
- **25-27, 2006 International Poultry Expo**, Georgia World Congress Center, Atlanta, GA. For more information, call 770.493.9401 or go to www.ipe06.org.

FEBRUARY

- **7-9, FPA's 2006 Food Claims and Litigation Conference**, San Juan, Puerto Rico. For more information, go to www.fpa-food.org.
- **8-9, Quality Milk Conference**, University of Wisconsin-Madison, Madison, WI. For more information, contact Dr. Scott Rankin at 608.263.2008 or go to www.cdr.wisc.edu.
- **20-23, 2nd International Conference on Microbial Risk Assessment: Foodborne Hazards**, The Sofitel Wentworth Hotel, Sydney, Australia. For more information, call 61.2. 8399.3996; E-mail: aifst@aifst.asn.au.
- **21-25, Diploma in Food Hygiene and Safety**, GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **26-March 3, International Meeting on Radiation Processing**, Hilton Kuala Lumpur, Malaysia. For more information, go to www.imrp2006.com.
- **28-March 1, Wisconsin Process Cheese Short Course**, University of Wisconsin-Madison, Madison, WI. For more information, contact Dr. Bill Wendorff at 608.263.2015 or go to www.cdr.wisc.edu.

MARCH

- **16-18, International Conference on Women and Infectious Diseases: Progress in Science and Action**, Atlanta Marriott Marquis Hotel, Atlanta, GA. For more information, contact Sakina Jaffer at 404.371.5308; E-mail: smjl@cdc.com.

MAY

- **12-14, Interbake China 2006**, Guangzhou International Convention & Exhibition Center, Guangzhou, China. For more information, go to www.faircanton.com.

IAFP UPCOMING MEETINGS

AUGUST 13-16, 2006
Calgary, Alberta, Canada

JULY 8-11, 2007
Lake Buena Vista, Florida

AUGUST 3-6, 2008
Columbus, Ohio

CAREER SERVICES SECTION

Research Food Scientist

The California Department of Health Services, Food and Drug Branch (FDB) is seeking a doctoral level food scientist to join a team of public health professionals who provide expertise in responding to incidents of food product contamination and provide scientific input into food safety and food defense regulatory policies. Opportunities also exist to participate in applied scientific research into the causes and prevention of microbial and chemical contamination of food products from the farm to the table. FDB is an internationally recognized state public health protection program that is responsible for regulating the manufacture, distribution, and sale of safe foods in California. Salary is commensurate with experience, which ranges from \$6,228.00 - \$7,569.00 per month for a Research Scientist IV (Food & Drug Sciences) and \$6,850.00 to \$8,327.00 per month for a Research Scientist V (Food & Drug Sciences).

Interested individuals who meet the minimum qualifications are invited to submit an examination package. The examination package must include a completed state application and responses to the supplemental items.

Research Scientist IV (Food & Drug Sciences):
www.dhs.ca.gov/jobs/html/rs/leveldef.htm#rsiv

Research Scientist V (Food & Drug Sciences):
www.dhs.ca.gov/jobs/html/rs/leveldef.htm#rsv

For questions, contact FDB Personnel Liaison at (916) 650-6500.

LABORATORY GENERAL MANAGER

Perdue Farms, Inc. is in search of an individual to fill a Laboratory General Manager position in Salisbury, Maryland. This position requires the selected individual to provide supervision to three lab sections – Health Monitoring, Virology and Microbiology Research. Provide diagnostic support services for other departments and assist in method development for both processing facilities and the live production area. The selected individual will have a M.S. in biology, microbiology or related science field and a minimum of three years experience, or B.S. in similar field with five years experience in a microbiology, virology, or serology laboratory. Strong verbal and written communication skills and experience with MS based software programs. This position offers full medical benefits, 401K and vacation plan.

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Corporate Manager of Quality Assurance and Food Safety

PURPOSE:

Responsible for managing corporate-wide Quality Assurance and Food Safety activities and initiatives to support Albertsons quality image and to achieve regulatory compliance and consumer protection.

This key position works closely with Fresh Food Merchandising to ensure fresh, quality products and regulatory compliance. Also, this position is critical for consumer protection by directing all recalls through active communication with stores, manufacturers, and regulators, and responding rapidly and efficiently to product quality and safety issues that pose health risks to consumers.

DUTIES AND RESPONSIBILITIES:

Manage all aspects of the Company recall function, ensuring regulatory compliance, consumer protection, efficient communication, and store execution. Maintain database of recall information for vendor performance ratings, financial compensation, and other actions required to protect company interests.

Drive technological enhancements for continual improvement in the efficiency and effectiveness of the recall process.

Investigate product quality, safety, and compliance issues (i.e., tampering, adulteration, mislabeling, etc.) that impact either fresh or manufactured products as they develop and are reported by the media, customers, suppliers or regulatory officials. Work with procurement and operations management to plan any corrective actions necessary. Assist media relations with developing relevant, clear communications, and provide the legal department with information as required.

Work closely with Fresh Food Merchandising, including meat, poultry, fish, produce, and prepared foods, to continually enhance product quality through purchasing specifications, inspections processes at receiving, and product handling in distribution.

Provide microbiological and chemical technical expertise on quality assurance and food safety matters related to corporate brand and national brand items to ensure consumer protection and regulatory compliance. Work closely with all fresh departments concerning regulatory matters.

Assist with store-focused food safety and sanitation programs and activities to promote the Company image of providing safe food in clean stores, and to ensure compliance.

Assist in developing food safety policies, procedures, and processes that apply to all aspects of company business, from procurement to distribution to retail sales.

Maintain active working relationships with all appropriate regulatory bodies, including but not limited to the USDA and the U.S. FDA, to facilitate timely, accurate execution of quality assurance, food safety, and consumer protection duties and responsibilities.

As a member of the Corporate Crisis Management team, help develop food safety/quality strategies to meet regulatory guidance and protect customers.

PEOPLE RESPONSIBILITIES:

Supervise an Administrative Assistant

JOB REQUIREMENTS:

Bachelor's degree in Food Science, Public Health, or related field from an accredited university.

5+ years experience in food retailing or food manufacturing quality assurance programs.

Experience with interpreting state and federal regulations, and maintaining working relationships with regulatory officials.

Experience with retail recall process is preferred.

Familiarity with microbiological techniques, and the interpretation of scientific data and literature.

Good written and oral communication skills.

Ability to work well with others to accomplish results.

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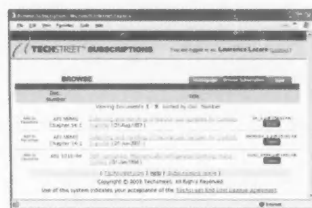


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		3,283	3,250
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