Emerging Food Categories

Food Fraud Series Part 4 of 5

Presented by:

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Organized by the IAFP Food Fraud PDG

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Webinar Housekeeping

- It is important to note that all opinions and statements are those of the individual making the presentation and not necessarily the opinion or view of IAFP.

- This webinar is being recorded and will be available for access by IAFP members at www.foodprotection.org within one week.

Food Fraud PDG Chair: Neil Bogart, Food & Beverage - Area Technical Support – Ecolab

Food Fraud PDG Vice Chair: Karen Everstine, PhD, Senior Manager, Scientific Affairs – Decernis

- Part 1: A Strategic Approach to Operationalize Food Fraud Mitigation (held on 2/20/19)
- Part 2: Challenges Identified with Food Fraud Implementation (held on 4/2/19)
- Part 3: Understanding Types of Risk (Regulatory, Operational, Enterprise)
- Part 4: Emerging Food Categories
- Part 5: Ecommerce, Counterfeit, and Labeling (scheduled for 6/27/19)

LATEST RISK & TRENDS FROM EMERGING MARKETS AND CATEGORIES

Dr. Psomiadis David

Head of lab / Business Development Manager

A partner of SGS

IMPRINT ANALYTICS

SGS

WHEN YOU NEED TO BE SURE

WHAT IS FOOD FRAUD?

- The deliberate and intentional substitution, mislabelling, adulteration or counterfeiting of food, raw materials, ingredients or packaging placed upon the market for economic gain.

- This definition also applies to outsourced processes (International Featured Standards Food 6.1).

- **Authentic product**: match between the food product characteristics and the corresponding food product claims

- **Authenticity**: state of being *authentic*

- **Authentication**: process of verifying the *authenticity* of the food product

- **Methods for authentication based on analysis of product characteristics**: methods and procedures for analyzing food product characteristics to *authenticate* claims
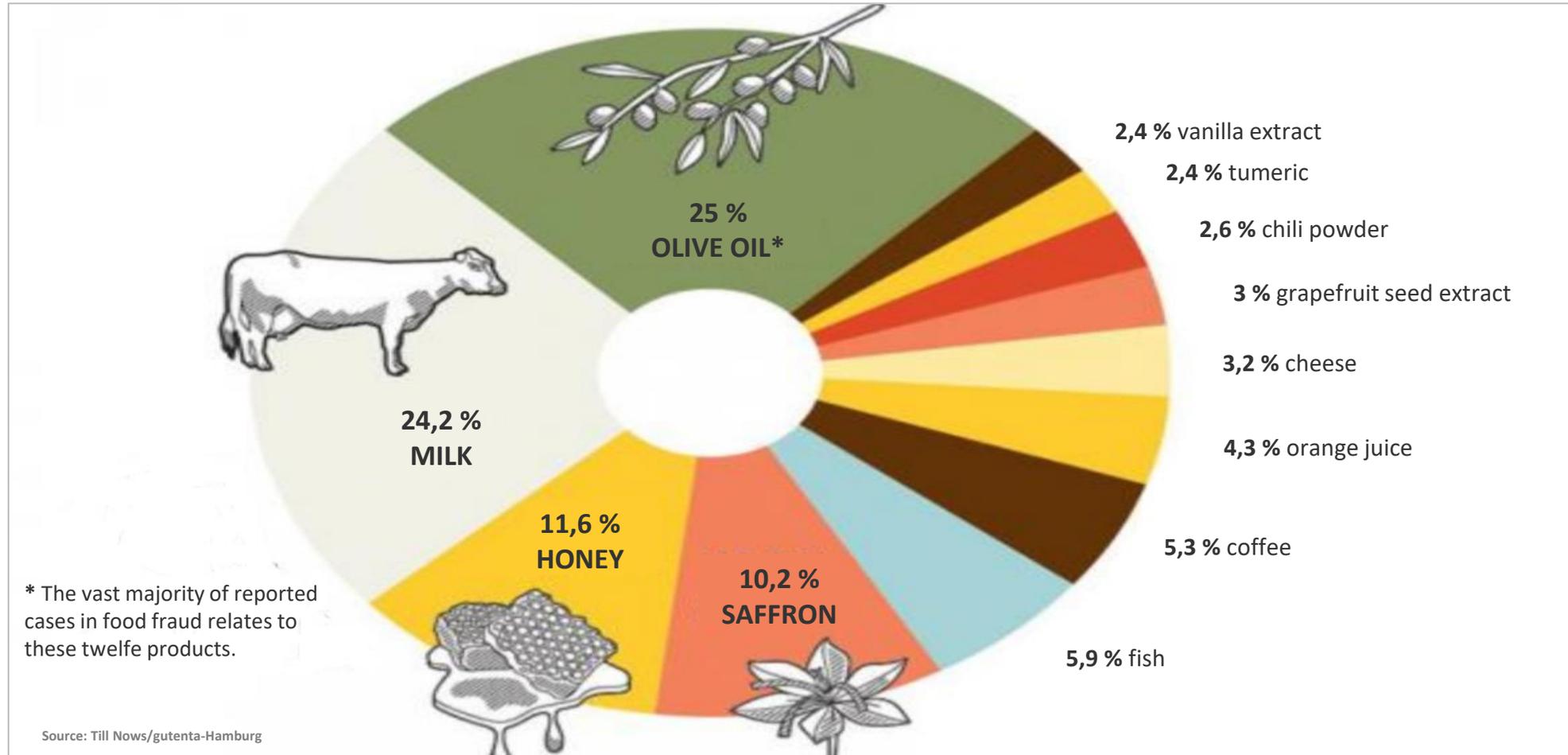
CWA 17369:2019

ROOT CAUSES - TRENDS

- In the food industry, the **dominant forces come from the consumers**, who are increasingly considering new value drivers when making a purchasing decision, like health and wellness, safety, social impact, experience, and transparency.

- Supply chain risk control is not only an emerging requirement but is an important part of **brand protection** in today's food integrity environment.

- When risks are well managed, the opportunities for growth are multiple and varied for those organizations that are willing and able to **adapt to market forces and challenges**, while retaining a competitive edge.

Top 10 most fraudulent foods

2,4 % vanilla extract

2,4 % tumeric

2,6 % chili powder

3 % grapefruit seed extract

3,2 % cheese

4,3 % orange juice

25 %
OLIVE OIL*

24,2 %
MILK

11,6 %
HONEY

10,2 %
SAFFRON

5,3 % coffee

5,9 % fish

* The vast majority of reported cases in food fraud relates to these twelfe products.

Source: Till Nows/gutenta-Hamburg

SGS

RASFF - Rapid Alert System for Food and Feed - European Commission

Product category	Reported incidents in 2018
nuts, nut products and seeds	17
herbs and spices	12
fish and fish products	10
fruits and vegetables	5
prepared dishes and snacks	5
cereals and bakery products	2
cocoa and cocoa preparations, coffee and tea	2
confectionery	2
crustaceans and products thereof	2
honey and royal jelly	2
other food product / mixed	2
cephalopods and products thereof	1
fats and oils	1
meat and meat products (other than poultry)	1
milk and milk products	1
poultry meat and poultry meat products	1
soups, broths, sauces and condiments	1

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Locally grown/produced food: Provenance

Premium foods/ingredients: market value

Clean labels: natural

EMERGING CATEGORIES AND RISKS

Locally grown/produced food: Provenance

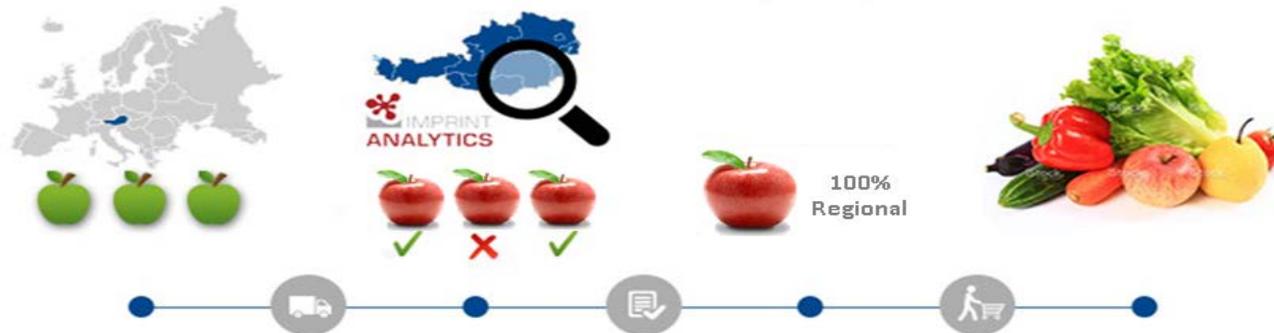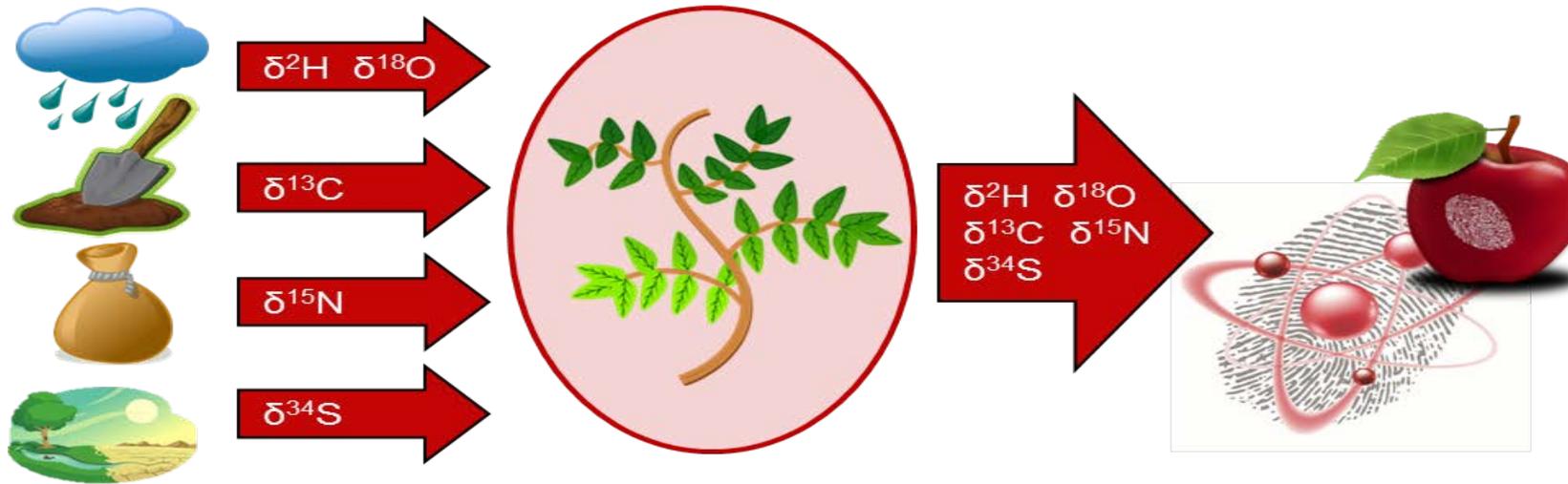Local production (fruits and vegetables)

National ‚brand' (tomatoes)

Regional value (olive oil)

Global origin control (soybeans)

Locally grown/produced food: Provenance

δ^2H $\delta^{18}O$

$\delta^{13}C$

$\delta^{15}N$

$\delta^{34}S$

δ^2H $\delta^{18}O$
$\delta^{13}C$ $\delta^{15}N$
$\delta^{34}S$

IMPRINT ANALYTICS

100% Regional

Premium foods/ingredients: market value

- Is there any cane sugar in coconut sugar?

- Does xylitol come from China (maize) or Europe (birch)?

- Is this authentic Ceylon cinnamon?

- Is the claim 'plant-based protein' really true?

- Is there any added sugar/syrup in maple syrup?

Premium foods/ingredients: market value

Observations (axes F1 and F2: 90.52 %)

- type-cassia
- type-ceylon
- Labelled "Ceylon"

Observations (axes F1 and F2: 93.80 %)

- from birch
- from maize

$\delta^{13}C$ (‰) measured by IRMS

Cane sugar

Beet sugar

Maple syrup

$(D/H)_l$ (ppm)

AOAC Official method 2000.19

VERIFICATION
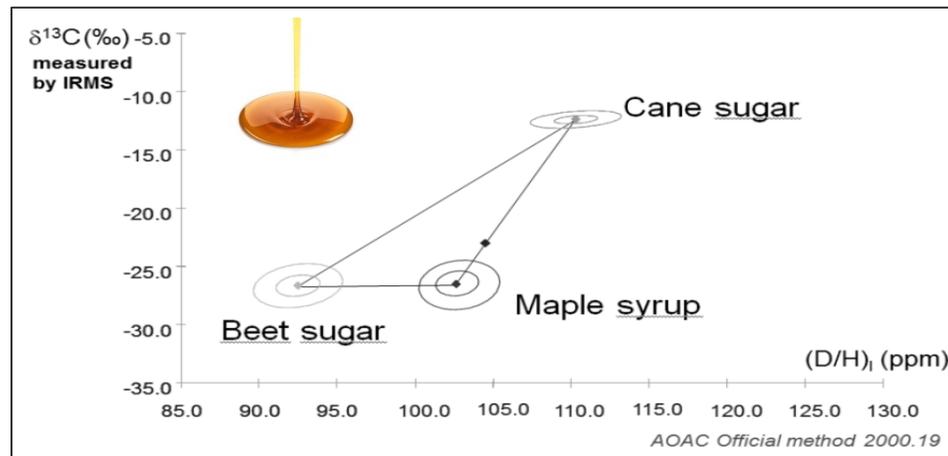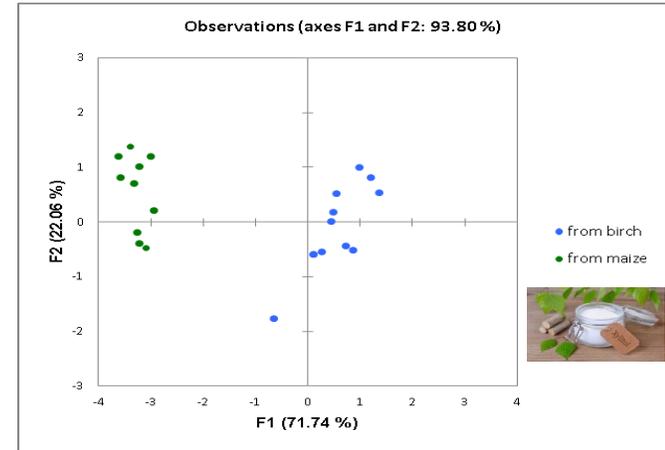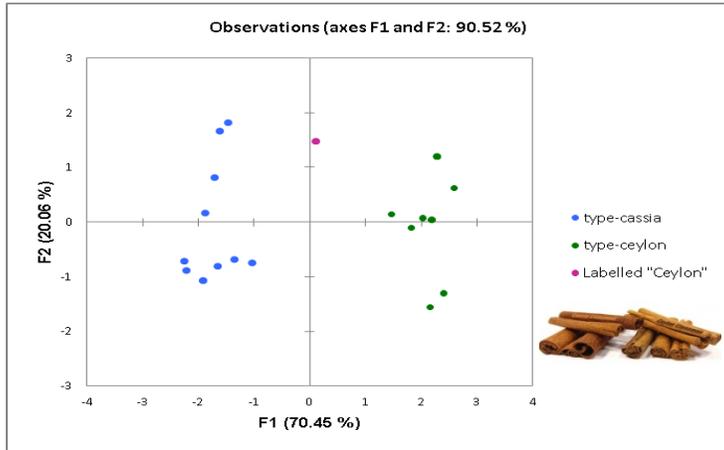
Clean labels: natural

The vanilla case

Product claim	Adulteration
Vanilla extract	Addition of (any) vanillin to the authentic vanilla extract
Natural vanilla flavoring	Addition of non-natural vanillin (acc. to reg.)
Bourbon vanilla ice cream	Use of (any) vanillin instead of Bourbon vanilla
Pure vanilla	Use of tonka extract in vanilla extract
Natural vanilla flavored yogurt	Addition of non-natural vanillin (acc. to reg.)
Bourbon vanilla extract	Use of *V. Tahitensis* instead of *V. Planifolia*

price comparison

Synthetic vanillins | Natural vanillins | Authentic vanilla

Clean labels: natural

The vanilla case

Verification of source material

Diagram of isotope fingerprints of vanillin ($\delta^{13}C$ und δ^2H) depending on the source material
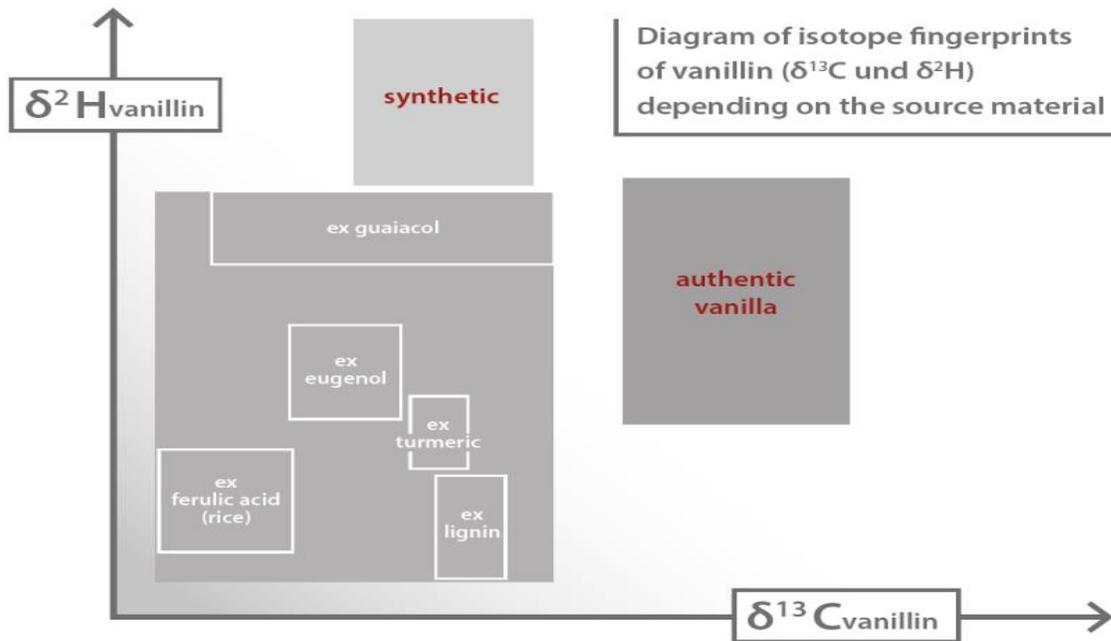
Verification of vanilla species
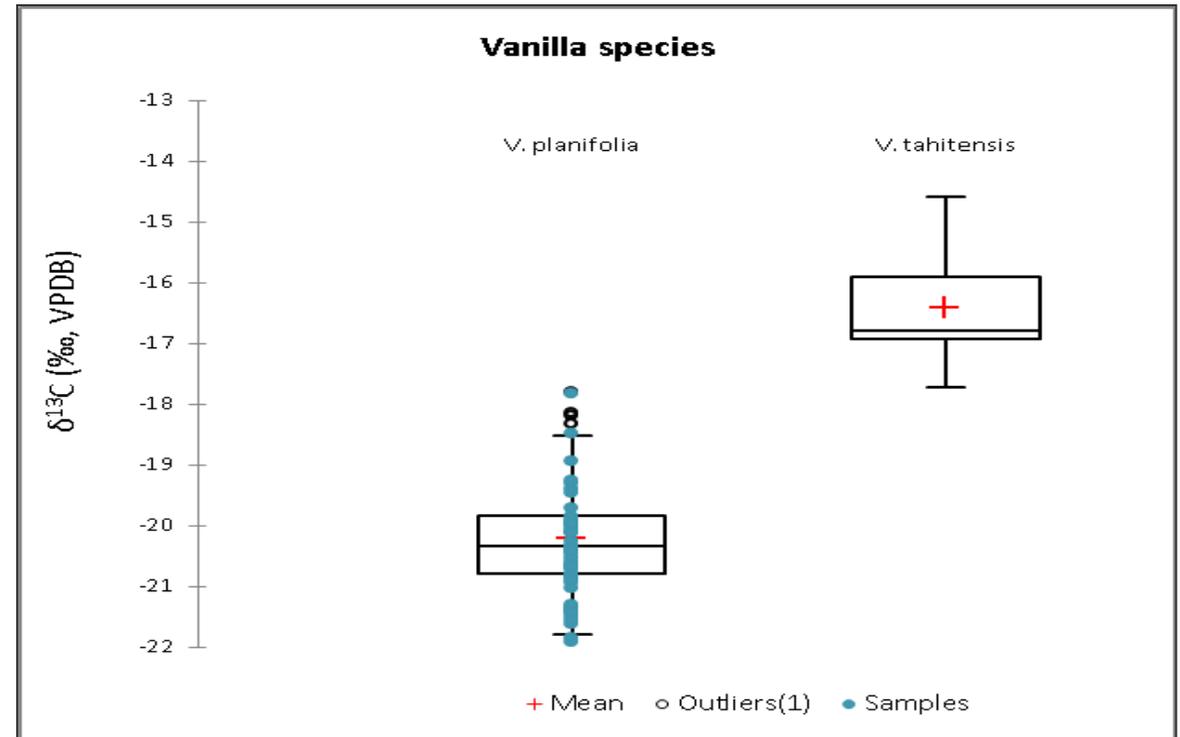
ANTI-COUNTERFEITING
DESIGN-DETERRENTS AND
DETECTION STRATEGIES

FORDHOLM

RESEARCH | DESIGN | FIT | EXPORT

Know what is happening

- Channel News Asia *(Feb. 2014)*
  - **1,200 tons** of counterfeit and substandard foods
  - **430,000 litres** of counterfeit beverages seized across 33 countries.
  - Oil, vinegar, biscuits, and chocolate bars to fake spices, condiments and substandard dairy products.
- Wine industry experts estimate **20%** of wine bottles sold worldwide are counterfeit.
- In 2013, the Chinese Ministry of Public Security reported that the counterfeit products seized and destroyed included:
  - Food and beverages **5,000 tonnes.**
  - Drugs and tablets **2 billion tonnes.**
  - Pesticides, fertilisers & agricultural seeds **3,100 tonnes.**
  - Personal care products, machinery and electrical products **53 million tonnes**.

Source: "China police crack down on counterfeit goods," Channel News Asia, August 10, 2013.

3

Know what is happening

- Counterfeited products increasing risks to **Chinese health and safety.**

- **Escalating demand** for Anti-Counterfeit Packaging & Tracking Technology (ACP).

- Market expected to reach **US $62.5 billion** globally by 2020.

- **Asia Pacific** region projected as fastest growing area (estimated. CAGR of 18.1%, 2015 to 2020).

Global Anti-counterfeit Packaging (Food and Beverages) Market

Global Anti-counterfeit Packaging (Food and Beverages) Market is expected to reach **$62.5 billion** by 2020

2020
2019
2018
2017
2016
2015
2014
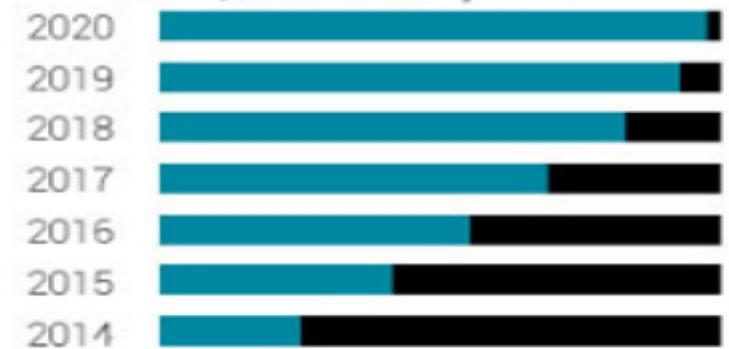
Growing at a CAGR of **16.1%** (2015-2020)

Source. www.alliedmarketresearch.com

Know what is happening

Counterfeiters are becoming more sophisticated in committing fraud because of:

- Low cost technology

- Globalization

- Consumer complicity

- Expansion of channels and markets

- Powerful worldwide brands

- Weak national and international enforcement

- High tariffs and taxes.

Chaudhry, P. and Zimmerman, A. (2013) 7 major driving forces behind worldwide growth of counterfeiting goods. Protecting your Intellectual Property Rights. 10th Edition. p22.

Know what is happening

Non-Deceptive Counterfeiting
Consumers are part of the fraud-chain

Some people may not mind to purchase <u>fake clothes and apparel</u> if the counterfeited goods are cheaper and look and feel like the original brands.

Deceptive Counterfeiting
Consumers are part of the solution

<u>Fake foods</u> however, have no benefit to consumers and are avoided at all costs.

Beat Con on…

TIME

Extend　　Reuse　　Copier　　Re-Engineer　　Corruption　　Rip-offs

Francis, C. (2019) Competing with Counterfeiters on Capability, University of Melbourne.

Know what is available

MEDIUM - HIGH RISK

- **Long shelf life if stored in appropriate temp. range.**

- **High variable Asian consumer group.**

- **Growing counterfeited product worldwide.**
  - Chongqing's Hechuan district police have discovered a production site for fake honey and confiscated about 500 kilograms of the fake nectar containing zero percent real honey and 187 mg of aluminium residue per kg of honey.

- **Highly adaptable packaging.**

OVERT SECURITY ICONS

COLOURS, FONTS, BADGES, ORIGIN

1. **GRADIENT COLOURS & COMPLEX BACKGROUNDS**

2. **CUSTOM FONTS**

3. **INDUSTRY RECOGNISED BADGES & AWARDS**

4. **IMAGERY REFERENCING SPECIFIC LOCATIONS**

5. **UNIQUE TEXTURES**

6. **ORIGIN REF.**

8. **HEALTH BENEFITS**

9. **UNIQUE STORY WITH GRAPHICS**
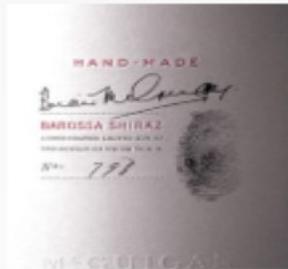
DESIGN-DETERRENTS

- **VOID PANTOGRAPH**

- **HANDWRITTEN SIGNATURE ON TEXTURED PAPER**

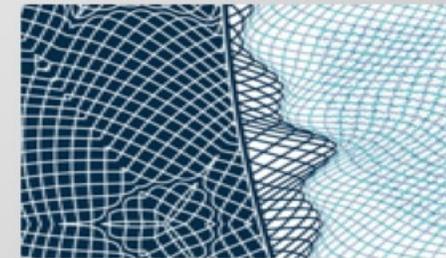- **ALERT CONSUMERS – GRAPHIC CHANGE EVERY 6-12 MONTHS.** Eg. Batch 02/258.2016

- **CUSTOM SHAPED BOTTLE**

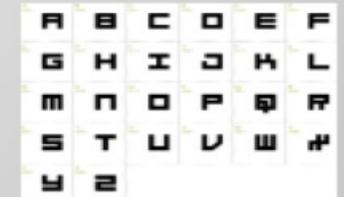- **SPECIAL PAPER WEIGHT, FIBERS, UNUSUAL SUBSTRATE**

- **WATERMARKS & SIMULATED WATERMARKS (WHITE INK)**

- **COMPLICATED NON-REPEATING PATTERNS**

- **CUSTOM DESIGNED MICRO FONTS**

CUSTOMER EMPOWERMENT

OVERT SECURITY INKS

INTERACTIVE THERMOCHROMIC INKS

This ink is made up of either very small liquid crystals or a special pigment called leucocytes.

CHANGES COLOUR

PRESS HERE

PRESS HERE

THERMOCHROMIC

PHOTOCHROMIC

HYDROCHROMIC

CUSTOMER EMPOWERMENT

HOLOGRAMS, FOILING & EMBOSSING

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BRAND PROTECTION AND AUTHENTICITY CHECK

Product differentiation. Holographic foil helps Colgate Palmolive create shelf impact for its products and instant recognition t

KURZ

COVERT

not openly acknowledged or displayed, concealed.

embedded authenticity security
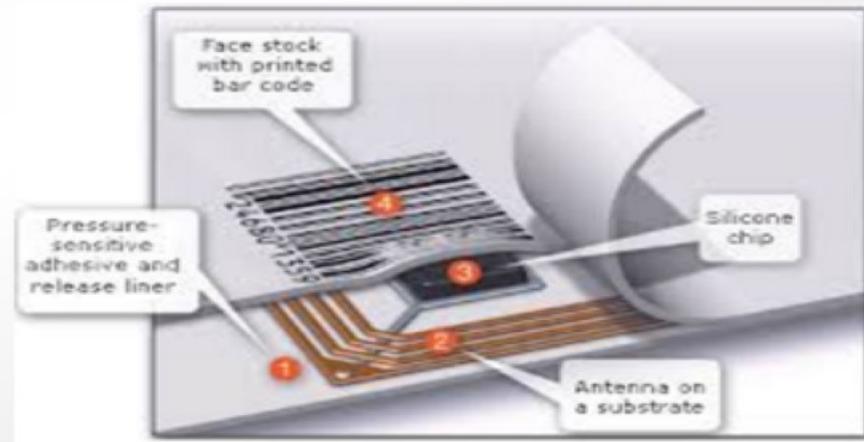
NFC – PEER TO PEER COMMUNICATION

NFC CHIP PRE-PRINTED STICKERS

THE UNIVERSITY OF
MELBOURNE
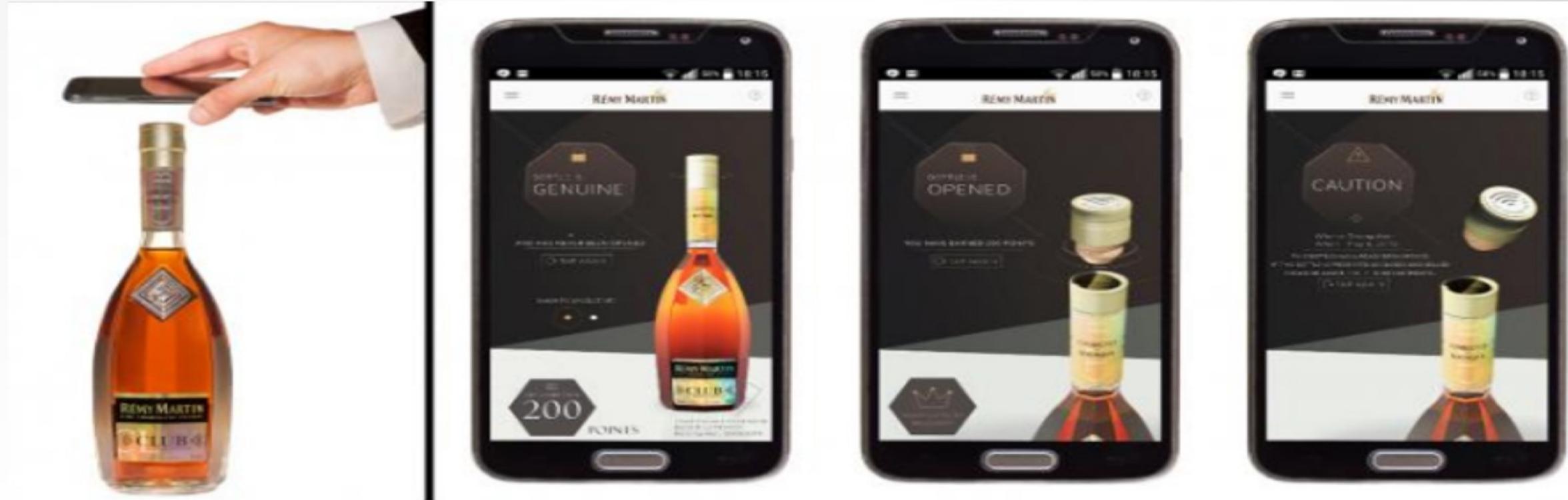
Pre-encoded NFC stickers

Sustainable high quality stickers
Printed ID for easing installation
Reliable NFC NTAG213 chips

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QR CODES, BAR CODING & DESTRUCTIVE COATINGS

THE UNIVERSITY OF
MELBOURNE

THE BLACK CHOOK
SHIRAZ
WINE OF AUSTRALIA

THIS IS THE BLACK CHOOK
LEARN MORE

BrandGuard
PRODUCT YOU CAN TRUST

PERSONAL IDENTITY

RESULT
GROUP OF COMPANIES

www.foodvaluechain.unimelb.edu.au

DISTINCTIVE OR DESTRUCTIVE PACKAGING

THE UNIVERSITY OF
MELBOURNE

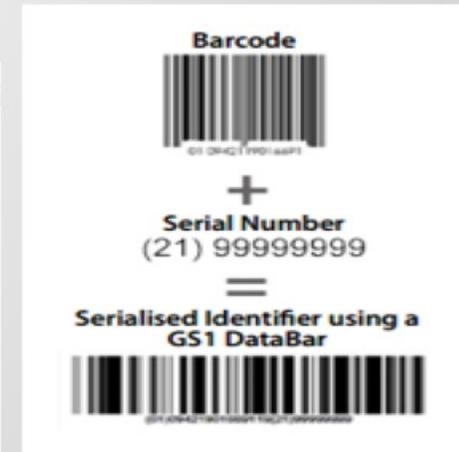# SMART PHONE VARIFICATION APPS

SMART QR CODES & UNIQUE SERIALS

Customer can authenticate product using a unique QR or serial codes with a free app on their smart phone.

1. *MaXQ : AMCOR*

2. **AuthenticateIT + GS1**

3. *OZIRiS : Beston Global Food Co.*

Barcode

Serial Number
(21) 99999999

=

Serialised Identifier using a GS1 DataBar

TRACK   TRACE

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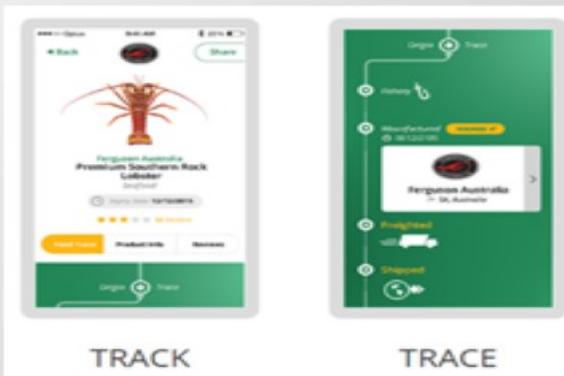
Know how to prepare

Know how to prepare

'There is **no silver bullet** for counterfeiting. It's really a matter of putting a **business process in place** with measures that help protect the brand and the consumer.'

Source. http://www.abc.net.au/radionational

Know how to prepare
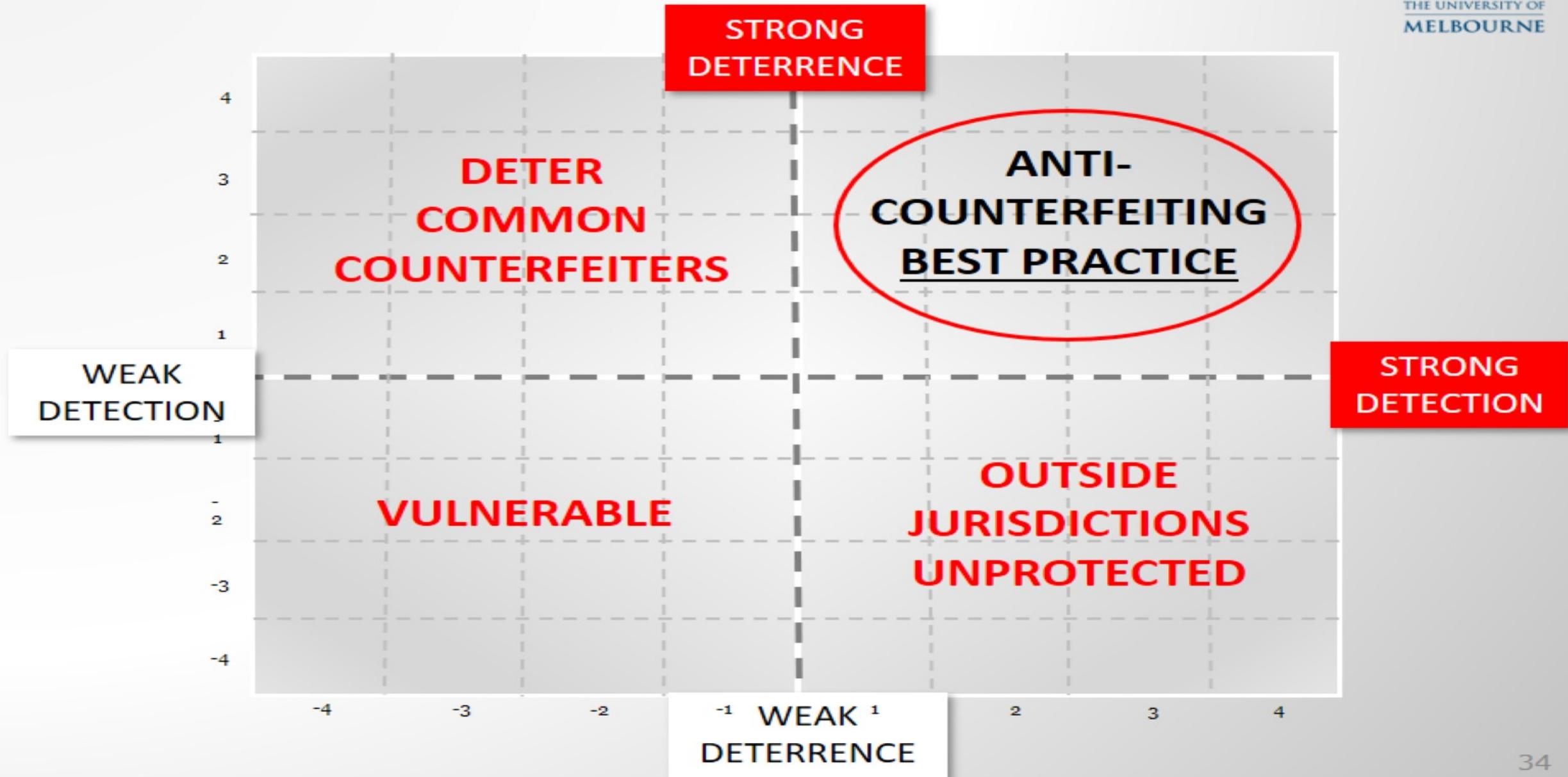

Busy growing and protecting your jurisdiction

unmet market needs

Counterfeiting opportunity found in an unprotected jurisdiction

Know How To Prepare

Beat Con on...

⏰ **TIME** →

Modify Conceal Extend · **Reuse** · **Scan** · **Re-Engineer** · **Corruption Bribery Stealing** · **Rip-off Replicas**

STRONG DETERRENCE ✚ **STRONG DETECTION**

Francis, C. (2019) Competing with Counterfeiters on Capability, University of Melbourne.

SELECTED AC TECH (YOGURT TUBS)	VIRTUAL PROTOTYPES (LAYERED OPTIONS)	RISK LEVEL	Hard to (copy) Category does not lend to reuse.	Cost/Effort to Business	Customer Benefits	Overall Added Value
HERITAGE INBUILT LABELS + IMAGE RECOGNITION + DUPLICATION HINDRANCES		1	Product can be copied over time however Duplication Hindrances (DuHs) can be designed into labels and product shape to slow targeting. Anti-Counterfeit security depending on DuHs.	Research and design DuHs into label graphics. Purchase Image Recognition subscription. Register images for launched products. Future updates for each new launch. **Labour cost in Content Management.**	Physical or digital products scannable to find authentic locations on where it is sold. Benefits similar to QR codes through education, rewards etc. Can choose between offline and online.	- No need for a QR - Register only high risk products. - Consumers looking for easy access to information. - No need for an APP.
SMART QR CODES + SERIALISATION + DIRECT OUTLET CONFIRMATIONS		1-2	Easy to copy the QR code however hard to counterfeit the site it directs to. Site can advise where products are sold.	QRs can be stickers or built into manf. Printing process for easy application. A managmenet database is required as well as an app to read them. **Labour cost in Content Management.**	Chinese consumers well educated in QRs and use them daily for payments, social connections, education and rewards.	- QR codes can be used in combo with unique serialisation for tracking and code verification online. - Can track customer scans and identify fraudulent activity.
THERMO, UV OR TENSILE -CHROMIC INKS OR PLASTICS		2-3	Hard to duplicate well. Inks ideally used on surfaces not in direct contact with quick method for user validation. Innovate quick with new designs.	New tech and thus compliments other forms of	A quick and interactive method for product	- Consumers like this technology however it requires good
HOLOGRAPHIC LAMINATES OR FOIL STAMPS		2-3	Off the shelf holograms or laminates can be copied over time however uniquely branded 3D holograms with layered images and text are difficult to copy.	sti however once set up, mass scale application is beneficial.	high tech solution for validation if done well.. Small unit on yogurt pack.	emblem and layered elements to achieve trust.
PRINTED NFC CHIPS		3-4	Hard to replicate due to programming. Counterfeiters would try to reuse stickers however destructive attributes could be built in to void reappropriation.	**Med cost for setup + manag. database required.** Cheaper generic versions applied post-printing, an additional step in production. Mass usage lowers costs.	Growing trend in consumer interaction and validation. Majority of smart phones can scan NFCs. Vast benefits and new ideas of applications are generated daily.	- NFC used in tracking and validation by logistics, consumers + detailed analytics. - Peer to peer communication, added-value for product learning and adaptation.
PRINTED MEMORY CIRCUITS STICKERS		3-4	Hard to replicate due to new technology. Destructive nature to avoid reuse. New applications are yet to be explored.	**Low-Medium cost - setup + manag. database required.** Easier production than NFC. Applied post-printing. Add step in production. Mass usage lowers costs.	Graphics would need to communicate technology. Technology would require a QR to link consumers to educational piece about security.	- Benefits are more so for the business and imply security. - Currently no commercial examples show technology applied with call out features and consumer engagement.
UNIQUE SUBSTRATE OR PLASTICS WITH IMPREGNATED VISABLE FLECKS		3-4	Dependable on uniqueness of substrate or plastic selected. Difficult to copy if flecks are unique in nature.	**Med costs for purchase of materials + setup for production usage,** offers a P.O.D and brand protection.	Low tech/high impact that over time can build brand semantics reinforcing quality and trust.	- Workmanship is admired and brands using unique substrates create identity and trust. - Can be paired with other AC.

Anti-Counterfeiting Tailored Assessment Reports

Recommendations

1. **High security:** *they must be as difficult as possible to forge or replicate* (Deterrent-Design)

2. **Easy visual judgement:** *in most cases, you should be able to verify the document without the need for special equipment* (Security Graphics and Icons)

3. **Verification with a simple tool:** *as a next level, a covert element should be included* (Smart Phone)

4. **Re-labelling or repacking prevention:** *it should be possible to detect when an anti-counterfeit solution has been tampered with.* (Destructive Packaging)

5. **Dynamic:** *Security changes to stay ahead of copy cats.* (Forecasted Plan)

6. **Stay Informed:** *Digital and Printing technologies are continuously improving.*

Thank you

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caroline@fordholm.com

Questions?

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