



Innovations in Printing Technology Can Help Boost Food Safety

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With our heightened awareness of food packaging safety today, it seems unthinkable that just 200 years ago, no one gave a second thought to sealing tin cans with lead soldering – a process that caused widespread lead poisoning.

Fast forward to the first decade of the 21st century, and we can see the tremendous innovations that have occurred, along with public recognition of the importance of preventing food packaging components – especially inks used on labels – from migrating into the food inside the package.

Last year, the European Commission implemented strict new standards for food packaging after a potentially dangerous chemical found in printing inks was discovered on some breakfast cereal boxes. The chemical, 4-methylbenzophenone (abbreviated 4-MBP), is a potential carcinogen. The EC required food manufacturers using packaging printed with UV cured inks to document that they'd put measures in place to prevent migration to the food inside the packaging.

Just four years earlier, the EC had investigated another printing ink chemical, ITX (isopropylthioxanthone), after it was found to have migrated into a milk product for babies. Nestle was forced to recall hundreds of thousands of containers of the product from Italy, France, Portugal and Spain, and the company that made the packaging, Tetra Pak AB, said it would eliminate the use of ITX.

FOOD PACKAGING GUIDELINES EVOLVE

In the U.S., food packaging guidelines became much more complex and stringent after the U.S. "Bioterrorism Act" of 2002 was enacted in response to the 2001 terrorist attacks. The act classified as a "food additive" any substance that may, either directly or indirectly, result in "becoming a component or otherwise affecting the characteristic of any food." This includes

any substance intended for use in packaging. Under its Food Contact Notification Program, the U.S. Food and Drug Administration will conduct a phased review of packaging substances and the chemicals used in inks to ensure their safety.

Food safety has reached top-of-mind awareness for food manufacturers. This year's PACK EXPO in Chicago, produced by the Packaging Machinery Manufacturers Institute, will feature a Food Safety Resource Center. In addition, the Packaging Association of Canada announced plans this year to spend USD \$568,825 to help improve food safety in the supply chain.

REVOLUTIONARY CHANGES TO PRINTING TONER

Fortunately for food safety professionals and consumers, the past 10 years have seen major innovations in printing technologies related to direct and non-direct food contact that help meet the requirements of not only stricter regulations but consumer safety as well. Dry toner technology has emerged as a safer, more environmentally friendly alternative to liquid inks, because it's non-toxic, and certain dry toners used with electrophotographic printing are approved for direct and indirect contact with dry food.

To fully understand the safety regulations around food packaging, we should examine what the FDA defines as direct or indirect contact with food. Direct contact means contact with a substance that is intended to be added to food, which includes substances regulated by the FDA as direct food additives. Indirect contact means contact with a substance that is on the side of the package that is not in contact with food, so that the packaging acts as a functional barrier to separate the food from the printed material. The FDA will look at the structure and thickness of the packaging and laminates to determine whether they can prevent migration of inks into the food.

UltraViolet (UV) inks, used in inkjet printing systems, may offer the advantages of fast curing and high quality, but these advantages are somewhat offset by the potential environmental and health concerns they create when used with food. At issue is the fact that printers can't ensure that some chemical residues from photoinitiators, which are used to cure UV inks quickly on packaging, won't migrate into food.

WHAT ARE THE ADVANTAGES OF DRY TONER?

Unlike many conventional solvent-based liquid printing inks, dry toner is non-toxic, offering the added benefit of producing no Volatile Organic Compounds (VOCs) during the printing process. The cartridge contains a dry plastic powder, eliminating the need for a drying or curing process. Unlike liquid toner, dry toner can be used for printing on nearly any kind of substrate: conventional label material such as paper, polyethylene terephthalate (PET) foil, and polypropylene (PP). In addition, some dry toner technologies available today are formulated so that they are easily removed from printed materials, thus allowing for higher recycling rates.

FOOD SAFETY UNDER HEIGHTENED SCRUTINY

Food safety professionals face pressures throughout the food safety system that didn't exist and weren't imagined a generation ago. The reappearance of foodborne illnesses such as Mad Cow Disease and foot-and-mouth disease are reminders of the unwanted side effects of globalization of food trade.

With increasing regulations and heightened consumer perceptions of the importance of food safety, professionals along the food supply chain can't afford to cut corners when it comes to ensuring the safety of food packaging. Any safety review of food packaging should include consideration of the printed inks, coatings and initiators, as well as the composition of the packaging itself, taking into account not only compliance issues but the safety of the consumer. Moving away from conventional, solvent-based inks toward more environmentally friendly ink technologies such as dry toner to eliminate the ink-migration risks can help ensure a safer and more stable food supply chain.

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