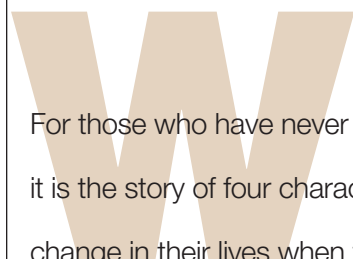


# Anticipating Changes in Food Packaging

By Richard Fama



For those who have never read the book “Who Moved My Cheese,” it is the story of four characters who are faced with unexpected change in their lives when their “Cheese”—their sole source of nourishment and enjoyment—has disappeared. Two of the characters, Sniff and Scurry, quickly adapt to this change by searching for and finding new supplies of cheese. A third character, Hem, reacts slower than Sniff and Scurry, but eventually adapts to his changed situation as well. The fourth character, Haw, who is Hem’s friend, refuses to accept change. In fact, Haw adopts a victimized mindset that prevents him from finding new sources of cheese. Hem contemplates bringing Haw to a newfound abundance of cheese, but later decides to assist him in finding his own way with the following words of advice: Anticipate change.

It is reasonable to suggest that much like Sniff, Scurry, Hem and Haw, the food industry is in the midst of a dramatic sea change. According to the Centers for Disease Control and Prevention, an estimated 76 million cases of foodborne illness occur each year in the United States, resulting in approximately 325,000 hospitalizations and 5,000 deaths. These staggering statistics, along with a seemingly endless list of food recalls and associated public outrage, have prompted the government to react. And while the Food Safety Modernization Act, or S510 (the “Amendment”), has been stalled in the Senate since it was unanimously voted out

of committee in mid-November 2009, it is clear that significant regulatory change is on its way. The Amendment is intended to expand the authority of the Secretary of Health and Human Services to regulate food under the Federal Food, Drug and Cosmetic Act (the “Act”). Among other changes, it would authorize the Secretary to suspend the registration of a food facility. Significantly, the Amendment also requires the Secretary to identify preventive programs and practices to promote the safety and security of food and promulgate regulations on sanitary food transportation practices. New forms of active and intelligent packaging systems used throughout all levels of the supply chain are sure to play a prominent role in whatever governmental legislation is ultimately enacted and to satisfy increasing consumer demand for safe and fresh food.

## The Evolution of Packaging Materials

It was not long ago that packaging was limited to mundane paper bags, glass or plastic bottles and cardboard boxes. Manufacturers did what they could to dress up packaging by adding enticing graphics and catchy slogans. Recent technological developments in active and intelligent packaging, however, have already radically changed the way our food is packaged, and we have seen only the tip of the iceberg. In fact, even without increased governmental pressures, it has been predicted that the global market for the food and drink industry will reach \$6.6 billion by 2015.<sup>1</sup> This growth is primarily being driven by exciting new advances in technology and consumer demand.

To appreciate the further impact that active and intelligent packaging will have on our lives and prepare for further changes down the road, we must first understand what active and intelligent

packaging is. Active packaging introduces material, gasses or other constituents into or on the packaging so that they interact with the product and the environment to extend the shelf life and/or enhance the safety and/or sensory properties of the packaged food. Typical active packaging systems include those that involve oxygen scavenging, moisture regulating, ethylene scavenging and inhibiting, carbon dioxide and ethanol generating, antimicrobial packaging, antioxidant packaging and insect repellent packaging. Perhaps the most exciting use of active packaging systems can be found in the beverage aisle of your local convenience store. Guinness brand beer, for example, employs a small plastic widget in its bottles and cans. The widget, which combines nitrogen and carbon dioxide, is pressurized in the container. When the container is opened, the gas is released. When the product is poured, it assumes its characteristic half-inch head.

Intelligent packaging utilizes internal or external indicators to transmit information about a product or package by virtue of its ability to sense, detect or record external or internal characteristics of the product or package and changes in its environment. Examples of intelligent packaging systems include barcode labels, radio frequency identification tags, time and temperature indicators, gas indicators, food spoilage indicators, rancidity indicators, moisture indicators, fruit ripeness indicators and ready-to-serve indicators. Consumer desire for safe and fresh food is likely to drive the growth of intelligent packaging systems, particularly in the refrigerated and frozen food segment. Today, in order for consumers to determine whether their food is fresh, they generally look at the “use by” date stamp. That stamp, however, does not account for variations in temperature to which the product may have been exposed throughout the supply chain and the deleterious effects of such changes on the product itself. In the near future, microbial and tempera-

ture-time indicators will be commonplace, providing consumers with a better insight into the quality and safety of the food products they eat.

In order to implement these technological advances in packaging at all levels of the supply chain, it is essential for manufacturers and distributors to be aware of consumer demand and expectations, as well as current and future regulations governing active and intelligent packaging systems.

### **Food Packaging Regulations**

In the United States, materials used in “food contact” applications are subject to pre-market notification to the FDA if they are deemed “food additives” under the Act.<sup>2</sup> The primary safety concerns with food additives used in packaging are whether they will migrate from the package to the food and the effects that those additives may have on consumer health. Food shall be deemed to be adulterated under §402 of the Act if it contains any food additive that is unsafe.<sup>3</sup> Importantly, the Act prohibits the introduction or delivery for interstate commerce or receipt in interstate commerce of any food that is adulterated or misbranded.<sup>4</sup> Violators are subject to fines and imprisonment or both.<sup>5</sup>

A food additive is defined in §201(s) of the Act as any substance that results or may reasonably be expected to result, directly or indirectly, in its becoming a component or otherwise affecting the characteristic of any food (including any substance intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting or holding food; and including any source of radiation intended for any such use). Exclusions include substances generally regarded as safe (GRAS), or used in accordance with a sanction or approval granted by FDA or Department of Agriculture prior to 1958, or otherwise excluded from the definition of food additives.<sup>6</sup>

Section 409 of the Act defines a food contact substance as any substance that

is intended for use as a component of materials used in manufacturing, packing, packaging, transporting or holding food if such use of the substance is not intended to have any technical effect in such food.<sup>7</sup> Common types of food contact substances include coatings, plastics, paper, adhesives, as well as colorants, antimicrobials and antioxidants found in packaging.

To be sure, active packaging systems are far more likely than intelligent packaging systems to interact with a food product. Thus, a quantitative analysis must be performed in order to determine whether it is reasonable to expect that the substance used in the active packaging system will become a component or otherwise affect the characteristic of the food and, thus, will be considered a “food additive” by the FDA. Simply put, residual and migration testing on such packaging systems should be performed for this purpose to consider migration of material constituents into the food product. If there is no migration of a packaging component from the package to the food, it does not become a component of the food and, thus, is not a food additive. In 1958, the Act was amended by adding §409, which required FDA to approve new food additives before they can be used in foods.<sup>8</sup> To meet this requirement, FDA established a petition process to obtain FDA approval. Previously, all food contact substances that were considered “food additives” required approval. Because it was thought that human exposure to components of packaging material that migrate into foods is typically low, in 1997, the Food and Drug Administration Modernization Act amended §409 of the Act by establishing a food contact notification process that allows for faster review of food contact substances that are considered food additives. Under the notification process, absent FDA objection, the food contact substance may be marketed 120 days after filing of the notification, as opposed to an average time of two to four years for traditional food

additives. This process has paved the way for increased implementation of active packaging systems throughout the supply chain.

Importantly, FDA notification is required only for new uses of food contact substances that are considered food additives. Notification is not required for food contact substances that are GRAS or previously sanctioned for their intended use in contact with food.

Even the most cursory glance at our food store shelves reveals that we are entering a new and exciting age in food packaging and safety, where barcode labels and oxygen scavengers abound. In order to succeed in this new era—one marked by advancements in food safety, product shelf life and marketing and promotional opportunities—it is critical

that we stay abreast of new technologies and the changing regulatory landscape affecting them. It has been said that the only thing one can be sure of is change. Technological advancements in active and intelligent packaging coupled with increased governmental regulations and consumer demand are sure to prove that statement true. And remember: enjoy change! ■

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## References

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3. 21 U.S.C. §342 (a)(2)(A).
4. 21 U.S.C. §331(a).
5. 21 U.S.C. §333(a)(1).
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