Some of these adulterants are cheap, harmless fillers, such as pork fat, water, or fake protein. Others are plain toxic and include pesticides, fungicides, and even tanning dyes among the economically-motivated adulterants that pose serious harm or even death to innocent users.

The Rise in Regulation

From small-scale dairy farmers in the developing world to large-scale milk producers in industrial economies, safety and quality are the most essential ingredients needed to earn the trust and confidence of the world marketplace. Since the voluntary inception of the now internationally accepted safety program called HACCP (Hazard Analysis and Critical Control Points) in 1997, the global dairy industry has become increasingly more regulated to protect consumers from adulterated and unsafe food products, no matter what their origins. As revealed by the Chinese melamine milk scandal that sickened thousands and caused at least six deaths in 2008, even the most stringent dairy regulations are only as good as what they monitor. What about those ingredients not screened or those that are simply unknown?

The Universality of Milk

Have you had your milk today? Whether you realize it or not, you likely have had more than you think. Forget about that milk moustache, the cheese Danish, or that deli sandwich you had for lunch. How about those energy bars you buy for the kids, the chocolate you keep nibbling on at your desk, or even that vegetarian “meat’’ you are planning for dinner? Each contains casein, lactalbumin, whey, or another byproduct that only a trained eye would recognize as a dairy derivative.

The fact is milk and its derivatives are among the most widely used products in the global food chain. More than seven billion of us use milk in one form or another every day. Industry experts predict that demand is only going to increase, as a strengthening global economy is already fueling an explosion in new, protein-enriched foods and beverages that count milk and milk-based products in their ingredients.

While the global dairy market is certainly dynamic, so are those individuals who continually scheme to make a fast buck by cutting milk and its byproducts with known and unknown additives.

Protecting You from Dairy Fraud

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The U.S. Pharmacopeial (USP) Convention, a nonprofit scientific organization that sets standards for the identity, strength, quality, and purity of medicines, food ingredients, and dietary supplements on a worldwide scale, maintains a food fraud database dating back to 1993. The database identifies dozens of adulterants USP scientists have discovered in milk and milk-derived products over the past 20 years. Most are benign, but some are highly toxic. Among the most dangerous are nitrogen-containing ingredients, including the aforementioned melamine and the agricultural chemicals dicyandiamide, urea, and biuret. These and dozens more compounds have been found in milk through the years to increase its apparent protein content with little or no regard to human health. The global increase in economically-motivated adulteration has become so worrisome that the USP is amending its own Food Chemicals Codex and now is asking the United States Food and Drug Administration (FDA) to take specific steps to stop food adulteration altogether. The question is, How?

PerkinElmer’s DairyGuard Advantage

The “unknown unknowns” in food are keeping regulators and manufacturers awake at night. To prevent potential threats to the global food chain, investigators are looking into new ways to actually “fingerprint” food by analyzing a variety of variables to create a unique imprint of authentic ingredients. While there are several technologies available to accomplish this task, each requires a laboratory with trained scientists and is both expensive and time-consuming. What is really needed is an early-warning device that is easy to use, fast, and portable enough to deploy just about anywhere.

Enter the DairyGuard Milk Powder Analyzer. Based on Near Infrared Spectroscopy, or NMR for short, the technology is paired with Spectrum Touch software, an adulterant screen algorithm for powdered milk in a portable device that does not require involved sample preparation or a laboratory to generate cost-effective and reliable results in testing for unknown compounds in food. Even better, the DairyGuard can be positioned in manufacturing plants and operated by non-lab trained technicians who can conduct an adulterant screening in less than a minute. The groundbreaking technology recently received an Innovation Award from the Institute of Food Technologists as the only screening tool that tests for unknown compounds in powdered milk. The equipment also monitors protein, moisture, and fat content, all in real time.

Using new tools like the DairyGuard to fingerprint at-risk foods, such as milk powder that ends up in so many of our products, is a major step forward in providing manufacturers and consumers with safer, better quality products. Criminals and their adulteration schemes are not about to disappear overnight. But it is reassuring to know that PerkinElmer’s wide array of analytical instrumentation and “boots-on-the-ground” expertise are helping to protect us all from potential threats before they become real, by scanning dairy ingredients right down to the molecular level. No more looking for that proverbial needle in a haystack. PerkinElmer’s 7,600 scientists, analysts, and global service personnel make sure there is nothing in that stack except hay.

With more than 75 years’ experience, PerkinElmer is helping dairy and food-processing companies optimize the integrity of their supply chain while protecting their brands with scientific solutions to detect fraud, control quality, and provide real-time, supply-chain intelligence. From the first ingredient to the final product, food processors count on PerkinElmer to protect their products, brands, and their global reputations by helping to assure that what is printed on the label is exactly what is in that package each and every time.

References
6. Current lab technologies available include nuclear magnetic resonance, molecular spectroscopy, and mass spectroscopy, and stable isotope analysis.