Researcher: Lasers used to detect melamine in baby formula

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With equipment readily available to health officials and businesses, a Purdue University researcher has found a way to detect trace amounts of melamine in infant formula.

Using infrared lasers and light spectroscopy methods, Lisa Mauer, an associate professor of food science, was able to detect melamine in baby formula at one part per million in about five minutes or less. Melamine, a synthetic chemical used in plastics and other products, has been found in baby formula and other milk-based products imported from China. High doses of melamine were associated with cancer in some animals, and it is especially dangerous for infants, according to the Centers for Disease Control and Prevention.

"We have found detection methods that are inexpensive and do not require a lot of the product or time for sampling," said Mauer, whose paper on the testing method was published in the early online version of the Journal of Agricultural and Food Chemistry. "Any company could do this itself. Police agencies, state departments of health and many colleges have this type of equipment."

Mauer obtained unadulterated samples of powdered formula and measured the samples using near- and mid-infrared spectroscopy techniques. Infrared laser beams reflected off the sample and toward a detector, which calculated how much of the laser's energy was absorbed by the sample and created an absorbance spectrum that was unique to the sample.

The same data were collected for pure melamine. When the formula was mixed with melamine and analyzed, the new spectrum was compared to that of the unadulterated formula, showing the concentration of melamine in the sample.

"The melamine structure is very different than the formula, so you can see differences in the spectrum," Mauer said. "Because they are so different, we can detect down to one part per million of melamine."

Federal guidelines allow for only one part per million of melamine in infant formula and up to two and a half parts per million in other products. Having an inexpensive and quick test would make it easier to test imported or domestically made products for melamine.

"If someone wanted to build a calibration model to detect melamine in their products, all they'd have to do is collect the spectrum of their product, add known quantities of melamine to their product, then collect those spectra and compare them," Mauer said. "Thumbprint analysis is basically the same thing. We can't see the differences with our own eyes, but software programs can."

Mauer and her four graduate students found the melamine detection process after she received a new software program that she wanted the students to become familiar with. Mauer challenged them to use spectroscopy to detect melamine, thinking they might be able to do so at high concentrations.

After successful tries at higher concentrations, Mauer and the students kept lowering the concentration of melamine until they reached one part per million.

Source: Purdue University (news : web)