Protecting Milk Products in India

Researchers from the Indian Institute of Science have developed a rapid new technique for detecting milk adulterated by melamine, using the synthesis of silver nanoparticles.

The research – which could be used to develop a simple, handheld device for detecting adulteration in the field – could be a boon for the food industry given that the incidence of adulterated milk with melamine is a serious concern.

Melamine is a nitrogen rich crystalline compound and is often added to milk to increase the apparent protein content. Normally used in the plastics industry, it can cause kidney problems in those who consume it. In 2008, there was a widespread scandal in China where melamine was added to infant milk formula – resulting in more than 54,000 children being hospitalised and the death of at least four babies.

The researchers have found that melamine interacts with a reducing agent while forming nanoparticles at room temperature, which can be picked up as a colour change. Caffeic acid was used as a reducing agent alongside silver nitrate. If melamine is present then it interferes with the synthesis of the nanoparticles and there is abrupt formation of nanoparticles leading to colour change, they said.

The researchers used UV-vis spectroscopy and high resolution transmission electron microscopy (HR-TEM) to detect the spectral surface plasmon resonance (SPR) and morphological changes of the synthesised silver nanoparticles both in the presence and absence of melamine.

The colour change depended on the amount of melamine present. When melamine was present there was almost no colour, versus a reddish yellow in the absence of the compound.

Current techniques to detect melamine in milk are time-consuming and laboratory-based. By contrast, the researchers were able to use a handheld device and detect the melamine in seconds from a small sample – leading to the potential for an integrated sensor for field applications.

They are now in the process of commercialising the technique, and also looking to extend the platform to other adulterants.

Securing infant formula

In a separate development in India, the Counterfeit Intelligence Bureau and Authentication Solution Providers Association (ASPA) has urged the Bureau of Indian Standards (BIS) to implement high security holograms on baby milk powder products to ensure safety and to fight counterfeiting.

Currently, the BIS has a product certification scheme that allows more than 30,000 licensees to use the Indian Standard Institute (ISI) mark as a symbol of quality product. It is one of the most recognised symbols in India.

But experts say it's easy for unscrupulous manufacturers to produce a fake ISI mark with recent advances in digital technology, and the growing number of counterfeit ISI mark products is becoming an increasing menace for government authorities and legitimate brand owners.

Nakul Pasricha, Vice President of ASPA commented: 'as the recent scandal in China has shown, counterfeiters will go to any lengths for a quick profit, including putting babies at risk. To protect the 25 million babies born in India every year, it is essential to protect baby milk powders and other nutritional products from the scourge of counterfeiting.

'This can be achieved by securing supply chains through authentication, track-and-trace and other digital solutions, as well as by applying tamper-proof or tamper-evident physical solutions onto packaging, such as security labels and holograms.'

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The masterbatch is authenticated instantaneously using a handheld detector that can upload and aggregate the data onto a secure inspection platform, allowing real-time monitoring at global, regional or local levels. This enables pharmaceutical companies to monitor and track their products from factory to pharmacy, identify emerging trends and improve response times if action is required.

The PLASTIWARD solution also includes a package comprising security assessment, needs definition, security system design, system deployment and on-going performance monitoring.

Fabienne Le Tadic, Executive President of Product and Brand Protection at SICPA said 'as part of our commitment to make this world a safer place, we partnered with Clariant, a leader in polymers and masterbatches, to create PLASTIWARD. This in-plastic brand protection solution helps pharma companies to protect their patients and brands.'

'At Clariant, our approach to the medical and pharmaceutical sectors is based on controlling and minimising risks of changes in the raw materials used and in our production facilities. PLASTIWARD is a robust, cost-effective end-to-end in-plastic system for protecting your brands worldwide,' said Steve Duckworth, Head of Global Segment Healthcare Polymer Solutions at Clariant.

PLASTIWARD was shown by both companies at the CPhI in Barcelona, Spain, earlier this month.

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