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New and Cheaper Device for Reliable Detection of Adulterated Milk

A new cheaper and easy-to-use device detects adulterated milk reliably by measuring its electrical conductivity and pH, claim scientists at the IIT Hyderabad, India in their recent study.

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The most common adulterant of milk is water that is added to increase its volume. Addition of clean water may not cause serious health threats despite lowering the nutritional statistics. However, recently, milk that is adulterated with harmful chemicals such as hydrated lime, sodium hydroxide, hydrogen peroxide, urea, borax, and tertiary nitrogen compounds has become a matter of serious concern. These chemical adulterants are added to milk to alter its acidity, or to increase its shelf life or preservation but may cause a wide variety of health problems ranging from food poisoning, and gastrointestinal complications, to cancer and even death.

At present, adulterated milk is tested by using a lactometer that detects changes in the density of milk. This strategy fails because most chemical adulterants do not alter the density of milk, hence, cannot be detected by a conventional lactometer. Many other techniques that are ELISA- and PCR- based, that detect chemical adulterants reliably are costly, time consuming and require lab infrastructure.

For detecting adulterants in milk, we need a technique that is rapid, cost effective, easy-to-use and reliable. Scientists at the IIT, Hyderabad have developed a new and cheaper device that detects adulterants in milk. It uses a convenient device and 10ml milk sample to carry out the tests.

A pH meter is immersed into the milk sample that calculates its pH within a few minutes. While fresh cow milk should have pH values between 6.6 and 6.9, the values of adulterated milk range anywhere from 4 to 11. By using a device made of fabricated gold electrodes that provides reliable results quickly, the electrical conductivity of milk is also measured. The scientists proudly proclaim, “The research aims at simultaneous monitoring of multiple biophysical properties through a multiplexed lab-on-chip platform for milk adulteration detection across the globe, irrespective of the geographical, biological and seasonal variations; and the present work is a proof of concept in that direction.”

A combined report from results of pH and electrical conductivity is used to label the tested milk as adulterated. This new device can prove to be a valuable on-the-spot test to detect adulterants in milk quickly and reliably.

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