Toward a home test for detecting potentially dangerous levels of caffeine

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Credit: AI-generated image (disclaimer)

The shocking news of an Ohio teen who died of a caffeine overdose in May highlighted the potential dangers of the normally well-tolerated and mass-consumed substance. To help prevent serious health problems that can arise from consuming too much caffeine, scientists are reporting progress toward a rapid, at-home test to detect even low levels of the

stimulant in most beverages and even breast milk. Their report appears in ACS' *Journal of Agricultural and Food Chemistry*.

Mani Subramanian and colleagues note that caffeine's popularity as a "pick-me-up" has led to it being added to more than 570 beverages and 150 food products, including gums and jelly beans. It also comes in a pure powder form that consumers can use themselves to spike drinks and food. In small amounts, most people can handle caffeine without a problem. But excessive doses can lead to serious health problems, including insomnia, hallucinations, vitamin deficiency, several types of cancer and in rare cases, death. Subramanian's team wanted to develop a quick and easy way for consumers to determine whether the caffeine levels in their foods and drinks fall within a safe range.

They tested an enzyme called caffeine dehydrogenase and found that it could detect caffeine in a variety of drinks—with the exception of teas—within one minute. Also, it was sensitive enough to pick up on caffeine's presence at concentrations as low as 1 to 5 parts per million, the maximum limit the Food and Drug Administration advises for nursing mothers. They say that their method could be integrated into a dip-stick type of test, like over-the-counter pregnancy tests, that could be used at home.

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