

New test could help consumers avoid surprise headaches from chocolate, wine

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Researchers in California are reporting development of a fast, inexpensive test suitable for home use that could help millions of people avoid those ‘out of the blue’ headaches that may follow consumption of certain red wines, cheese, chocolate, and other aged or fermented foods.

The test is designed to detect the presence of so-called biogenic amines, naturally occurring toxins that can trigger a wide range of symptoms in sensitive individuals —from nasty headaches to life-threatening episodes of high-blood pressure.

Existing tests for biogenic amines can take several hours, are cumbersome and require large, expensive instruments found only in laboratories, the researchers say. The new test, based on lab-on-a-chip technology, could produce results within five minutes, they state. It will be described in the Nov. 1 issue of *ACS’ Analytical Chemistry*.

“These toxins can be a serious health problem and are more common than people think,” says study leader Richard A. Mathies, Ph.D., a chemist with the University of California, Berkeley. “They are hidden in a wide variety of foods. Having a quick, convenient way to identify them will help consumers avoid them or at least limit their intake.”

Biogenic amines include tyramine, histamine, and phenylethylamine, which have been known to cause nausea, headaches, and respiratory disorders. These toxins can be particularly dangerous in people with reduced monoamine oxidase (MAO) activity or those taking MAO

inhibitors, an older class of antidepressant medications, because they can potentially interact and cause dangerously high blood pressure. Having a quick testing kit could ultimately save lives in these individuals, Mathies suggests.

The new technique, called portable microchip capillary electrophoresis, involves labeling the sample with a fluorescent dye, separating the components by applying an electric field on a special microchip, and analyzing the pattern of light produced by the sample upon exposure to a laser beam. In the study, Mathies and colleagues used a prototype device to analyze tyramine and histamine concentrations in a variety of wines (both red and white), beer and sake. They found that the device accurately measured the biogenic amines present in the beverages in less than five minutes.

The highest levels of tyramine were found in red wine, and the highest levels of histidine were found in sake, the researchers note. The beer tested contained only small amounts of these biogenic amines, they say.

“Some foods have more biogenic amines than others, but you can’t tell because they aren’t listed on the food labels,” Mathies says. Even a single glass of wine has been known to trigger elevated blood pressure, heart rate and headaches in some people, he notes. “I think that certain foods, especially wines, should indicate their biogenic amine content.”

Besides beverages, the test can be used for a wide range of food products, including cheese, chocolate, fish and even sauerkraut. In addition to being used by consumers in the home, the device could be used by industry as a quick method to monitor or limit the biogenic amine content of foods and beverages, according to the researchers. It can also be used to screen foods that have been deliberately contaminated, they say.

Mathies envisions that the test will eventually be engineered into a PDA or other handheld device that consumers can use at home or in a restaurant to instantly screen a food or beverage sample for the presence of these toxins. More research is needed before this occurs, he says.

The study was funded, in part, by the National Aeronautics and Space Administration. The analyzer was originally developed to look for organic molecules, particularly amino acids, on future explorations of Mars. A version of the sensor has been developed for use in the European Space Agency's 2013 ExoMars mission, Mathies says.

Source: American Chemical Society

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