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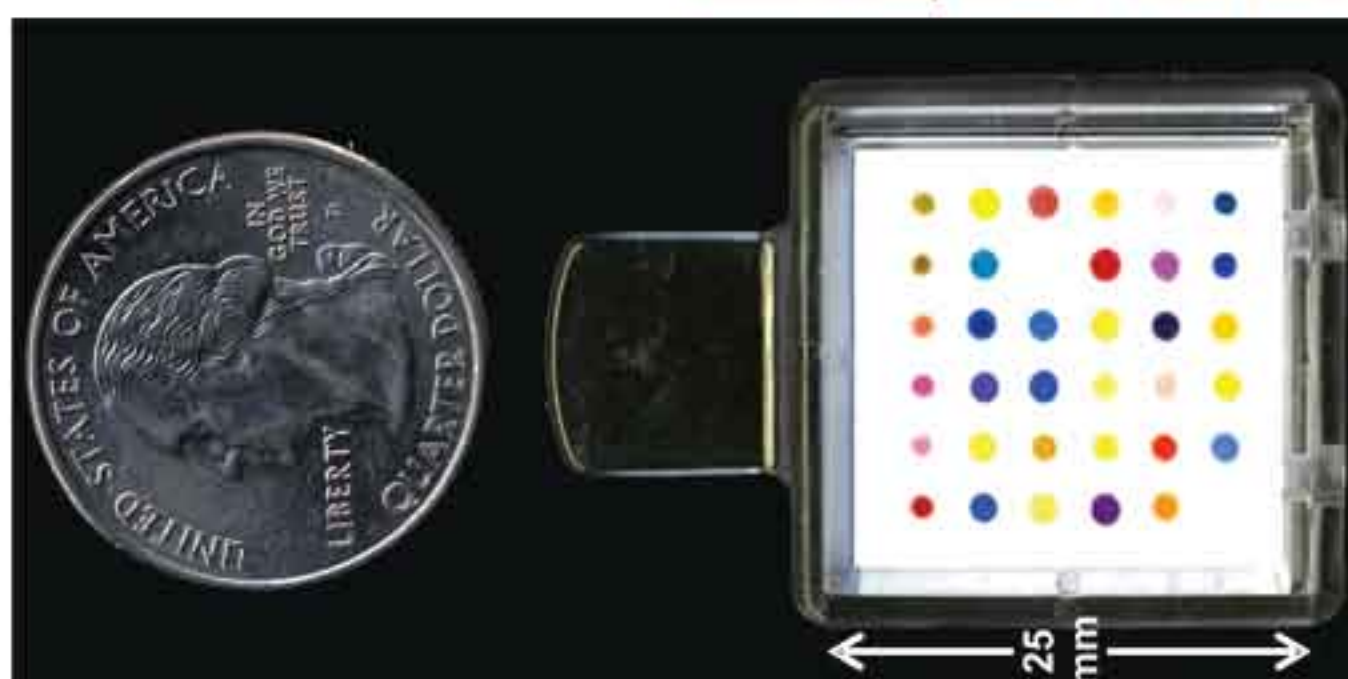
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Business isn't sweet for Chicago's Berry Chill



Kenneth S. Suslick/UIUC

The colorimetric array was used to differentiate between 10 brands of coffee. Each dot is a special dye that reacts when exposed to various compounds in the aroma.

Electronic nose sniffs out coffee brands

BY KEVIN EISENMANN
APRIL 13, 2010

For one of the most popular beverages in the world, measuring the quality of coffee has remained largely subjective; relying on other people's noses and taste buds.



8'Clock Columbian Folgers Columbian Starbucks Columbian
Kenneth S. Suslick/UIUC

For years, the complex makeup—over 1,000 chemical compounds—impeded efforts to reliably analyze the beverage. Many of the compounds also change dramatically when the roasting time and temperature are even slightly altered.

Researchers used a specialized sensor to map the molecular "fingerprint" of different brands of coffee. Such analysis could assure roasters that each batch is a molecular match from the previous.



Kenneth S. Suslick/UIUC

Researchers developed a smaller, handheld prototype they call "the sniffer." Such a device could—among many possible uses—assist food and beverage manufacturers with quality control.

That is, until a researcher at the University of Illinois Urbana-Champaign developed an electronic nose so sensitive it can identify differences between even the gourmet and everyday cups of joe.

Ken Suslick, UIUC professor of chemistry, with a little of help from his son Benjamin, developed a stamp-sized sensor marked with 36 dyed spots that change color when they encounter certain chemicals.

"I had a good idea when I was talking with a grad student," Suslick said. "Almost everyone's heard of litmus paper...well this is essentially a digital version with a bunch of chemically response dots."

Suslick's son and lab assistant Benjamin, who at the time was a high school sophomore with a caffeine habit, was the one who suggested that the team try testing coffee. The younger Suslick carried out much of the experimentation at University Laboratory High School in Urbana, where he measured reactions of whole and ground beans from 10 commercial brands including Starbucks and Folgers. The sensors offered distinct molecular snapshots of each brew.

The Suslicks' findings were published in the March issue of the journal *Analytical Chemistry*, where the authors noted that coffee is "one of the most consumed beverages in the world, and remarkably, the primary industrial method of quality control for coffee remains the use of human smell and taste, in spite of the... subjective limitations."

The National Institute of Environmental Health Sciences funded Suslick's research in an effort to determine what chemicals to which individuals may be regularly exposed.

"One of the significant benefits of a device like Ken's is the ability to rapidly identify and quantify exposures to several toxic chemicals simultaneously," said David Balshaw, program administrator for the institute.

Suslick's team has also developed a handheld prototype sniffer that—if made smaller—could be mass-produced, offering food and beverage companies with a cheap and easy method to analyze their product in comparison to traditional chemical analysis.

Chicago coffee roaster Intelligentsia welcomed the possibility of such technology.

"This type of device could be a useful tool in our arsenal of quality control mechanisms," said Bob Quinlan, chief operating officer. "I'd love to try one out and put it through its paces."