



## Science News

Share Blog Cite

### Advance Toward An 'Electronic Tongue' With A Taste For Sweets

*ScienceDaily (Aug. 18, 2009)* — In a new approach to an effective "electronic tongue" that mimics human taste, scientists in Illinois are reporting development of a small, inexpensive, lab-on-a-chip sensor that quickly and accurately identifies sweetness — one of the five primary tastes. It can identify with 100 percent accuracy the full sweep of natural and artificial sweet substances, including 14 common sweeteners, using easy-to-read color markers. This sensory "sweet-tooth" shows special promise as a simple quality control test that food processors can use to ensure that soda pop, beer, and other beverages taste great, — with a consistent, predictable flavor.

See also:

#### Matter & Energy

- [Electronics](#)
- [Detectors](#)
- [Technology](#)
- [Construction](#)
- [Sports Science](#)
- [Biometric](#)

#### Reference

- [Catalytic converter](#)
- [Nanomedicine](#)
- [Nanorobotics](#)
- [Isotope](#)

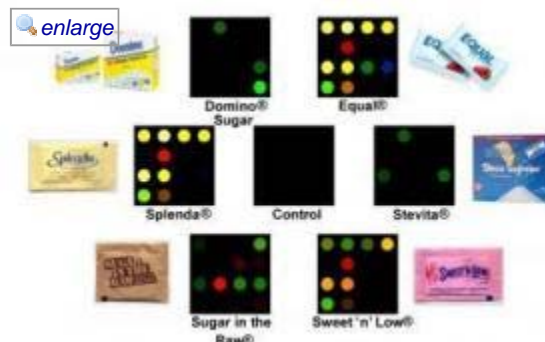
substances in the environment, the researchers say.

"We take things that smell or taste and convert their chemical properties into a visual image," says study leader Kenneth Suslick, Ph.D., of the University of Illinois at Urbana-Champaign. "This is the first practical "electronic tongue" sensor that you can simply dip into a sample and identify the source of sweetness based on its color."

Researchers have tried for years to develop "electronic tongues" or "electronic noses" that rival or even surpass the sensitivity of the human tongue and nose. But these devices can generally have difficulty distinguishing one chemical flavor from another, particularly in a complex mixture. Those drawbacks limit the practical applications of prior technology.

Their study was described August 17 at the American Chemical Society's 238th National Meeting in Washington D.C.

The new sensor, which is about the size of a business card, can also identify sweeteners used in solid foods such as cakes, cookies, and chewing gum. In the future, doctors and scientists could use modified versions of the sensor for a wide variety of other chemical-sensing applications ranging from monitoring blood glucose levels in people with diabetes to identifying toxic



*In an advance toward a long-awaited "electronic tongue," a new sensor can detect up to 14 commonly-used sweeteners. The device shows promise for quality control monitoring in the food and beverage industry. (Credit: Kenneth Suslick, Ph.D., University of Illinois at Urbana-Champaign)*

Ads by Google

[Advertise here](#)

#### Coca-Cola Positive Living

The Lowdown on Low-Cal Sweeteners. Learn the Facts. Live Positively.  
[LivePositively.com/JoinUs](http://LivePositively.com/JoinUs)

#### Get a Metal Detector Free

Buy One, Get One Free + Free Ship Free Accessories - Huge Selection!  
[www.KellycoDetectors.com/BOGO](http://www.KellycoDetectors.com/BOGO)

#### Sensa For Weight Loss

Revolutionary Weight Loss System. Patent-Pending Tastant Technology.  
[www.TrySensa.com](http://www.TrySensa.com)

#### Electronic Nose

Search Thousands of Catalogs for Electronic Nose  
[www.globalspec.com](http://www.globalspec.com)

#### Aspartame Resource Center

Link to new 2009 American Dietetic Association Evaluation  
[www.aboutaspartame.com](http://www.aboutaspartame.com)

#### Related Stories

**Electronic Tongue Tastes Wine Variety, Vintage**  
(Aug. 12, 2008) — You don't need a wine expert to

Just In:  
'Electronic T

#### Science V



Scientists I  
Newspape  
Electrical E  
Warning S  
Exhibit Del  
*more scier.*



#### Breaking

Sleep apne  
death risk  
percent: st  
Building bl  
found on c  
South Kore  
launch bou  
the North  
Funding to  
new U.S. r  
institute he

Suslick's team has spent a decade developing "colorimetric sensor arrays" that may fit the bill. The "lab-on-a-chip" consists of a tough, glass-like container with 16 to 36 tiny printed dye spots, each the diameter of a pencil lead. The chemicals in each spot react with sweet substances in a way that produces a color change. The colors vary with the type of sweetener present, and their intensity varies with the amount of sweetener.

To the scientists' delight, the sensor identified 14 different natural and artificial sweeteners, including sucrose (table sugar), xylitol (used in sugarless chewing gum), sorbitol, aspartame, and saccharin with 100 percent accuracy in 80 different trials.

Many food processors use a test called high-pressure liquid chromatography to measure sweeteners for quality control. But it requires an instrument the size of a desk that costs tens of thousands of dollars and needs a highly trained technician to operate. The process is also relatively slow, taking up to 30 minutes. The new sensor, in contrast, is small, inexpensive, disposable, and produces results in about 2 minutes.

Those minutes can be critical. Suslick noted that the food and beverage industry takes great care to ensure consistent quality of the many products that use sweeteners. At present, when a product's taste falls below specifications, then samples must be taken to the lab for analysis. Meanwhile, the assembly lines continue to whirl, with thousands of packages moving along each minute.

"With this device, manufacturers can fix the problem immediately — on location and in real-time," Suslick says.

Christopher Musto, a doctoral student in Suslick's lab, says it will take more work to develop the technology into a complete electronic tongue. "To be considered a true electronic tongue, the device must detect not just sweet, but sour, salty, bitter, and umami — the five main human tastes," he says. Umami means meaty or savory.

The National Institutes of Health funded the research. An Illinois-based company, iSense, is commercializing the technology. Sung H. Lim also contributed to the research study.

*Adapted from materials provided by American Chemical Society.*

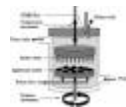
Email or share this story: [More](#)



identify a '74 Pinot Noir from Burgundy -- a handheld "electronic tongue" devised by European scientists will tell you the grape variety and vintage at the press of a ... > [read more](#)



**Toward Non-invasive Disease Diagnosis With Wellness Cards** (Oct. 29, 2008) — Scientists are reporting development of a device that could serve as the electronic "reader" for a coming generation of "wellness cards," specimen holders used to diagnose disease from a drop of a ... > [read more](#)



**Munch-o-matic: Scientists Develop The Artificial Mouth** (May 6, 2008) — For years scientists have tried to build an electronic tongue, a robotic tasting device that could have profound applications in improving food quality and safety. But before machines learn to taste ... > [read more](#)

**Fast, Accurate Sensor To Detect Food Spoilage** (Aug. 15, 2007) — Amid growing concern about outbreaks of food poisoning, researchers in South Carolina are reporting development of a new "food freshness sensor," for fast, accurate detection of food spoilage. ... > [read more](#)



**Monitoring Broken Bones Without Using Electronics: Wireless Bone Monitor** (Oct. 29, 2008) — The novel sensor is intended one day to help doctors monitor broken bones as they grow back together. Depending on the values of the forces measured by the sensor, they can decide whether the healing ... > [read more](#)

**Search ScienceDaily**

Number of stories in archives: 44,032

[Blood pres reverses M symptoms](#)  
[more scier](#)

**In Other Ne**

[U.S. housi producer p in July](#)  
[GM raises production "clunker" s](#)

[Hacking ca U.S. vulner breaches](#)

[U.S. says t criminal ca against UB](#)

[Obama ser progress o settlement](#)

[Hurricane I in Atlantic, uncertain](#)

[Conservati commenta Novak dies](#)

[Iran's Mou: governmer raped deta](#)

[more top n](#)

Copyright I

**Free Subs**

Get the latest newsletters, 1 hourly update

[Email New](#)  
[RSS News](#)

**Feedback**

Tell us what you think, we welcome both positive and negative feedback. Have any problems?

Your Name:

Your Email:

Comments:

Click button to submit

Need to cite this story in your essay, paper, or report? Use one of the following formats:

- APA American Chemical Society (2009, August 18). Advance Toward An 'Electronic Tongue' With A Taste For Sweets. *ScienceDaily*. Retrieved August 18, 2009, from <http://www.sciencedaily.com/releases/2009/08/090817184431.htm>
- MLA

Find with keyword(s):

Enter a keyword or phrase to search ScienceDaily's archives for related news topics, the latest news stories, featured articles, science videos, images, and books.

# Blue Heron Bio GeneMaker

Gold standard gene synthesis Technology leader [www.blueheronbio.com/](http://www.blueheronbio.com/)  
Advertise here

Ads by Google

## Innovations in Action

Advanced Cooling Technologies, Inc. ISO Cert. Heat Pipe Manufacturer  
[www.1-ACT.com](http://www.1-ACT.com)

## Xylitol Sweetener

Sweeten Your Life with Xylitol! Strengthens teeth and dental health  
[www.Xlear.com](http://www.Xlear.com)

## Fingerprint Readers

Fingerprint Readers, Software & SDK for PC Access and Control  
[www.zvetcobionometrics.com](http://www.zvetcobionometrics.com)

News

Articles

Videos

Images

Books

Health & Medicine

Mind & Brain

Plants & Animals

Earth & Climate

Space & Time

Matter & Energy

About This Site

| Editorial Staff

| Awards & Reviews

| Contribute

News |

[Advertise With Us](#) | [Privacy Policy](#) | [Terms of Use](#)

Copyright © 1995-2009 ScienceDaily LLC — All rights reserved — Contact: [editor@sciencedaily.com](mailto:editor@sciencedaily.com)