

# How to make strawberries sweeter without adding calories

July 1 2014, by Michael Schwieterman

---



Sugar is not the secret to sweetness. Credit: Yodatheoak , CC BY-NC-SA

Strawberries and cream are symbolic of Wimbledon and appreciated worldwide for their oh-so-sweet flavour. Researchers at the University of Florida, including myself, studied more than 30 varieties of strawberries and found that what makes them so sweet is not just sugar. We have identified a handful of chemicals that can make strawberries sweeter, without needing to increase the amount of sugar in them.

The sense of smell depends on our interaction with thousands of chemicals that we are surrounded by every day. We interact with them when we stop to smell a rose or when we take a drink of lemon juice. These are volatiles – chemicals which diffuse in the air – that are responsible for fragrance and flavour. Volatiles that increase perception of sweetness without adding [sugar](#) will have far-reaching effects in food chemistry, and also provide targets for breeding improved flavour in [strawberry](#) and other fruits.

## **It's all about ingredients**

The sense of taste allow humans to take a chemical inventory of food or drink in the mouth. When we consume we qualify these chemicals in terms of savoury, salty, bitter, sour and sweet. Smell enriches these flavours. And it does so when we chew and swallow food or drink, because volatile chemicals are forced up the back of the throat to the nasal cavity, which triggers smell upon exhalation. This is called the "retronasal" path.

In the brain, different areas receive different sensory information. In the case of taste and smell, there is some overlap. For instance, sensory information from the tongue and retronasal smell overlap, whereas "orthonasal" smell, which is inhaling through the nostrils, acts independently. It is the integration of taste and retronasal smell that gives rise to how we perceive flavour.

Genetic distinctions between varieties of strawberries create different flavours through levels of sugars, acids and volatile chemicals. There are thousands of varieties of strawberry available today. Much of this genetic diversity exists as a result of more than 250 years of breeding.

At the University of Florida Plant Innovation Program, we wanted to capture this diversity of strawberry flavours and determine the sensory

effects on consumers. Perhaps we could find that ingredient which results in a more preferable strawberry. So, over two years, we cultivated more than 30 genetic varieties of strawberries and tested them.

We recorded the amount of different types of volatile chemicals, sugars and other chemicals in each type of strawberry. Then we asked 100 consumers to score each sample for its hedonistic and sensory properties. Our results have been published in the journal [PLOS ONE](#).

## **Making strawberries sweeter without adding sugar**

We found, not surprisingly, that the total sugar content in strawberries is the most predictive of sweetness intensity. However, we were surprised that, among the potential 300 volatiles, only a handful contributed to the intensity of strawberries' flavour.

The volatile linalool, for instance, was found to be associated with strawberry flavour intensity, and is also found in orange blossoms and blueberries. Another volatile, mesifuran, is strongly associated with strawberry flavour and has been focus of research strawberry research for a while.

The best part of the study was that we identified specific volatiles in strawberry that make contributions to perceived sweetness independent of sugar concentration in the fruit. These sweet enhancing volatiles, such as 1-penten-3-one, had been overlooked in the past.

Our research has identified these individual volatile chemicals which greatly enhance the perceived strawberry flavour and sweetness intensity independent of sugar. These effects are happening in a retronasal manner rather than orthonasal. The sensory integration of retronasal [smell](#) and taste happening in the brain allows certain volatile chemicals to influence perceived sweetness.

These findings are being used by the University of Florida breeders to develop more flavourful and sweeter varieties of strawberries. Screening [volatile chemicals](#) in strawberry selections can ensure that newly developed varieties offer the best "recipe" to consumers. Also, the identification of genes responsible for the presence or quantity of specific volatiles will allow for the development of molecular markers, a type of genetic testing. Maybe in the near future the Wimbledon strawberry tart will not need extra sugar.

*This story is published courtesy of [The Conversation](#) (under Creative Commons-Attribution/No derivatives).*

Source: The Conversation

Citation: How to make strawberries sweeter without adding calories (2014, July 1) retrieved 11 May 2024 from <https://phys.org/news/2014-07-strawberries-sweeter-adding-calories.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.