

# Tomatoes And The Genetics Of Flavour

Flavour in all food is something we detect using both our sense of taste and smell. When we are sick or are aging we can lose these senses and as a result find eating less enjoyable than it should be. But in the case of modern commercial varieties of tomatoes you don't have to be sick or in your dotage to know that something is not right in the flavour department. Like any living thing the genetic makeup of the tomato contributes to the flavour profile. Genes code for the acid and sugar content and for the volatile compounds that activate our olfactory receptors. Modern tomato varieties have arisen from selective breeding for yield, size, disease resistance and firmness: all factors essential from a commercial perspective but emphasised at the expense of taste. But what are the components of flavour that we have lost in the modern tomato? Research published in the January issue of the journal, *Science*, has identified volatile compounds as the major source of flavour and consumer taste preference by analysis of 398 modern, heirloom and wild varieties. Volatile compounds are present in minuscule amounts, so are not amenable to standard lab tests and quantification. This has meant they have been inadvertently lost or diluted through selective breeding of tomatoes for those other traits. The researchers studied the flavour-associated chemical composition of 48 modern cultivars against 236 heirloom and wild varieties. While refrigeration, handling and storage can affect the taste of tomatoes, even when harvested fully ripe and consumed immediately, the modern cultivars were just not comparable in flavour to heirloom varieties. How the genetic loci are linked is all important in trying to get all the desirable factors into one tomato. It seems the loss of these volatile compounds was random and not linked to the traits selected against in the modern tomato, so by making a genetic

map of these volatile compounds it may now be possible to address flavour loss by selecting for these flavour genes. In addition, this study identified the genetic loci linked to sugar content and, lo and behold, what they found was that the larger the size of the tomato the lower the sugar content. Now there is scientific proof for what we all kind of knew from experience and why we all reach for the cherry tomatoes when we want some sweet flavour. The upshot is that if increased sugars are wanted then fruit size has to come down. In contrast, increasing some flavour-associated volatiles will not affect tomato size and yield and some can even increase our perception of sugar, so we can look towards more flavoursome commercial varieties sometime in the future. That still leaves handling, shipping and storage impacting tomato flavour.

Reference: Tieman, D et al (2017) A chemical genetic roadmap to improved flavor. *Science* **355** (6323), 391-394.

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## **Less Common Green Things at QVM**

Two stalls at the Queen Victoria Market have some hard to find green things. If you have been wanting to make a green papaya salad like you had in Thailand then head over to Shed C at the corner with Queen St as they have very green papaya just perfect for the task as well as an array of Asian greens,

including fine and fresh coconuts.  
For a recipe for green papaya salad here is a link to Luke Nguyen preparing one.



Shed B, stall 61-3 has beautifully presented produce with less common varieties, including golden beetroot, every colour of carrot, kohlrabi, red and green cabbage, great herbs and hard to find broccoli rapa. See link to Guy Grossi's orecchiette con cime di rapa (or broccoli rabe)