

Wasabi

Eutrema japonicum

A sushi essential

This extraordinary perennial, semi-aquatic herb came to our attention with the increasing popularity of sushi in Australia in the 1970s. Edible thickened stems are the source of the pungent paste that accompanies sushi rolls, sashimi and soba noodles. Wasabi and soy sauce complement the neutrality of white rice and various combinations of seafood, vegetables and pickles.

Wasabi is believed to have been first used in sushi during the Bunka/Bunsei era (1804-1830) of the Edo period when Japan was under the rule of the Tokugawa Shogunate, although its use can

be traced to much earlier times. A medical encyclopedia published in CE 918 reports that wild ginger (wasabi) had been eaten for 1,000 years or more in Japan, possibly from as early as 14,000 BCE. There is much debate about the original time and place of cultivation, but a mountain village, Utogi, during the Keicho era (1596 to 1615) is one possibility.

Wasabi, *Eutrema japonicum*, grows naturally along mountain streams in Japan, Korea and eastern Russia and is now widely cultivated worldwide. Cultivation is not without difficulties. In its natural environment, wasabi is a cool climate plant from temperate regions of Japan.



Sushi – photo Sarah Schuler

Wasabi is grown in northern Tasmania, where it grows well in a cool, high rainfall area at a latitude that corresponds with the wasabi production regions of Japan. All parts of the wasabi



Distribution of Wasabi, *Eutrema japonica* - Japan, Korea and Russia's Sakhalin Island.

plant are edible: flowers, leaves and leaf stalks but the most valuable components are the thickened stems.



Azumino Wasabi Fields in Japan: 江戸村のとくぞう, CC BY-SA 4.0
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However, the production of wasabi cannot keep up with worldwide demand, so much so that *western wasabi*, an inferior product made from the much less expensive western horseradish (*Armoracia rusticana*) is usually substituted. This is usually a mixture of various combinations of western horseradish, mustard, sugar, starch, green food colouring or spinach powder.

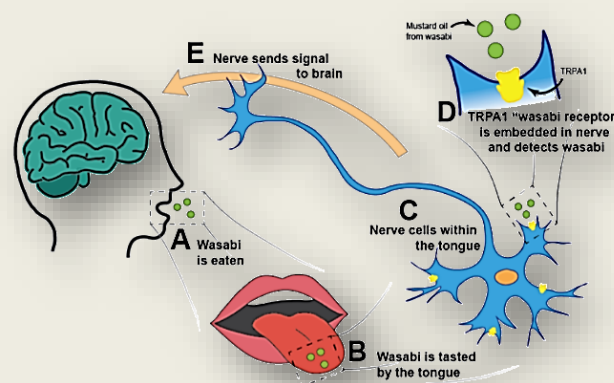
Where does the fiery pungency come from? Wasabi belongs to the mustard family, the Brassicaceae, and so is related to numerous other plants with pungent qualities including white mustard, brussels sprouts, radishes, nasturtium and western horseradish for a start, as well as some of the less malodorous members of the family such as cabbage and broccoli.

The presence of *glucosinolates* – sulphur containing compounds, sometimes referred to as *mustard oils* – are responsible for the characteristic peppery smell and pungent taste of many/most of the family. The chemistry of wasabi is complex: the pungency comes from *allyl isothiocyanate*, a volatile compound produced when an enzyme, *myrosinase*, is released when the plant cells are damaged, for example when grated during food preparation. Of course, in nature, these same chemicals are also a useful deterrent to predation by a



wide range of organisms. They have also been shown to inhibit both microbial and bacterial growth.

In order to taste the fiery pungency of wasabi, the mustard oil not only has to be present in wasabi paste, but we need to have a receptor in our neurons or nerve cells to detect its presence, the TRPA1 *wasabi receptor*. The TRPA1 receptor is present in the nerve cells of mouth and tongue. When wasabi is present in the mouth, it sets off the TRPA1 detector in the nerves and relays the alarm signals to the brain. It is hoped that the science behind the identification of the TRPA1 receptor may be harnessed to develop a new generation of painkillers and new approaches to manage chronic pain.



How TRPA1 *wasabi receptor* in nerve cells allows us to detect the spicy, fiery pungency of wasabi. From Vivian Chou. 2015. Figure by Anna Maurer

We shouldn't forget the role of Wasabi as a potential smoke alarm. In 2011, a team of Japanese scientists were awarded the Harvard Ig Nobel award for Chemistry for *determining the ideal density of airborne wasabi to awaken sleeping people in case of fire or other emergency, and for applying this knowledge to invent the wasabi alarm*. Ig Nobel awards are for achievements that *first make people laugh, and then make them think!!!*

AgriFutures Australia, Wasabi. [Wasabi | AgriFutures Australia](#)

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