

# This Spicy Japanese Plant Can Improve Cognitive Function

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December 28, 2023

## STORY AT-A-GLANCE

- › Research from Tohoku University in Japan demonstrated that the primary bioactive compound in wasabi – 6-methylsulfinyl hexyl isothiocyanate (6-MSITC) – improved long-term and short-term memory in community-dwelling older adults
- › The compound is known to have antioxidant and anti-inflammatory properties that the researchers believe positively affected the hippocampus and caused an 18% jump in memory scores on average in the intervention group, which the lead researcher called "really substantial"
- › The wasabi plant is difficult to grow and expensive to purchase. Most of the wasabi paste sold in stores is made from European horseradish and dyed green with food coloring. Just 1 kilo (2.2 pounds) of wasabi cost €250 (\$260) in 2020
- › Wasabi has many health benefits including antibacterial activity that may be protective while eating raw fish, and protects against blood clotting, neurodegeneration and cavities. 6-MSITC reduces symptoms of chronic fatigue syndrome and may play a role in lowering inflammation and pain
- › If you can find authentic wasabi locally, add it to your diet carefully since it contains a hepatotoxin that causes liver damage in large amounts. Overeating can also cause nausea, vomiting and diarrhea

Cognitive function is vital to supporting your ability to remain independent as you age. A 2023 study<sup>1</sup> published in *Nutrients* found the primary bioactive compound in wasabi improved the working and episodic memory in community-dwelling older adults.

While it may not be at the top of your list when you're 20, aging at home is important to most older adults. In one survey<sup>2</sup> of 1,000 homeowners aged 55 and older, 89% said it was important to them to remain at home as they aged as opposed to living in a senior living arrangement outside their home. Several factors play a role in your ability to age at home, including frailty, balance and cognition.

While there are cognitive and structural changes that normally occur with aging, mild cognitive impairment and dementia are not a normal part of aging. According to the Centers for Disease Control and Prevention<sup>3</sup> in roughly 40% of people diagnosed with dementia, the condition could have been prevented or delayed.

With age, you might experience slower processing or more difficulty multitasking, but your memory, skills and knowledge should not be affected. More than 6 million Americans are living with Alzheimer's disease, which, along with other types of dementia, cost the nation \$345 billion in 2023.<sup>4</sup>

## **Wasabi Improved Working and Episodic Memory in Older Adults**

Recognizing that past studies had demonstrated herbs and spices have a positive effect on cognition, the researchers from Tohoku University in Japan<sup>5</sup> chose to investigate the potential that the main bioactive ingredient in wasabi may also have a positive impact on memory. Wasabi is a traditional Japanese spice.

The main bioactive compound, which was the focus of the study, is 6-methylsulfinyl hexyl isothiocyanate (6-MSITC).<sup>6</sup> The compound is known to have antioxidant and anti-inflammatory properties, so the researchers expected it to positively influence cognitive function.

Other studies had demonstrated a beneficial effect on function in middle-aged adults, but these researchers chose to study healthy adults 60 years and older who lived in the community. In the featured October 2023 Nutrients study, using a 6-MSITC supplement in a double-blind, randomized control trial, 72 older adults received either the intervention or a placebo for 12 weeks.<sup>7</sup>

The supplement contained 100 mg of wasabi extract powder that included 0.8 milligrams (mg) of 6-MSITC. The researchers measured a range of cognitive performance at baseline and again at the end of 12 weeks. Those cognitive functions included episodic memory, processing speed, attention, working memory, and executive function.

The group taking the 6-MSITC supplement demonstrated a significant improvement in both working (short-term) and episodic (long-term) memory. The researchers noted no improvements in other cognitive functions. Rui Nouchi is the study's lead researcher and an associate professor at the school's Institute of Development, Aging and Cancer.

He told a CBS News reporter that the results exceeded their expectations. "We knew from earlier animal studies that wasabi conferred health benefits. But what really surprised us was the dramatic change. The improvement was really substantial," he said.<sup>8</sup>

The long-term memory scores in those who took the supplement jumped by an average of 18% and overall they scored on average 14% higher than the placebo group. The researchers believe that the supplement's antioxidant and anti-inflammatory properties affected the hippocampus, which in turn affected memory function and boosted neuroplasticity.<sup>9</sup>

The researchers told CBS News, that compared to those taking the placebo, the group of older adults taking the wasabi supplement "showed improved verbal episodic memory performance as well as better performance in associating faces and names, which is often the major memory-related problem in older adults."<sup>10</sup>

## **What Is Real and What Isn't?**

Before you run out to the store for some wasabi, you may want to consider that the green paste you dip your sushi into is likely not the real thing in the U.S. Chef Aya Yamamoto of Gastronomica Yamamoto in Milan told a Vice reporter, "Let's start with the basics: What you find in the West isn't real wasabi, it's fake wasabi."<sup>11</sup>

Native wasabi is grown in Japan and is very expensive. One kilo (2.2 pounds) costs as much as €250 (\$260) in 2020. To make the paste more affordable, most wasabi sold on the global market is made from a similarly tasting rhizome of European horseradish that is in the same family, and then is mixed with green food dye.

Wasabi has been described as one of the most difficult plants in the world to grow because it thrives in very unique climate conditions. The roots of the plant must be in water and the climate must be cooler. The plant does not like direct sun and is incredibly slow-growing. It generally takes two years from planting wasabi until the rhizome is ready to harvest.

While the plant is difficult to grow, it also loses its flavor roughly 15 minutes after it's grated. In Japan, you can buy whole rhizomes at local markets but in the U.S., it's more likely that the jar of wasabi at the grocery store is fake.

## 9 More Benefits From Real Wasabi

In Japan, the rhizome was originally used to help preserve fish, taking advantage of the plant's antibacterial properties. It was also popular in medicine as an antiseptic. It wasn't until between 1603 and 1868 that it became a food ingredient.<sup>12</sup> There are several health benefits from the real wasabi rhizome.<sup>13</sup>

- 1. Antibacterial activity** – Allyl isothiocyanate (AITC) is a microbial compound found in wasabi that has strong antibacterial properties against *E. coli* and *staphylococcus aureus* in foods.<sup>14</sup> Some have also reported use as herbal medicine against other foodborne pathogens including *salmonella*, *pseudomonas aeruginosa* and *helicobacter pylori*. This is thought to contribute to the protection it may confer when eating raw fish.
- 2. Neurodegeneration protection** – AITC has been shown to regulate lipopolysaccharide-induced neuroinflammation and has demonstrated neuroprotective efficacy achieved through the upregulation of nerve growth factor (NGF) production.<sup>15</sup> The findings of the study provided insight into the anti-

neuroinflammatory effects, which could have clinical significance in neurodegenerative disease.

3. **Vitamin C** – The recommended dietary allowance for vitamin C in persons 14 years and older ranges from 65 mg to 90 mg, depending on age and gender.<sup>16</sup> Just 100 grams (g) of wasabi contains 41.9 mg of vitamin C,<sup>17</sup> which supports your immune system and may help fight against colds.
4. **Sinigrin** – This is the precursor to AITC and a glucosinolate that's also present in vegetables in the Brassica family.<sup>18</sup> The compound has known pharmacological activities including anticancer, antioxidant, anti-inflammatory, antibacterial, and antifungal and wound healing properties.<sup>19</sup>
5. **Cavity protection** – The isothiocyanates found in wasabi and other plants in the Brassica family have antimicrobial activity against oral bacteria known to cause cavities, including *Streptococcus mutans*. It also has the strongest antimicrobial activity against *Candida albicans*, suggesting that it could be a candidate as a possible antimicrobial agent against harmful oral bacteria.<sup>20</sup>
6. **Improves ME/CFS symptoms** – 6-MSITC supplements were tested in participants with myalgic encephalomyelitis (ME)/chronic fatigue syndrome (CFS)<sup>21</sup> and found to improve their performance status, subjective symptoms including headache frequency, myalgia, improved brain fog scores, photophobia and potentially reduced pain sensitivity.

The researchers concluded that it was a "promising therapeutic option, especially for improving cognitive dysfunction."

7. **Allergy prevention** – Isothiocyanates have demonstrated the ability to inhibit type 1 allergies, such as seasonal allergies and asthma, by inhibiting the chemical mediator release.<sup>22</sup>
8. **Blood clot prevention** – 6-MSITC modulates endothelial cells, helping to maintain vascular homeostasis between blood coagulation and vascular inflammation. This

modulation suppresses cell adhesion and suggests that it has a "therapeutic potential as a treatment for vasculitis and vascular inflammation."<sup>23</sup> This function may help lower your risk of heart attack and stroke.

**9. Pain relief** – Overexpression of inflammatory factors plays a central role in the pathophysiology of inflammatory diseases and pain response.<sup>24</sup> By reducing lipopolysaccharide-inducible inflammatory factors, 6-MSITC may be an effective strategy against inflammatory disease and pain, including modulating the synthesis of prostaglandins and Cox-2 expression.

## Adding Wasabi to Your Diet

If you'd like to add wasabi to your diet, it can be difficult to find authentic rhizomes. If you can find it locally, fresh grated wasabi can be added to noodle soups, as a condiment on grilled meats and vegetables, in salad dressings and marinades, and as a flavoring for your favorite roasted vegetables.

However, it is important to take care when adding it to the diet. Eating too much wasabi may cause liver damage as it contains a hepatotoxin. While in small amounts it's not dangerous,<sup>25</sup> overeating it can cause nausea, vomiting and diarrhea, and the isothiocyanates may irritate your stomach and slow blood clotting.

## Sources and References

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- <sup>1</sup> [Nutrients, 2023;15\(21\)](#)
- <sup>2</sup> [Today's Homeowner, November 21, 2023](#)
- <sup>3</sup> [Centers for Disease Control and Prevention, Recognizing the Symptoms of Dementia and Seeking Help, top box](#)
- <sup>4</sup> [Alzheimer's Association, Alzheimer's Disease: Facts and Figures, Quick Facts 10% DTP](#)
- <sup>5</sup> [Interesting Engineering, December 5, 2023](#)
- <sup>6</sup> [Nutrients, 2023;15\(21\) abstract](#)
- <sup>7</sup> [Nutrients, 2023;15\(21\) Abstract and 2.7. 6-MSITC and Placebo Supplements 30% DTP for supplement amount](#)
- <sup>8, 9, 10</sup> [CBS News, December 7, 2023](#)
- <sup>11</sup> [Vice, November 9, 2020](#)

- <sup>12</sup> Vice, November 9, 2020, para 4
- <sup>13</sup> Conserve Energy Future, 13 Incredible Health Benefits of Including Wasabi in Your Daily Diet
- <sup>14</sup> Frontiers in Microbiology, 2016
- <sup>15, 18</sup> International Journal of Molecular Sciences, 2017; 18(7)
- <sup>16</sup> National Institutes of Health, Vitamin C
- <sup>17</sup> Food Data Central, Wasabi
- <sup>19</sup> Molecules, 2016; 21(4)
- <sup>20</sup> Biocontrol Science, 2013; 18(3)
- <sup>21</sup> BioPsychoSocialMedicine, 2022;16(26)
- <sup>22</sup> Journal of Nutritional Science and Vitaminology, 2012; 58 (4)
- <sup>23</sup> Journal of Natural Medicines, 2016;38(1)
- <sup>24</sup> Advances in Pharmacological Sciences, 2012; 2012(614046)
- <sup>25</sup> Sushi Inc, Wasabi and Sushi: A Perfect Pair, Overeating Can Be Dangerous 70% DTP