

金印ワサビスルフィニル®

*Wasabi sulfinyl*™

Ingredients for healthy food

Manufacturing  
Method

JAPAN Patent  
No.3919489



# The history of wasabi as a medicinal herb

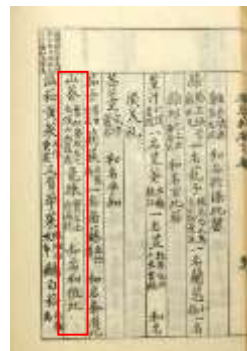
“Wasabi” is a traditional ingredient essential to Japanese cuisine.

Once upon a time, about 13 centuries ago.

The word of “wasabi” can find among strip of wood which discovered at the Asuka capital enchi site, upon which the names of medicinal herbs and prescriptions are thought to be recorded.

Later on, the word of “wasabi” was recorded in manuals on medicinal herbs, including “Honzo Wamyo” from the Heian period, “Honcho Shokkan” and “Yamato Honzo” from the Edo period. So it is believed that wasabi was used as a medicinal herb in ancient times.

And the other hand, Ieyasu TOKUGAWA as the first Edo shogun, who is well-known for his longevity, eated wasabi habitually. He is also known for ruling it as contraband not to be spread to other regions.

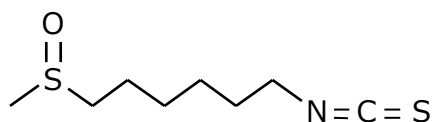


## What is Wasabi sulfanyl™?

Wasabi sulfanyl™ is a health food ingredient extracted from the rhizome / root of Japanese wasabi.

Contains “6-Methylsulfinylhexyl isothiocyanate”, an active ingredient.

※ The Pungent flavor has been removed the patented manufacturing method.



6-Methylsulfinylhexyl isothiocyanate (6-MSITC)

## Safety test

Safety confirmed in the test bellow.

- Mutagenicity
- Toxicity test by single oral administration
- Toxicity test by 28 days repeated oral administration

## Evidence

- Antioxidative effect
- Mitigation of Oxidative stress
- Skin-beautifying
- Relieving knee joint pain
- Anti-hair fall
- Improving brain function
- Improving atopic dermatitis
- Inhibiting cancer cell metastasis

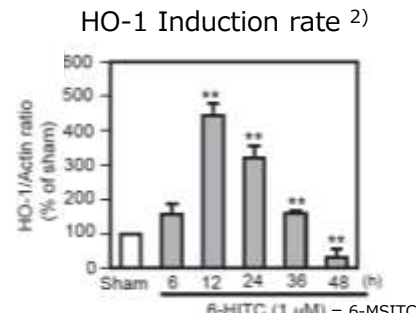
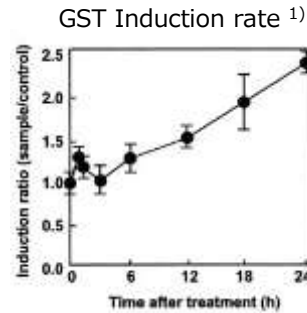
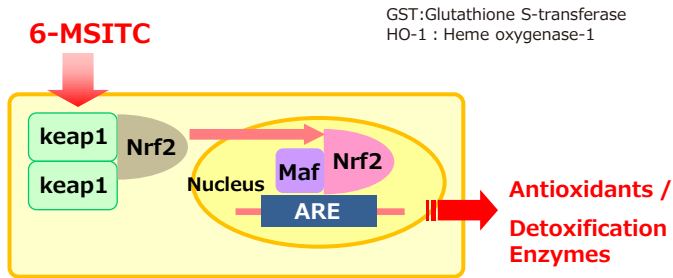
## Product standard

Product	KINJIRUSHI Wasabi sulfanyl™ KPC-1
Active ingredients	Contains 0.8% or more of 6-MSTIC
Recommended amount of mixture	40 to 200 mg per day
Form	Light to medium brown powder
Storage method	Store in a cool, dark place for up to 720 days
Expiration date	
NET	1 kg
Display on final product	Japanese wasabi extract powder, cyclodextrin

# Antioxidant & anti-inflammatory

## Antioxidative effect

Activating the transcription factor Nrf2 on Keap1, leads to the expression of GST, QR and other antioxidants and detoxification enzymes. And the activity continued over 24 hours<sup>1) 2)</sup>



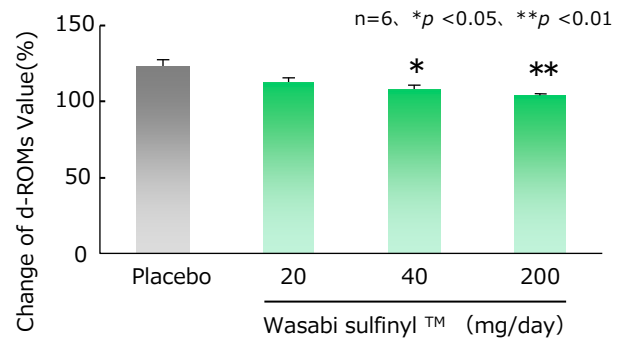
1) *J Biol Chem* 277,3456-3463(2002) 2) *J Pharmacol Sci* 115,320-328(2011)

## Mitigation of Oxidative stress

- Ingestion : Wasabi sulfinyl™ 20,40,200mg/day
- Period : 1 weeks each
- Subject : 6 ( ingestion of placebo and Wasabi sulfinyl™ with wash out interval )
- Method : dROM\* value has been measured after rode a stationary bicycle for 30 minutes on the last day of the trial.
- Result : The rate of change of dROM value was significantly lower in ingestion of wasabi sulfinyl™ (40 and 200mg/day) compared to the placebo.

\* d-ROMs; a method of comprehensively evaluating the status of in vivo oxidative stress.

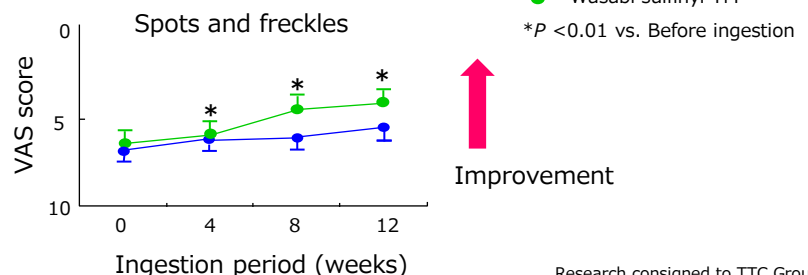
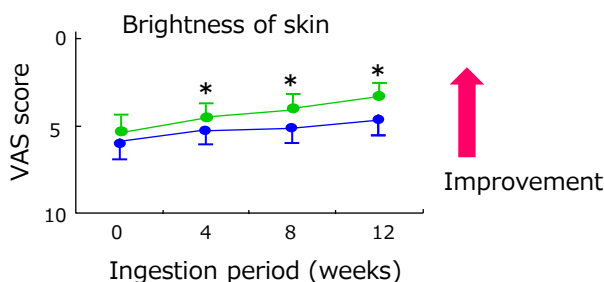
## Change of d-ROMs Value Before and After Exercise



KINJIRUSHI Co., Ltd. in-house test

## Skin-beautifying

- Ingestion : Wasabi sulfinyl™ 200mg/day
- Period : 12 weeks
- Subject : 18 ( Placebo 9, Active 9) average age 52.6 years old
- Result : As a result of evaluation with VAS scores, "brightness of skin," "spots and freckles," "transparency," "moisture," and "shine" significantly improved by ingestion of Wasabi sulfinyl™.

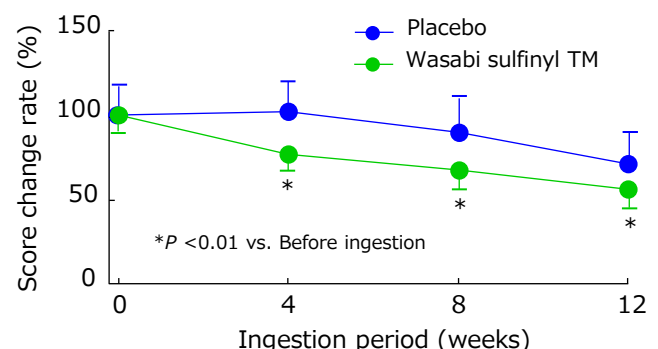


Research consigned to TTC Group

## Relieving knee joint pain

- Ingestion : Wasabi sulfinyl™ 200mg/day
- Period : 12 weeks
- Subject : 29 ( Placebo 13, Active 16)
- Result : As a result of evaluation with VAS scores, joint pain upon standing up was significantly alleviated by ingestion of Wasabi sulfinyl™.

Research consigned to TTC Group

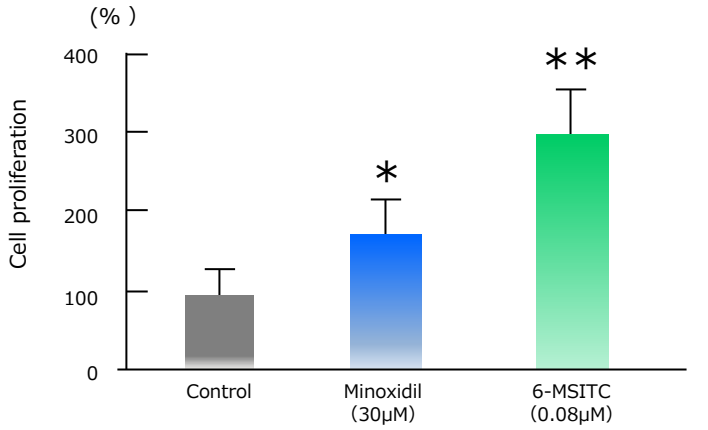


# Anti-hair fall

- Test cell : Human Follicle Dermal Papilla Cells (Human DPCs)
- Method : 【Cell proliferation of human DPCs】 WST method, 【Upregulation of VEGF gene】 real time PCR
- Results : 6-MSITC shows both effects at low concentration even compared with the pharmaceutical ingredient.

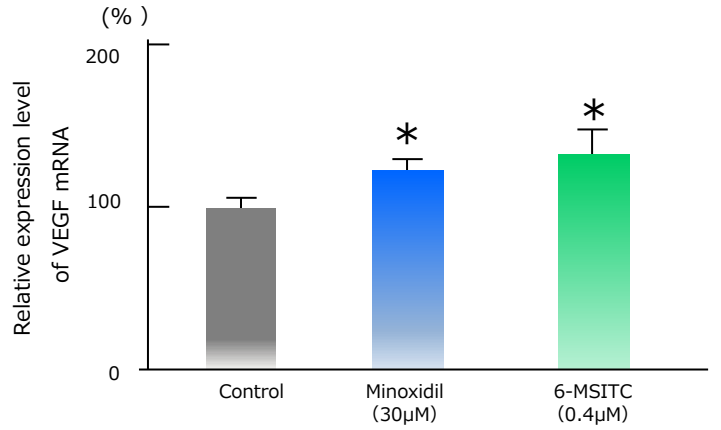
Food Science and Technology Research, 24(3),567-572,2018

## Proliferation of human DPCs



n=5, \* P < 0.05, \*\* P < 0.001

## Upregulation of VEGF gene

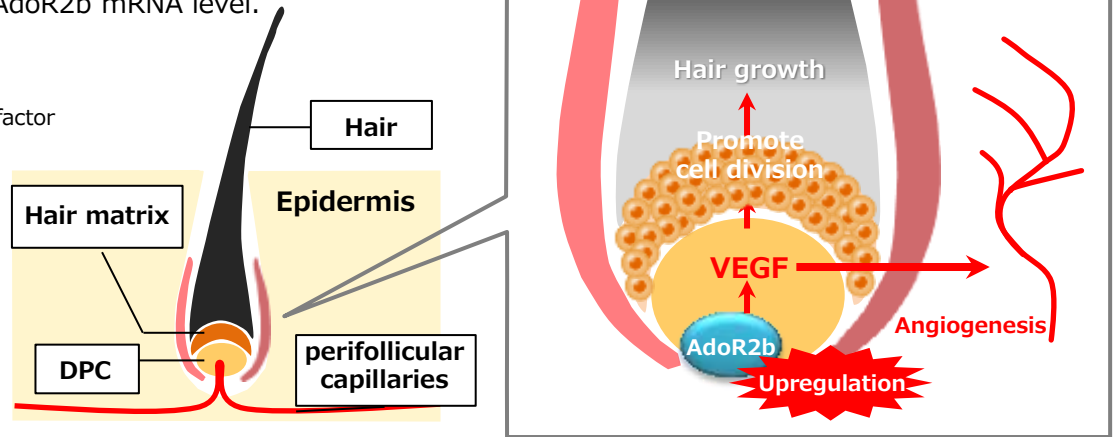


n=3, \* P < 0.05

## Mechanism

6-MSITC upregulates VEGF mRNA level on DPCs through the upregulation of AdoR2b mRNA level.

AdoR: adenosine receptor  
VEGF: vascular endothelial growth factor



## Supplements

- Antioxidant
- Hair care
- Improving cerebral function
- For athletes
- Skin beautifying
- Preventing knee pain
- Anti-allergies



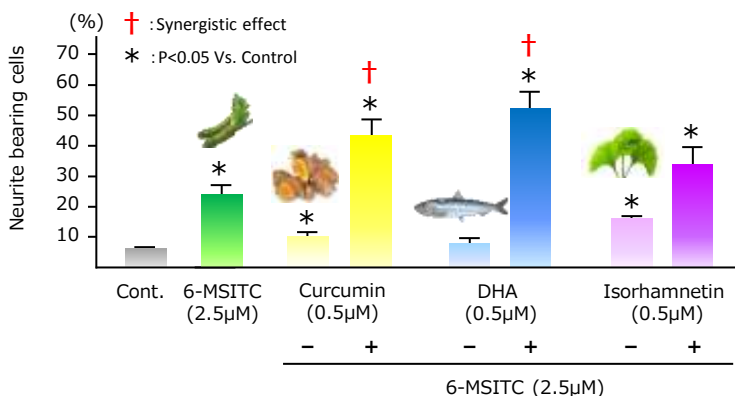
# Brain Food

“Foods with Function Claims (in Japan)” is being prepared.

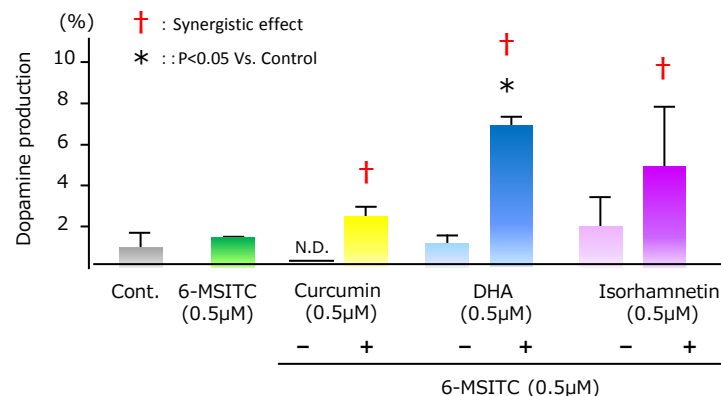
## Efficacy for PC-12 cell tests

PC-12 cells were preincubated with each sample before adding nerve growth factor (NGF) for 72 hours, then neurite outgrowth and dopamine production were analyzed. (n=3)

### Neurite outgrowth



### Dopamine production



▶▶ 6-MSITC induced neurite outgrowth. Furthermore, synergistic effect has observed when 6-MSITC was added with other compounds.

## Clinical Trial

- Research food : Wasabi sulfanyl™ 100mg/day
- Test period : 8weeks
- Number of subjects : 37 subjects (Placebo 18, Active 19)
- Target group :
  - For men and women who are aware of forgetfulness of 45 to 69 years old
  - Elderly people without exercise habits (less than twice a week, more than 30 minutes per week)

### Scheme of the Stroop Test

**STEP 1**  
(Control task of reverse stroop)

Q. BLUE  
A. [Yellow, Green, Red, Blue, Black]

**STEP 2**  
(Reverse stroop assignment)

Q. YELLOW  
A. [Yellow, Green, Red, Blue, Black]

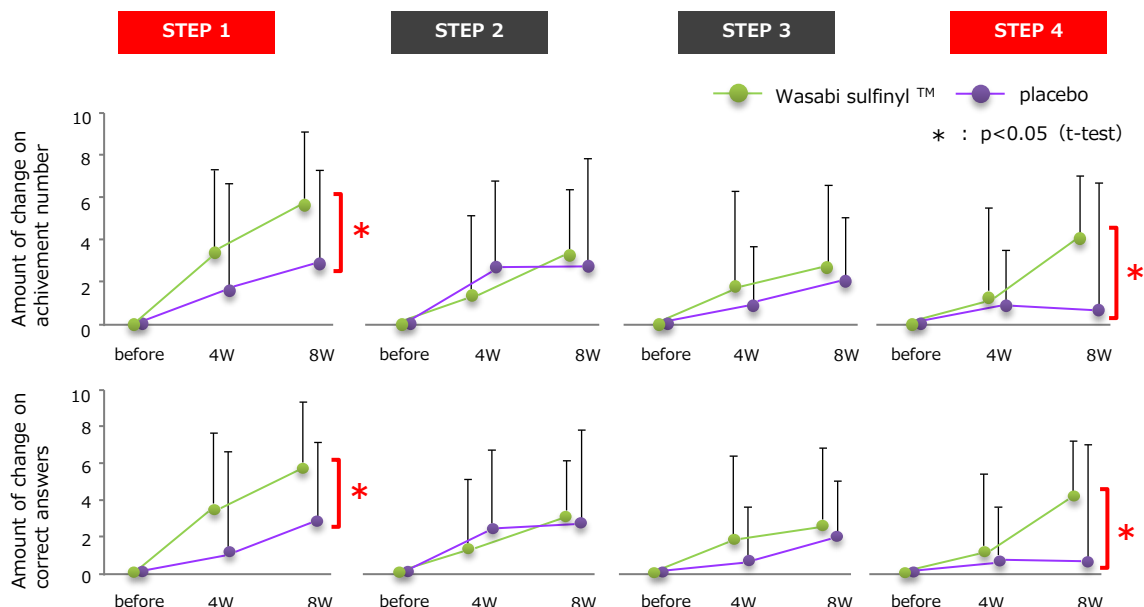
**STEP 3**  
(stroop control task)

Q. [Blue]  
A. Yellow Green Red [Blue] Black

**STEP 4**  
(stroop assignment)

Q. YELLOW  
A. Yellow Green [Red] Blue Black

▶▶ In the Wasabi sulfanyl™ group, there was a significant improvement from the placebo group in Step1 and Step4.



# 金印わきび

KPC-EN1809

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