

Super Vitalizer of  
Vegetables

SUPER  
スーパー  
やさしい  
活  
力  
剤  
の

植物剛健<sup>®</sup>プラス

Shokubutsu Goken Plus is an environment-friendly  
agricultural material containing amino acids

Shokubutsu Goken Plus richly contains aspartic acid, glutamic acid, leucine, lysine, arginine, histidine, proline and others. By spraying, it invigorates the growth of plants, and induces and activates plants' resistance against pest and diseases, with an expectation that vegetables and flowers become stronger against pest and diseases.

Shokubutsu Goken Plus is produced by adding amino acids from fish sauce to chitin and chitosan oligosaccharides that have been contained in Shokubutsu Goken. With an expectation for synergy between amino acids and oligosaccharides, Shokubutsu Goken Plus has stronger effects on plants. As a quality stabilizer, acetic acid, an ingredient of vinegar, is used.


Shokubutsu Goken Plus uses fish sauce that is refined to a food level from materials that are disposed of in the food processing industry, as well as chitin and chitosan oligosaccharides that are raw materials for health food. This product is a safe and secure agricultural material that efficiently utilizes natural resources.

[Effects]

Shokubutsu Goken Plus has an elicitor effect that enhances plants' resistance against pest and diseases. When provided with Shokubutsu Goken Plus, a plant temporarily stops growth in its aboveground part, and promotes rooting in order to increase its nutrient absorbing efficiency, thereby invigorating the biosynthesis of phytoalexin, an antibacterial compound, in order to prepare itself against natural enemies. The period when the elicitor effect is exercised varies by plant. After this effect fades, the developed rhizome promotes the growth of the aboveground part, with an ultimate expectation for improved crop yield. Because seedlings grow stronger with developed rhizomes, the product is also favorable for raising seedlings.

As another effect, the product actively proliferates microbes that degrade chitin and chitosan in the soil. These microbes have an ability to kill bacteria that cause plant diseases. Therefore, Shokubutsu Goken Plus can also be used as a soil amelioration agent.

Selling agency

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Shokubutsu Goken Plus

Designed to contain  
chitin and chitosan oligosaccharides  
plus amino acids,  
Adding vigor to plants and vegetables!

# Amino acids from salt-free fish sauce, delivered by the state-of-the-art technology, enhance the vigor of plants.

Salt-free fish sauce delivered by the state-of-the-art technology is produced in short hours without adding salt. It contains many amino acids including aspartic acid, glutamic acid, lysine, glycine and histidine, and further enhances the strong resistance of plants.



- ◎Contains amino acids that grow strong vegetables and flowers
- ◎Plant-vitalizing agent
- ◎Amino acids from salt-free fish sauce, richly containing aspartic acid, glutamic acid, leucine, lysine, arginine, histidine, proline and others, promote the growth of plants
- ◎In addition to amino acids, chitin and chitosan oligosaccharides activate the inherent resistance of plants against pest and diseases
- ◎Shokubutsu Goken Plus grows strong plants
- ◎Use it when you want to invigorate plants, to prepare against pest and diseases, and to prepare for the cold, heat and other abnormal weathers.

## [Effects]

Induce plants' resistance against pest and diseases

Promote rooting

Improve crop yield

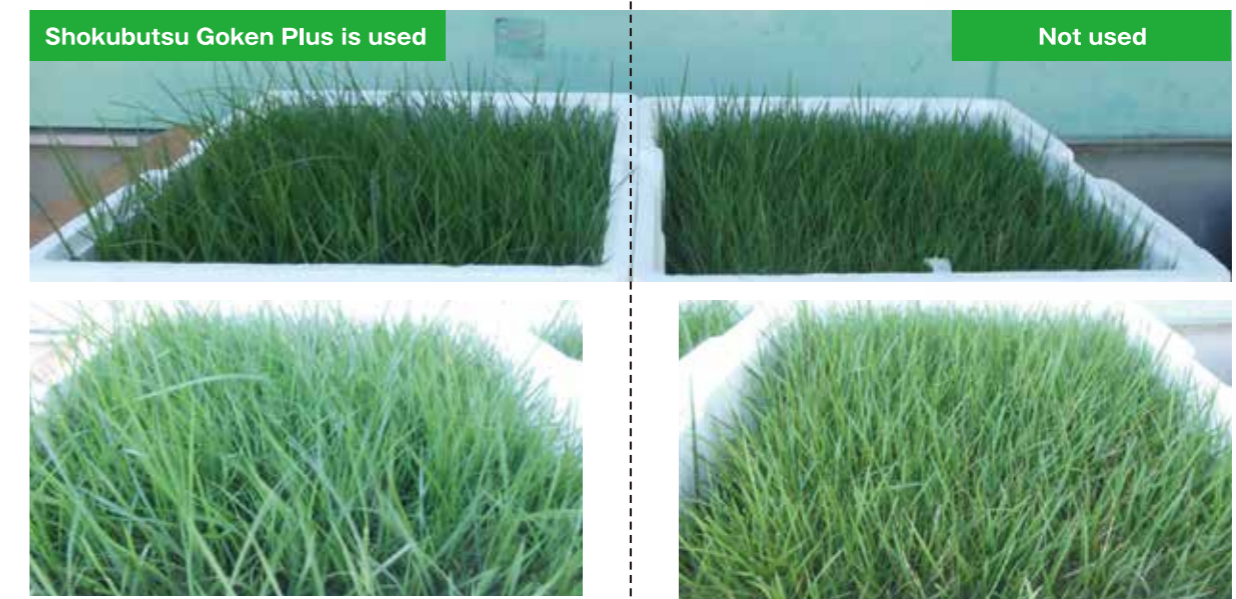
Ameliorate soil

- How to use
- ◎Dilute the product with water to 100 to 1,000 times, and spray it over leaves, or irrigate the root with it.
  - ◎The product contains no preservative. Prepare only a necessary amount immediately before use, and use it as soon as possible.
  - ◎Start using the product immediately following planting, and take an interval of at least one week between uses.

## [Results of using Shokubutsu Goken Plus]

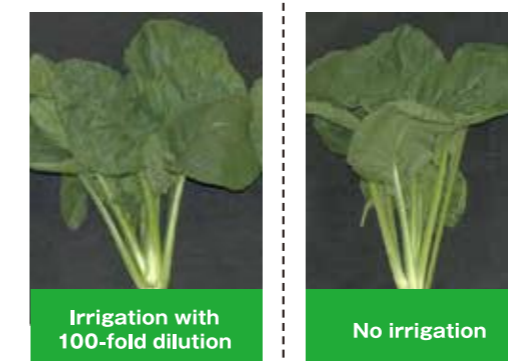
### 1 Promotion of growth of lawn

Following irrigation with Shokubutsu Goken Plus diluted to 1,000 times at an interval of one week, the growth of lawn has been promoted



### 2 Promotion of growth of Japanese mustard spinach

Following irrigation with Shokubutsu Goken Plus diluted to 100 times at an interval of one week, leaves became thicker, and the fresh weight of the aboveground part increased, though the length of leaves did not change.



### 3 Reduction of powdery mildew on tomatoes

Following spraying with Shokubutsu Goken Plus diluted to 1,000 times at an interval of one week, powdery mildew of tomatoes was reduced.

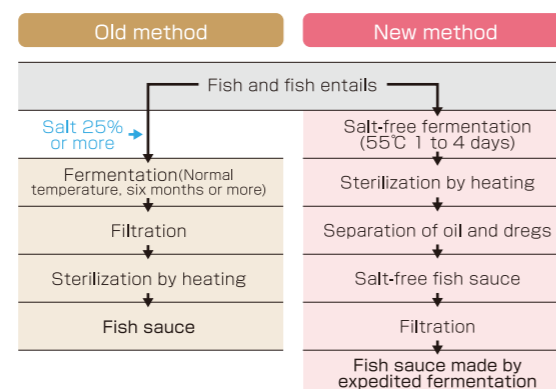


## What are amino acids from salt-free fish sauce?

When we hear "fish sauce", we remember shottsuru from Akita and ishiru from Okunoto, Japan, or nam pla from Thailand. Fish sauce is produced by preserving raw fish in salt and fermenting it for approx. one to three years. It contains amino acids and minerals degraded from fish protein, and has special aroma and rich flavor. At Fukui Prefectural University, a technology was developed to produce salt-free fish sauce, for the purpose of utilizing fish entrails that had been disposed of. This technology substantially shortens the fermentation period to approx. 15 hours, without adding salt, while avoiding microbial contamination under high temperature (55°C). It has been proved that the types of amino acids contained in salt-free fish sauce are mostly the same as those in conventional fish sauce, and the contents of amino acids are even larger.

## Salt-free fish sauce production technology

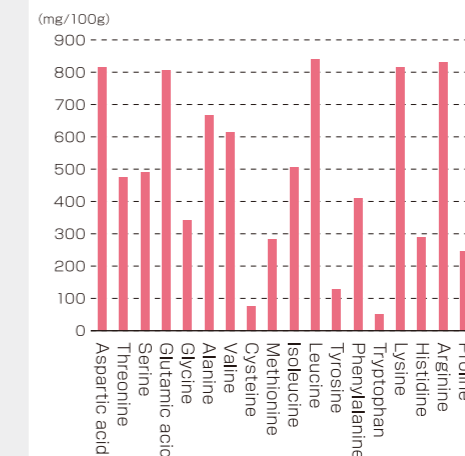
### [Comparison of the old and new methods]



## Utilization of amino acids from salt-free fish sauce in agriculture

It has been recently known that plants can directly absorb and use amino acids. On the sites of agricultural production, technologies are used to directly spray amino acids over plant leaves, or to have amino acids absorbed through plant roots. Usually, plants absorb nutrients (e.g. nitric acid, ammonia), and synthesize protein. In this synthetic process, plants consume energy. No problem occurs in an environment where adequate photosynthesis is possible. However, if cloudy weather or low temperature continues, the amount of photosynthesis declines, resulting in decreased protein synthesis and slower growth. By providing amino acids in such cases, plants can synthesize protein with a smaller amount of energy, and continue growing. While fish cakes have been used as an organic fertilizer, fish sauce has not been used despite the known fact that fish sauce richly contains amino acids. This is because a large amount of salt is contained in fish sauce. However, the salt-free fish sauce developed by the Fukui Prefectural University contains no salt, and therefore it can be used in agriculture. Its application to vegetable cultivation is under examination. In addition, it has been lately known that specific amino acids induce plants' resistance against pest and diseases. Measurement using tomatoes proved that salt-free fish sauce induced resistance against pest and diseases.

## Amino acids in salt-free fish sauce made from mackerel



## Induction and activation of resistance against pest and diseases (tomato)

