

Miso & Natto

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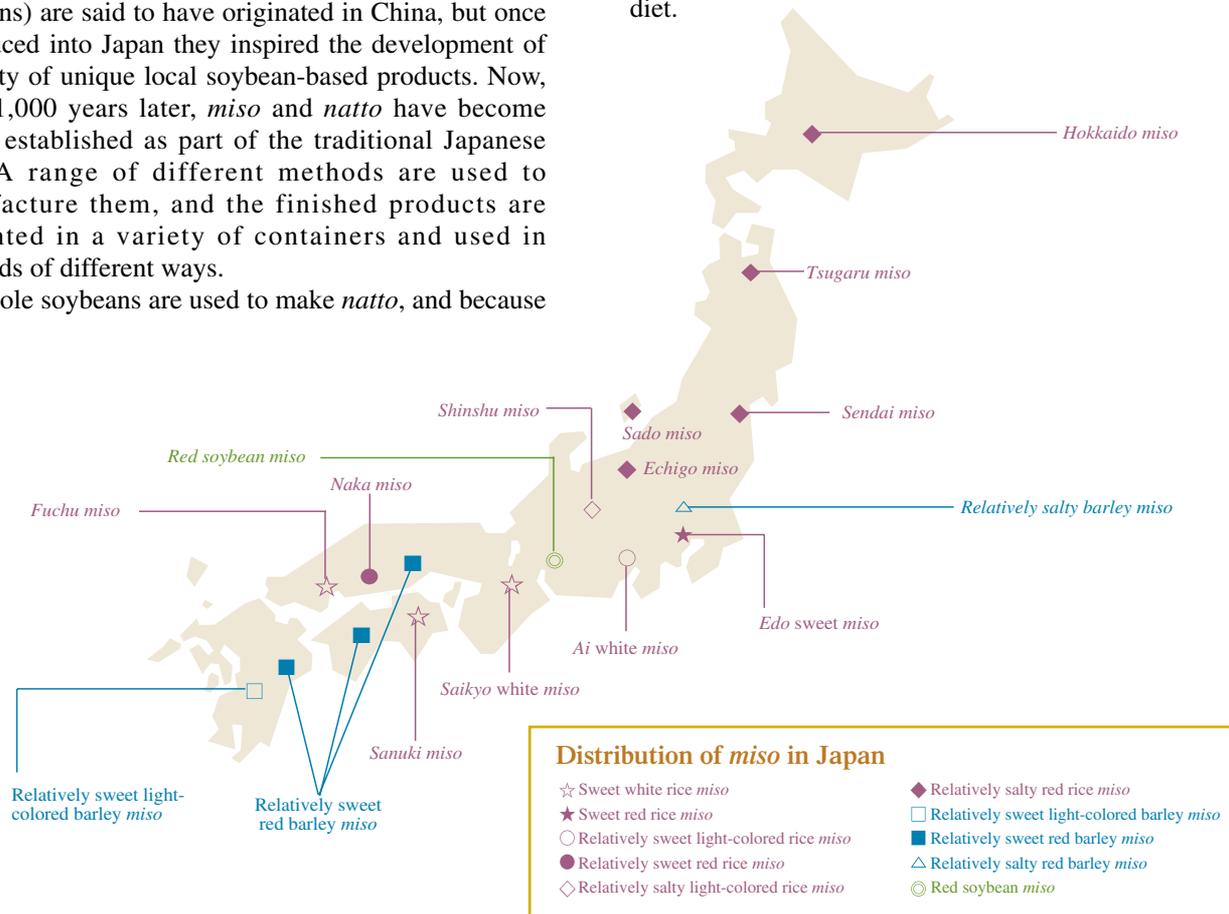
Introduction

The influence of Buddhism in traditional Japan led to various restrictions on the consumption of animal products other than fish. For this reason, people had to obtain vital proteins through the skillful use of soybeans.

Both *miso* (soybean paste) and *natto* (fermented soybeans) are said to have originated in China, but once introduced into Japan they inspired the development of a variety of unique local soybean-based products. Now, some 1,000 years later, *miso* and *natto* have become firmly established as part of the traditional Japanese diet. A range of different methods are used to manufacture them, and the finished products are presented in a variety of containers and used in hundreds of different ways.

Whole soybeans are used to make *natto*, and because

only a single variety of *natto* mold is used in the fermentation process, the beans retain their original shape. *Miso*, on the other hand, is fermented using lactic acids, yeast, and *tane-koji* (mold starter), and while some of the texture of the beans is retained, the finished product is in the form of a paste. Here we will look at the position held by *miso* and *natto* in the Japanese daily diet.



Variety of Futsu Miso (standard miso)

(Table 1)

Variety	Flavor (sweet or salty)	Color (tone of color)	Koji rate (rice/soybean) ×10	Salt percentage (%)	Major brands & districts where produced
Rice miso	Sweet miso	White	20-25	5-7	Saikyo white miso (Kyoto)
		Red	13	6	Edo red miso (Tokyo)
Relatively sweet miso	Light-colored	Light-colored	8-10	10	Ai white miso (Shizuoka)
		Red	10-20	11-13	Naka miso (Hiroshima)
Relatively salty miso	Light-colored	Light-colored	8-10	12-13	Shinshu miso (Nagano)
		Red	8-10	12-14	Sendai miso (Miyagi); Sado miso (Niigata)
Barley miso	Relatively sweet miso	Light-colored	20	9-11	Kyushu
		Red	15-25	9-11	Kyushu; Shikoku; Chugoku
Relatively salty miso	Red	Red	10	11-13	Saitama; Tochigi
		Red	0	10-12	Aichi/Mie; Gifu

Miso

Miso is produced in ordinary households all over Japan, and many people have their favorite local taste (see map previous page). A range of varieties exists, but *miso* can be divided into two broad categories: standard and processed. Standard *miso* is made from soybeans, salt, water, and rice or barley (see Table 1 previous page). Generally speaking, *miso* with a higher proportion of *koji* made from rice (*kome*) or barley (*mugi*) is whiter and sweeter, while that with a higher proportion of soybeans is saltier and brown in color (Figure 1). *Mame-miso* is made with hardly any rice or barley (Fig. 2), and is rich and full of flavor because of its high nitrogen content. Using *awase-miso*, a blend of two or more varieties of *miso*, to make *miso* soup gives the soup a unique flavor. Blended *miso* containing *mame-miso* along with other varieties is known as *akadashi miso* (page 9, left).

Special varieties of nutritional *miso* include *miso*

fortified with calcium or Vitamins A, B₁, or B₂, low-salt *miso* and other varieties, which are popular as therapeutic foods.

The most popular *miso* dish is *miso* soup. Almost every household in Japan eats this soup, the standard materials for which are *miso*, *dashi* (stock), ingredients for variety, and various condiments. The key to a good *miso* soup lies in the selection of suitable ingredients, the cooking method, and the serving method. The *miso* and other ingredients all have their distinctive colors, aromas, tastes, and textures, so it is important to choose the right combination.

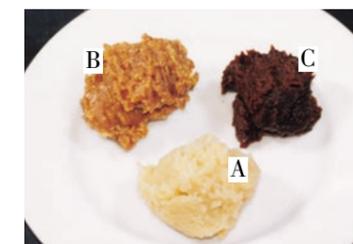
The ingredients differ according to the time of year and place, but may include tofu, *wakame* seaweed, eggplant, green onions, taro, fried bean curd, short-neck clams, freshwater clams, bean sprouts, and *nameko* mushrooms. The *dashi* is made from dried bonito, dried sardines, and seaweed, such as *konbu* kelp.

Miso is also used as an ingredient in *miso-zuke*, *miso* pickles. Vegetables, such as *daikon* (Japanese radish), or edible wild plants are preserved in *miso*, raw or after

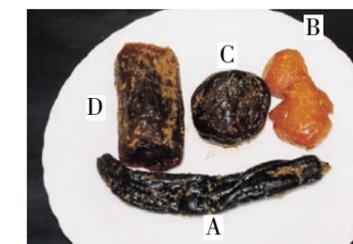
being processed in some way. Meat and fish are preserved in *miso*, too. *Miso-zuke* is eaten as a main dish with rice or as a side dish when drinking alcohol (below, center).

Varieties of *name-miso*, or *miso* relish, include *hishio-miso*, which is made by fermenting a mixture of dehulled soybeans, barley, vegetables, salt, chili peppers, and ginger, as well as *kinzanji-miso*, which was

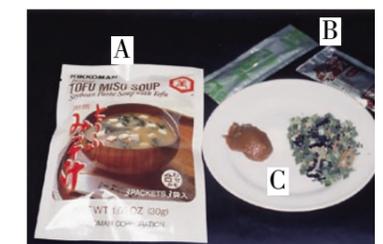
introduced from China. Processed *name-miso* is made by combining sea bream, clams, shrimp, or chicken with a combination of soybeans, burdock, *yuzu* (aromatic citron), seaweed, and nuts as well as sugar, malt jelly, seasonings, and spices and then simmering and kneading the mixture. In recent years, instant *miso* soup made from dried *miso* and seasoned raw *miso* has also become very popular (below, right).



Miso
A. Saikyo miso (rice miso; sweet; white)
B. Sendai miso (rice miso; red; relatively salty)
C. Akadashi miso



Miso-zuke (miso pickle)
A. Cucumber
B. Ginger
C. Uri gourd
D. Daikon



Instant *miso* soup mix
A. Outer pack
B. Individual packs inside (left: *awase-miso*; right: ingredients and condiments)
C. *Awase miso* paste, dried ingredients and condiments

Fig. 1
Production of *Kome Miso* (*Mugi Miso*)

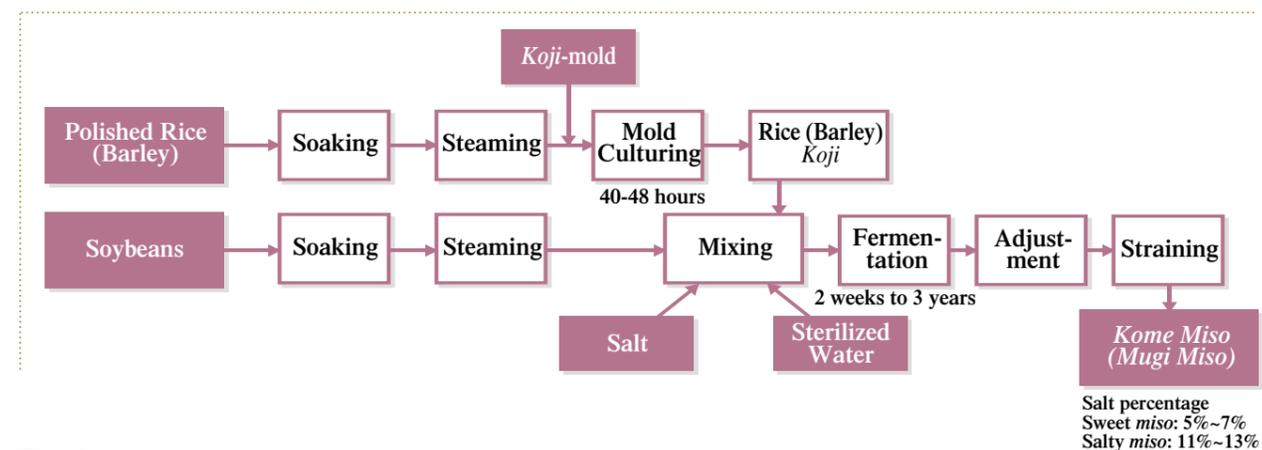
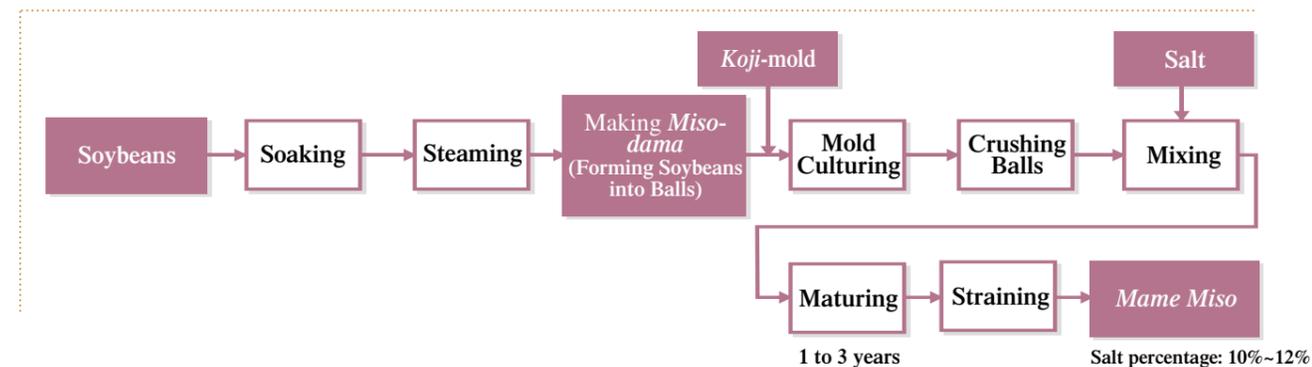


Fig. 2
Production of *Mame Miso* (soybean miso)



Natto

Natto is thought to have originated in China's Yunnan province, although legend has it that *itohiki-natto* (hereinafter simply "*natto*") was invented by accident in Japan's Tohoku region in the eleventh century when boiled beans that were going bad were eaten and found to be rather tasty.

The two main varieties of *natto* are *itohiki-natto* and *shiokara-natto*, which was introduced to Japan from China during the Nara period (710-794) by a Buddhist priest. *Shiokara-natto* is also known as *tera-natto*, and includes *daitokuji-natto* from Kyoto and *hama-natto* from Hamamatsu. A bean *koji* is made using *koji-mold*, and then salt is added before the mixture is set aside to ferment for approximately six months. This gives the final product its distinctive dark-brown color and flavor.

The process of making *natto* is relatively simple. *Natto* bacillus is spread over soybeans that have been steamed and boiled, then the mixture is stored for 16 hours at a temperature of around 40°C before being allowed to mature for 24 hours at a low temperature (see Fig. 3 next page).

Natto is famous for its unique aroma, flavor, and viscous texture. The *natto* bacillus produces amylase and protease, which soften the soybeans and give the final product its taste. The bacillus grows only on the surface of the beans, producing the distinctive sticky texture. It is this stickiness, along with the aroma, that sets *natto* apart from other foods.

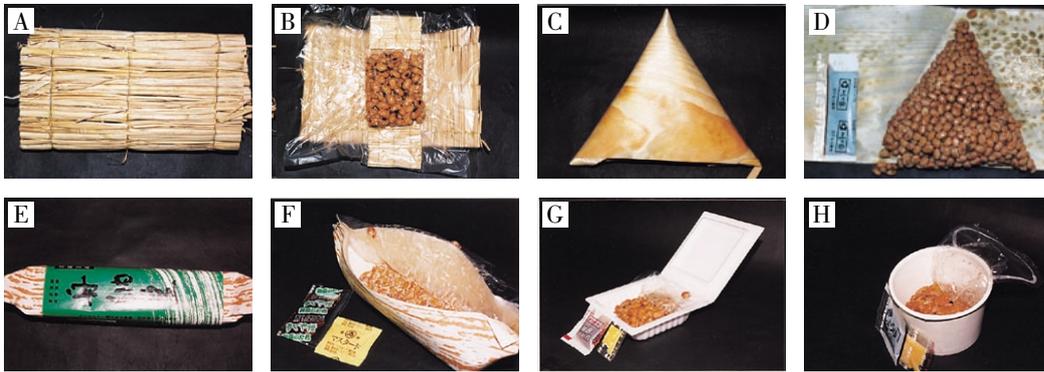
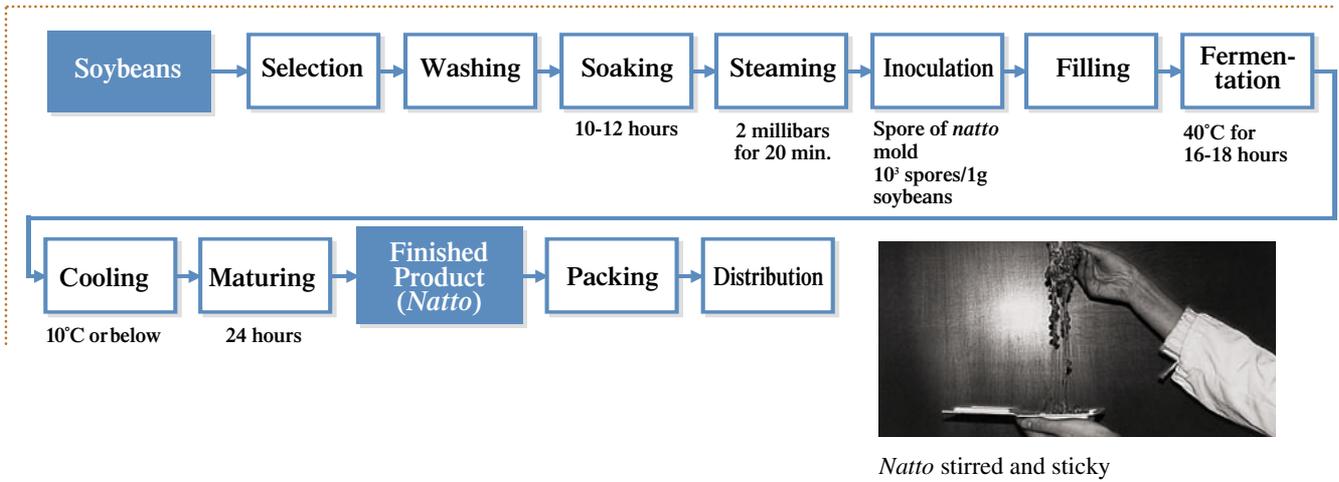
Until about 30 years ago, *natto* was mainly produced and consumed north of the Kanto area, with many farms producing their own *natto* for sale through small operators. Independent *natto* sellers would often travel into town every morning to sell their product.

In the 1980s, however, *natto* began gaining popularity in the Kansai region. This period coincided with the spread of large supermarkets, and the consumption of *natto* increased dramatically as affordable products were distributed nationwide via these new sales networks. Nowadays, though it has a shelf life of about a week, most *natto* is sold within two to three days of production.

Back in the days of small-scale production, *natto* was packed in small boxes made from shaved cedar board or containers made from straw. Today it is usually sold in polystyrene trays or paper cups.

Most people eat *natto* by mixing it in a bowl with condiments, egg, and *dashi* (sometimes substituted with soy sauce) and then spreading it over hot rice. *Natto* can also be eaten in the form of *natto* soup. This is made by pounding the *natto*, chopping it finely, and then adding it to *miso* soup along with small cubes of tofu. *Shiokara-natto* (or *daitokuji-natto*) is either eaten plain or used in dishes such sea bream *kinkan-maki*, which is made by slicing open a sea bream and smearing the surface with finely chopped *daitokuji-natto*. Other popular dishes include *daitokuji-natto* tempura, or a variety of *miso* soup made by marinating *daitokuji-natto* in a stock made from *konbu* kelp, grinding it in an earthenware mortar, and then mixing it with *hatcho-miso*.

Fig. 3
Production of *Natto*



Varieties of *natto* packages
A. Wheat straw wrap
B. Inside wrap
C. *Kyogi* (thin wood shavings)
D. Inside wrap
E. Boat-shaped container
F. Inside boat
G. PSP container
H. Paper cup



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Born in Tokyo in 1940, Dr. Kan Kiuchi is now a professor at the Department of Food Science and Nutrition at Kyoritsu Women's University. He graduated from the Faculty of Agriculture at Tokyo University and later received his Ph.D. in Agricultural Chemistry from the university's agricultural graduate school. After joining the

Food Research Institute (today known as the General Food Research Center) of the former Ministry of Agriculture, Forestry and Fisheries, he worked as chief researcher of the Department of Applied Microbiology, and as Director of the Third Research Laboratory of Microbial Applications.

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