

## Katsuobushi - A typical Japanese fermented seasoning -

It is no exaggeration to say that *katsuobushi* (dried bonito) typifies the taste of traditional Japanese foods. Among international dishes, people enjoy a variety of broths made from foods that contain ingredients for flavor: boiling these foods enhances the flavor. We call this kind of broth *dashi* in Japan. Typical broths include *shirumono* (soup) in Japanese cuisine, *tang* in Chinese cuisine, and bouillon and soup stock in Western cuisine (**Table**). Many delicious dishes with compound flavors can be made by using broth for seasoning with other ingredients that add flavor. Typical ingredients for *dashi* include *katsuobushi* (dried bonito), *niboshi* (made of boiled and dried sardines), kelp, and *shiitake* mushrooms: they are used for different types of dishes in various parts of Japan. Among them, *katsuobushi dashi* (extract of dried bonito) can be said to be the origin of Japanese cuisine.

### What is *katsuobushi* ?

*Katsuobushi* is produced by boiling bonito meat (**Photo 1**), removing the bones, smoking, shaving the surface of the meat, applying mold for fermentation, and finally sun-drying. A bonito of five kilograms yields about 800 grams of dried bonito. A total catch of bonito reaches 300,000 to 400,000 tons annually.

Historically, the first mention of dried bonito can be seen in 1,300-year-old Japanese documents. A fermentation procedure like the current method of applying mold was added to the process of drying bonito meat about 300 years ago. With the process of drying bonito fully developed, many cookbooks that use dried bonito as a seasoning have been published. Bonitos have been consumed by the Japanese people as a "good-luck" fish since ancient times. Today, bonitos are used in wedding ceremonies, presents given to guests at housewarming parties, and for gifts. It is not too much to say that Japanese cuisine has been greatly influenced by dried bonito.

### Process of *katsuobushi*

Dried bonito is known by different names according to the season the fish is caught, the fishery, and the different characteristics of processing used. Two traditional forms of bonito are *kamebushi* and *honbushi*. *Kamebushi* is prepared from two dried bonito made from the right and left halves of a small bonito while *honbushi*, is prepared from four dried bonito made from the right and left halves of a big bonito that is further cut into the dorsal side and the abdominal side. More than six months can pass from the time the fresh fish are unloaded to the time dried bonitos are shipped.



Photo 1: Bonito (Skipjack tuna)

The scientific name of the bonito is *Katsuwonus pelamis*. The fish is called skip jack in Canada and striped tuna in Australia. Bonito is found in the temperate zone and the tropical zone of the world's oceans. Bonito can grow up to one meter, but typically bonito up to 50 centimeters are caught in large quantities.

The process of making *honbushi* is briefly outlined below:

#### 1. Cutting bonitos (*Namagiri*)

First, the fish heads are cut off. Then, dorsal skins, organs, and fatty meat are removed, and the bonitos are cut into portions.

#### 2. Dividing bonito meat (*Aidachi*)

The bonitos are cut along the central fishbone into the dorsal side and the abdominal side. Small bonitos are processed as *kamebushi*.

#### 3. Laying bonitos in a basket (*Kagotate*)

The bonitos have been cut in a way so that they will not break into pieces while cooking. They are put in a container or basket with good thermal conductivity before proceeding with the following process of *Shajuku*.

#### 4. Putting bonitos in a cooker (*Shajuku*)

Eight to ten baskets are piled up, and the bonito meat is boiled for 60 to 90 minutes. This will kill enzymes and delay decomposition as well as solidify protein so the bonito meat can be easily processed. In addition, the water content of the bonito meat will be reduced for easier drying.

Table : Major broths of the world

	Type	Ingredients for flavor
<p><b>Japanese cuisine</b></p> <p>Dashi (Broth)</p>	<p>○Kelp: Kelp is used for soups with seafood seasoned with salt and tofu when the flavor of ingredients should not be destroyed.</p> <p>●<b>Dried bonito: Dried bonito is widely used for Japanese cuisine. (Photo 3)</b></p> <p>○Dried small sardines: Dried small sardines are used as a thick broth for meso soups and boiled and seasoned vegetables.</p>	<ul style="list-style-type: none"> <li>• Glutamic acid</li> <li>• Inosinic acid, glutamic acid, and peptides</li> <li>• Same as above and glutamic acid peptides</li> </ul> <p>Western cuisine</p>
<p><b>Western cuisine</b></p> <p>Soup stock Fond de veau</p>	<p>○Soup stock with chicken bones</p> <p>○Soup stock with vegetables (onions, carrots, celery, cabbage, etc.)</p> <p>○Fond de veau: Beef shanks with bones, calves' bones and flavored vegetables are fried and boiled to bring out the flavor.</p>	<ul style="list-style-type: none"> <li>• Inosinic acid and glutamic acid</li> <li>• Glutamic acid</li> <li>• Inosinic acid and glutamic acid</li> </ul> <p>Chinese cuisine</p>
<p><b>Chinese cuisine</b></p> <p>Tang (Broth)</p>	<p>○<i>Ji tang</i>: Ginger, onions and water are added to a whole chicken and boiled for a long time.</p> <p>○<i>Rou tang</i>: Ham and pork loin are boiled with ginger, onions, and water for a long time.</p> <p>○<i>Xiang lu tang</i>: Dried shiitake mushrooms are soaked in water to reconstitute them. Onions and ginger are added to the reconstituted mushrooms and boiled over low heat to make broth.</p>	<ul style="list-style-type: none"> <li>• Glutamic acid and inosinic acid</li> <li>• Inosinic acid</li> <li>• Guanylic acid and glutamic acid</li> </ul>

#### 5. Removing bones (*Honenuki*)

After boiling the bonito the bones, excess skin, scales and subcutaneous fat are removed in a water tank.

#### 6. Smoking (*Baikān*)

Smoking (*baikan*) further hastens the drying of the fish.

#### 7. Shaving (*kezuri*)

The dried bonitos collect tar during the smoking process which is removed with any fat content that forms at the surface by shaving the fish.

#### 8. Applying mold (*kabitsuke*)

After removing the tar, the dried bonitos are sun-dried for several days, packed in casks or wooden boxes, and put in a fermentation room where mold is applied for fermentation. The water content will be further reduced because mold grows all over the surface of the dried bonitos. In addition, fat will resolve, and flavor ingredients will condense.

#### 9. Sun-drying (*Nikkan*)

The dried bonitos that were treated with mold are sun-dried, and the mold is temporarily removed. After cooling, the dried bonitos are put into the fermentation room again and covered with more mold. This process is usually

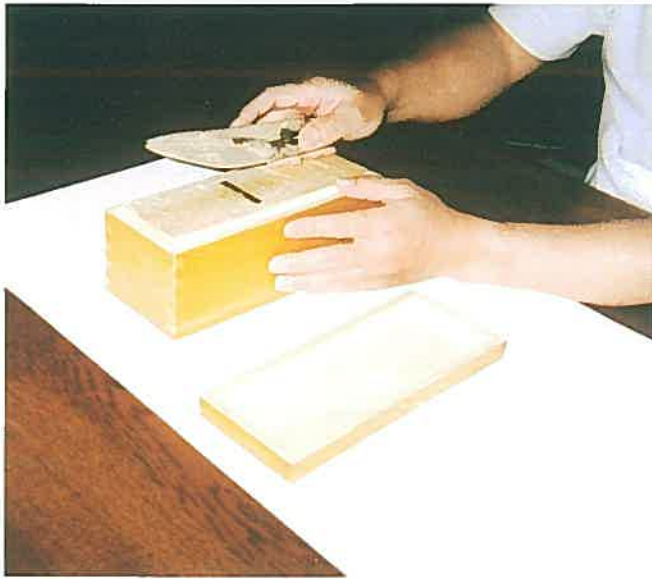


Photo 2: Shaving a *katsuobushi*.

repeated four times in order to finish *honbushi*.

The mold that is applied to dried bonitos belongs to the *Aspergillus glaucus* group. The mold is very useful for resolving fat, but it is not useful for resolving protein. Lipase, which is secreted from mold, is a fat-decomposing enzyme. It resolves fat, forms fragrant alcohols, and mellows the smoking smell so that the flavor characteristic of dried bonito will be created. Lipase also decomposes bad-smelling ingredients such as trimethylamine so that dried bonitos will be transformed into flavor ingredients without the bad smell typical of fish.

Mold hyphae are seen about 50 to 500  $\mu\text{m}$  from the surface layer of a dried bonito. Mold spores are localized in a layer of 20 to 120  $\mu\text{m}$  outside the surface layer. Neither mold hyphae nor mold spores exist in the inner portion of dried bonitos.

#### **Taste of *Katsuobushi* (flavor ingredient)**

Dried bonito is a highly nutritious food that is mostly protein (70%) and contains a very high content of the amino acid histidine. Dried bonito is also rich in vitamins, especially the Vitamin B group and Vitamin D, and also omega 3 fatty acids, such as DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid), which are known to promote good health.

The primary flavor ingredient of dried bonitos is inosinic acid. Inosinic acid does not create a strong flavor by itself but when an aromatic amino acid, such as sodium glutamate, is present its full flavor is brought out.

#### **Preparation of broth from *katsuobushi***

With a water content of slightly over 10 percent, dried bonito can be said to be one of the driest foods in the world. Therefore, to use dried bonito, it should be shaved with a plane called a *kanna* to a thickness of 0.1 mm to 0.5 mm (**Photo 2**). The shavings of dried bonito, called *kezuribushi*, are also available at stores.

To make broth, dried bonito is usually used with kelp. There are various ways of making broth according to the region of Japan, the type of dish being prepared and of course on the chief preparing the dish. A basic way to make broth is the following: first, kelp is put into water in a pot and then the pot is heated. The kelp should be taken out just before the water comes to a boil. Dried bonito shavings (a weight equal to about three percent of the boiled water) should be added and boiled for five to ten minutes. After removing from the heat, the broth should be put through a piece of cloth in order to remove insoluble matter.



Photo 3: Noodles sup with *katsuobushi dashi*.