Chapter 9

A Great Variety of Garnishes of Japanese Cuisine

Garnishes of Japanese foods and soup are also liked by oversea customers. These side dishes of Japanese cuisine are usually put on the side of the table without order and they are usually free.

9.1 Serving edible wild plants, *Sansai,* in four seasons

As a garnish of Japanese cuisine we sometimes have fresh edible wild plants collected on fields or in mountain areas, which are called *san-sai* (山菜) in Japanese. The *san* and *sai* mean mountain and vegetable, respectively. Many kinds of seasonal *sansai* are served as garnishes according to the changes of seasons. Figure 9.1 shows typical *san-sai*s in spring time; bracken, *warabi* (*Pteridium aquilinum*)*; zenmai* (*Osmunda japonica*) and *fuki* (*Petasites japonicum*). Potash contained in these wild plants is treated with straw ash or sodium bicarbonate in boiling water in order to take out some toxins, such as ptaquiloside from *warabi* and petasitenine from *fuki*.

Fig. 9.1 *Edible wild plants served for Japanese dishes.*

Left, *warabi (Pteridium aquilinum)*; middle, *zenmai (Osmunda japonica)*; right, *fuki (Petasites japonicus).* (Photos quoted from a web page of ja.wikipedia.org.)

When we went hiking on a beautiful hillside in the West Coast, which is located in the north of San Francisco, we were surprised to find a lot of *warabi* growing under the spring sun. When we were picking them, a lady hiker asked

us "How do you use these fiddle heads?" We learned the English word for *warabi* then, and my wife explained the way of cooking to her. We noticed that they were really like fiddle heads. We like this lovely name.

9.2 We make several varieties of Japanese pickles, *Tsuke-mono*

Fig. 9.2 *Varieties of Japanese pickles, tsuke-mono.*

Many varieties of Japanese pickles, *tsuke-mono* are seen as commercial products and also homemade ones. A, *senmai-zuke* (sliced white pieces); B, *nuka-zuke;* C, *nara-zuke*; D, *nozawana-zuke* (deep soaking); E, *nozawana-zuke* (light soaking).

I have rarely found fermented pickles in western countries except those of cucumbers, but in Japan, like China and Korea, we have many kinds of pickled foods so called *'tsuke-mono'* (漬物), Japanese preserved vegetables. *Tsuke-mono is* often served with bowl of rice as a side dish, *okazu.* It is also served with alcohols as snack, *otsumami* or as a garnish for meals. In making *tsuke-mono,* vegetables are usually pickled with salt, brine, or a bed of rice bran or *sake* lees and pressed by heavy stones in a vessel. Various kinds of vegetables, such as Japanese radishes (*daikon*), Chinese cabbages, cucumbers, egg plants, melons, *etc.*

are used, and we call them such as *takuwan, nozawana-zuke, hiroshimana-zuke, nara-zuke, etc.* depending on vegetables used, producing local town names or preparation methods. Figure 9.2 shows a few samples of my favorite *tsuke-mono;* sliced Japanese radishes, *senmai-zuke;* various vegetables in rice bran, *nuka-zuke*; pickling Japanese melon in *sake* lees, *nara-zuke*; and *nozawa* cabbages, *nozawana-zuke*.

During pickle processing, many kinds of microorganisms, which inhabit vegetables and rice bran or *sake* lees, grow and ferment vegetables. The typical microorganisms involved in *tsuke-mono* fermentation are yeasts, *koji* mold, and lactic acid bacteria. After vegetables are fermented by these microorganisms, several biochemical compounds, such as amino acids, vitamins, polyphenols and organic acids, which are good for our health, are produced. Although we can readily get these *tsuke-monos* at food markets, many Japanese still make *tsuke-mono* at home like *kimchi* in Korea.

9.3 *Wasabi* is essential for *Sashimi* and *Sushi*

Wasabi as well as soy sauce is essential to taking *sashimi* or *sushi* (Fig. 9.3). *Wasabi*, Japanese horseradish, belongs to the *Brassicaceae* family, which include mustard. The roots of the plant are used as a condiment and have an extremely strong flavor. Its hotness is more akin to that of hot mustard than that of the capsaicin in a chili peppers. It produces vapors that stimulate the nasal passages more than the tongue. Thus, *wasabi* can musk fishy smell of raw fishes and strengthens their umami tastes.

The plant grows naturally along clean stream terraces in mountain river valleys in Japan (Fig. 9.3). Thus, naturally cultivated *wasabi* is expensive and so restaurants often use Western horseradish as a substitute for Japanese *wasabi*

or mixed one. *Wasabi* was once grated and sold as dried powder, but these days it is sold as a ready-to-use paste in tubes.

Fig. 9.3 *Wasabi cultivation.*

Japanese *wasabi* is cultivated along street of terraces of valleys (upper pictures). Roots of *wasabi* plant are sliced or ground and used for *sashimi* and *sushi* (lower pictures). (Photos quoted from a web page of ja.wikipedia.org.)

9.4 Substances contained in garnish promote the death of damaged cells

Speaking of garnish, *wasabi* and mustard contain physiologically active substances, like allylisothiocyanate and sulforaphane, and beefsteak plants and parsleys contain luteolin. It came to be known that sulforaphane has the power which promotes detoxification of toxic substances in the liver and also promotes degradation of acetaldehyde formed by ethanol metabolism after drinking alcohol.

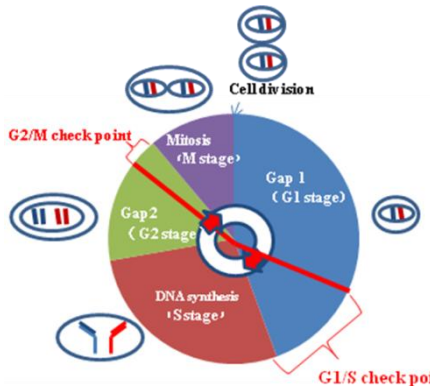

Fig. 9.4 *Check points of replication of DNA between G1 and S stages and G2 and M stages of eukaryotic cell cycle.*

We, human beings, have excellent mechanisms, which judge whether cells are normal or not when they grow in our bodies. It gradually came to be known that the substances in garnish of Japanese foods, like allylisothiocyanate and sulforaphane promote the induction of cell death (apoptosis) when the replication (duplicate the copy) of DNA during the life cycle of cells division from the mother cells to the daughter cells is mistaken (Fig. 9.4). It also came to be known that if there is much mutated DNA which is too difficult to repair, the cells are induced to apoptosis, and damaged cells are killed but normal cells are kept as they are. If the DNA damage is not so much, the cells can repair the mutated DNA to the correct DNA.

9.5 Our cells check abnormal DNA and keep normal cells

We, living organisms on the earth, are always exposed to many kinds of cosmic radiations, ultraviolet rays and nuclear radiations, so DNA of genes of cells are damaged and generate mutations. Mutation means changing of DNA bases. DNA is sometimes damaged due to strongly-reactive molecular oxygen, too, which is

the active oxygen derived in metabolic process of the cells. As a result, genetic DNA of cells is mutated naturally at the ratio of one per 10 to the sixth power (10^6), that is to say, one per one million DNA base sequences. Speaking of A, T, G and C in DNA base sequence (Fig. 5.1), it mutates like from A into T or from G into C and sometimes some bases are missing or inserted. When such a mutation occurs, information of normal DNA sequence is conveyed incorrectly, which results in the formation of incorrect protein or non-functional enzyme. However, human cells have the ability to sense incorrect mutated DNA and repair them, therefore final ratio of mutation is one per 10 to the ninth power (10^9), and it is quite accurate, so correct DNA is restored to new cells. If too many mutations occur and they are malignant, they are led to death. This is called apoptosis. It means programmed cell death. One of the polyphenols, catechin, in Japanese green tea or caffeine in coffee also induces apoptosis of damaged cells.

However, there may be some people who are afraid that a little mutation is conveyed to new cells. But you don't have to worry about it, because we have about 60 trillion of cells in our bodies and they are metabolizing repeatedly. Therefore, this kind of mutation can be ignored. The amount of human cells is miraculous, that is to say, DNA in each cell equals 2 meters if it is stretched and if DNA contained in 10 trillion cells is chained, the distance equals more than 60 times the distance from the earth to the sun.

Nevertheless, as you are worried, this sort of mutation sometimes occurs continually and that results in cancer, aging and death. Aging and death prove that we, human beings, are living organism.

Speaking of the DNA damage by nuclear radiation, I recall a terrible experience that I had when I was three years old. An atomic bomb exploded over Hiroshima City and killed more than 140 thousand people at once and within 5

months. Fortunately, I lived at a small town 18 miles away from Hiroshima but we were able to see mushroom clouds caused by the explosion. In those days, we didn't know how awful and terrible the residual radiations are and my family moved to Hiroshima and lived one mile away from the explosion point. There are people who survived probably by repairing their damaged DNAs, but there are people who couldn't, because they were exposed to a large amount of radiations at once. We should recognize that the power of a present nuclear weapon is several hundred times stronger than that of Hiroshima type bomb.

9.6 Seaweed foods have a lot of substances which are good for health

Fig. 9.5 *Various seaweed foods marketed in Japan.*

Upper from left to right; laver *(nori)*, agar *(kanten)*, *hijiki*, and brown seaweed (wakame). Lower from left to right; *mekabu*, *arame*, kelp *(konbu)*, and sea lettuce *(aosa)*. (Photos quoted from Uabe Foods Co., Ise, Mie, Japan.)

Seaweeds are also one of healthful foods. They contain plentiful minerals absorbed from the ocean. I will show you some typical seaweeds used in Japanese cuisine (Fig. 9.5). *Nori* is the best known seaweed and is often used to make *sushi* rolls. We make *sushi* rolls, *nori-maki* with *nori* sheets which contain a lot of

nutrients including minerals. Agar, *kanten,* is used for making sweet jelly of beans, *yokan,* but it may be recognized as a solid plate for cultivation of microorganisms in biological experiments at school. Deep green seaweed, *wakame* tastes best when they are hydrated in water for a few minutes before being used in soups, stocks, stews, stir fries or savory dishes. *Arame* is black stringy looking seaweed. It needs to be soaked for a few minutes before it is added to other materials of cooking. It can be added to any grain dishes, stir fries, soups, salads and curries. Similarly, we also eat *hijiki, mekabu* or *aosa,* sea lettuce.

Kombu which is indispensable to Japanese soup and *nabemono*, dishes served in the pot, contain several percent of umami taste of sodium glutamic acid. Main functional element of sea tangles is vegetable fibers of polysaccharide called fucoidan. Main functions of vegetable fibers are

1. Improvement of peristalsis of intestines.
2. Improvement of activities of bacteria in intestines.
3. Control of digestion and alimentation.

Except for vegetable fibers, *kombu* contains a lot of elements, like sugary mannitol, arginic acid, minerals of magnesium, calcium, iodine and so on, nutritious elements of amino acid, *etc.*, therefore, *kombu* can be said to be supplementary food.

These seaweeds contain several bioactive compounds whose functions are summarized as follows:

1. Blood purifying: Since some compositions of seaweeds are similar to human blood plasma, so they are thought to purify human blood.

2. High content of calcium: They contain about 10 times more calcium than milk and 8 times as much as beef.

3. Alkalizing: They help to alkalize human blood and as a result, neutralize the over-acidic effects of diets.

4. Chelating properties: They protect us from various environmental toxins, such as heavy metals, chemical pollutants and radiations by chelating reaction that convert them to harmless salt compounds.

5. Anti-oxidant effects: Seaweeds contain lignin which has anti-cancer properties.

6. Detoxification effect: They are rich in chlorophyll (green pigment) which helps to take out waste products from body.

7. Lose weight: Seaweeds have a potential to play a role in boosting weight loss.

Furthermore, *kombu* has been drawing the attention of the world after the accidents of nuclear power plants at Chernobyl and Fukushima, because it contains iodine which competes and prevents radioactive iodine from accumulating on the thyroid. At the same time, its minerals act like electrolytes to break the chemical bonds that seal the fat cells, allowing trapped wastes to escape.

9.7 Japanese hot cuisine, *Nabemono* and *sukiyaki*

Here, I will tell you about the above-mentioned *nabemono* dishes. *Nabemono* is a popular and traditional Japanese winter dish. Meat, sea-food and different kinds of vegetables are cooked in an earthenware pot filled with a special soup stock, in which *kombu* is often included (Fig. 9.6). The pot is placed in the

center of a table, and people gather around the pot and share the food. *Nabemono* is good for socializing and it is often enjoyed by families or close friends. This style seems to be similar to *sukiyaki.*

Fig. 9.6 *Nabemono (left) and sukiyaki (right).*

Sukiyaki, is, as you probably know, a kind of typical Japanese *nabemono* dish. It is prepared in a shallow iron pot at the table by cooking thinly sliced beef together with various vegetables, *tofu (*bean curd), *konnyaku* made from polysaccharide, mannan, of 'devil's tongue', and so on in a mixture of soy sauce, sugar, and *mirin* (sweet *sake* for seasoning). I hope you will try to cook both *nabemono* and *sukiyaki*, which are popular among Japanese people particularly in winter.

9.8 The secret of longevity is *Washoku*, Japanese foods after all

It seems correct that the top rank of longevity of Japanese people is owing to taking *washoku*, which include Japanese traditional fermented foods and low fat food materials.

I would like to tell you again that we should not take unbalanced diets even if some food is good for the health. It is evident that we should take balanced diets. The basic role of food is to supply nutrition to our bodies. We call the tendency of expecting food function too much, 'food faith'. It is obvious that food is related to our health, and it is also apparent that we cannot enjoy our health by having an unbalanced diet.

9.9 Summary

As a garnish of Japanese cuisine we have many kinds of fresh *san-sai*, *tsuke-mono, wasabi* and sea weeds. In *tsuke-mono* preparation, yeasts, *koji* mold and lactic acid bacteria are involved in fermentation of various vegetables. Several biochemical compounds, such as amino acids, vitamins, polyphenols and organic acids are produced by these microbes. *Wasabi* as well as soy sauce is essential to taking *sashimi* or *sushi. Wasabi* can musk fishy smell of raw fish and strengthens their umami tastes. The substances in garnish of Japanese foods, like allylisothiocyanate and sulforaphane promote the induction of cell death, apoptosis, when the replication of DNA during the life cycle of cell division is mistaken. Seaweeds, especially *kombu*, contain a lot of elements, like vegetable fibers, mannitol, arginic acid, amino acids, minerals of magnesium, calcium, iodine and so on, therefore, *kombu* can be said to be supplementary food.