Methods of tasting sake

Learning outcomes

- Knowledge of vessels and procedures used for tasting sake
- Knowledge of evaluation criteria, such as appearance, aroma, taste and mouthfeel
- How to recognize off-flavors

4.1 Vessels used for sake tasting, temperature of sake

Japanese breweries and analysis laboratories use a special vessel called a *kikichoko*, but it is also possible to use a wine glass (Bordeaux style). When using a glass, it is recommended to cover the table with a white cloth to enable the color of the sake to be seen more easily.

The serving temperature for tasting should be 18°–20°C, as this is best for appreciating the product's subtle characteristics and is least likely to cause taste fatigue.

【Kikichoko】
The cup used to taste sake at breweries and analysis laboratories is called a kikichoko. This is a 180 ml white porcelain vessel with two concentric cobalt blue circles on the inside bottom. The white color highlights differences in sake color. If there is turbidity, the edges of the two blue concentric circles become blurred, enabling detection of slight differences in turbidity. Breweries and analysis laboratories look very carefully for turbidity in sake while it is in storage, as this can indicate either inadequate filtration or contamination by lactic acid bacilli.

Figure 4.1
Kikichoko, sake tasting cup

4.2 Procedure

Sake tasting involves the following sequence of steps. The procedure is basically the same as for wine tasting.

(1) Observe the appearance, including color and clarity.
(2) Evaluate the *uwadachika* (orthonasal aroma) by bringing the vessel up to the nose and smelling the aroma given off directly by the sake.
(3) Take about 5 ml of sake into the mouth, spread it around on the tongue, breathe in air through the mouth and mix it with the sake.
(4) Evaluate the *fukumika* (retronasal aroma), which is the aroma that reaches the nose via the mouth.
(5) Slowly evaluate the taste on the tongue.
(6) After expectorating the sake, quietly sip more sake and allow it to pass down the throat in order to evaluate the aftertaste.

It is important to evaluate both the orthonasal aroma, which is the aroma sensed when the vessel is brought near the nose before tasting, and the retronasal aroma, which is the aroma sensed while the sake is in the mouth.

The entire tongue should be used to evaluate the taste. This is because the tip of the tongue is sensitive to all tastes, and the back of the tongue is sensitive to acidity, bitterness and umami, but the middle part of the tongue has less ability to sense taste.

4.3 Appearance

Clarity
Most varieties of sake are clear. Except for nigorizake and so-called unfiltered sake, which are intended to have a cloudy appearance, any turbidity in bottled sake indicates that it has not been properly filtered. Although not to the same extent as wine, sediment may form in bottled sake that has been stored for a long time.

Color
Colorless, transparent sake is filtered using active charcoal to stabilize the quality (Sec. 2.9). This treatment removes impurities and color. Sake that is not treated with active charcoal may retain a pale yellow color.

The color of koshu, or sake that has been aged for a long time, ranges from gold to dark amber. This color results from the reaction of the sugars and amino acids in the sake.

Sake also discolors if it is stored at high temperature or exposed to light for a long period. These conditions also increase undesirable aromas and bitterness, reducing the commercial value of the product. Determining whether there has been quality degradation requires examining the full range of color, aroma and taste attributes.

4.4 Aroma

In wine tasting, the taster first smells the aroma directly from the glass, then swirls the wine to allow contact with air and smells it again. A tulip-shaped wine glass is ideal for this purpose. The sides of a kikichoko, however, are straight, as the tasting procedure usually does not include swirling. This is probably because retronasal aroma is more important for sake than orthonasal aroma.

The sake aroma profiles shown in Figure 4.2 are used for describing aroma classifications to the general public, while the sake flavor wheel shown in Figure 4.3 is used by professionals. For most practical purposes, it is good enough to use the sake aroma profiles based on the names of familiar foods. Quality deficiencies usually show up in the aroma, therefore it is important to have a good understanding of off-odors (Sec. 4.7).

Fruit – apple, pear, banana, melon, lychee, strawberry, citrus
Ginjo-shu is rich in aromas suggestive of tree fruits, such as apple and pear, or tropical fruits like banana, melon and lychee. It is these aromas that are referred to as ginjo-ka. The element "ka" means aroma. The aroma comes from the esters produced by yeast in the fermentation process and is analogous to the secondary aroma in wine. To make sake with ginjo-ka, it is necessary to use highly polished rice and to employ painstaking care to create the right low-temperature conditions for fermentation. This brewing technique is known as *ginjo-zukuri* (Sec. 8.5).

Spice – clove, cinnamon, fenugreek
Some varieties of koshu, or long-aged sake, may have an aroma suggestive of clove, cinnamon or fenugreek.

Nuts
Another type of aroma found in some koshu varieties is reminiscent of almond or walnut, while some forms of namazake may have a hazelnut aroma.

Grass / green – cedar, green grass, rose
Taruzake, or sake that has been stored in cedar casks, has a wood aroma, called *kiga*, which derives from the cedar used in the cask. Some sake varieties have an aroma evocative of green grass or roses.

Cereal
Certain types of junmai-shu have a grainy aroma similar to that of the rice from which sake is made.

Fungi
Koji has an aroma similar to mushroom. This comes through in certain types of namazake and young sake varieties.

Caramel – honey, brown sugar, dry fruits, soy sauce
Because sake contains large amounts of amino acids and sugars, it acquires color and a sweet burned aroma due to the Maillard reaction during aging. This ranges from a honey-like aroma to one resembling soy sauce, brown sugar or dried fruit in the case of koshu varieties that are allowed to age for several years.

Acid – vinegar, yoghurt, butter, cheese
Depending on fermenting conditions, some varieties of sake have an aroma similar to butter or cheese, or a vinegar-like aroma.

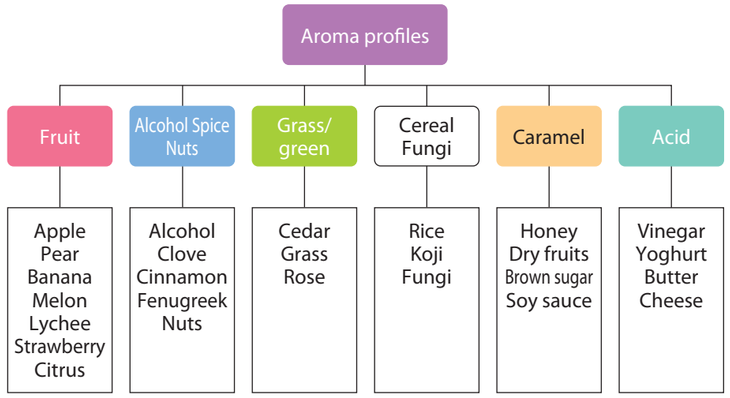

Figure 4.2 Sake aroma profiles

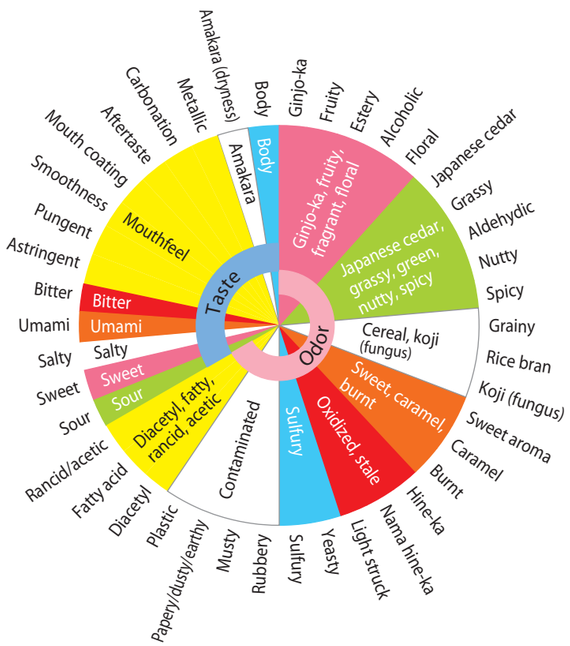

Figure 4.3 Sake flavor wheel for professional purposes

4.5 Taste and texture (mouthfeel)

The first tastes noticed after taking sake into the mouth are sweetness and sourness, followed a little later by bitterness and/or umami, which are most readily sensed at the back of the tongue. Also experienced are the texture attributes of astringency and smoothness. The finish (aftertaste) is experienced after swallowing or expectorating the sake.

***Amakara (amakuchi or karakuchi)*, sweetness or dryness**
The balance of sugars and acids determines whether sake tastes sweet or dry. Increasing the acidity will reduce the sake's sweet taste even if the amount of sugar remains the same (Sec. 7.4).

***Notan (nojun or tanrei)*, body**
The sugar level and acidity also affect the sake's body. Sake with a high sugar and acid content is regarded as rich or heavy. Amino acids and peptides also contribute and high levels of these result in full-bodied sake. A full-bodied variety may be referred to as having *koku* or *goku(mi)*.

Two Japanese terms used to denote the level of body are tanrei and nojun. Tanrei conveys the notion of "light" as well as "clean" and "sophisticated." Nojun, on the other hand, conveys the meaning of "full (rich)" along with "complex" and "graceful."

Umami
Umami refers to "savoriness" or "deliciousness." A key amino acid associated with umami is glutamic acid. Sake is richer in amino acids than wine or beer, and contains a large amount of glutamic acid (Table 1.1). Adding glutamic acid to sake, however, does not boost the sensation of umami. This is probably because the umami of sake derives from a harmonious blend of numerous amino acids and peptides.

***Nigami*, bitterness**
Bitterness is not a desirable trait in many varieties of sake, but it is one of the characteristics that give long-aged sake its complexity.

***Kime*, smoothness**
An appropriate level of aging reduces any roughness or pungency to produce a smooth, mellow sake.

***Kire*, finish or aftertaste**
In high-quality sake, regardless of whether it is sweet or dry, heavy or light, the taste is expected to vanish quickly after it leaves the mouth. This is referred to as kire. Unlike wine, a long finish is not regarded as a desirable characteristic of sake.

4.6 Overall quality

Balance or harmony is an important feature of sake. Sake with a well-balanced flavor is considered superior. The brewers of ginjo-shu aim to produce a light body, but it should not be watery. Striking the right balance between aroma and taste is also important. The aroma may be fruity, but if the sake has a monotonous taste or an excessively complex taste, it will not be regarded highly. To use somewhat abstract terminology, the type of sake that scores best on appeal and perceived quality is that delivering "elegance" and "resonance."

4.7 Faults

***Zatsumi*, unrefined or undesirable taste**
Balance (or harmony) is a key requirement of the taste of sake. A disagreeable, unbalanced taste that cannot easily be identified as bitterness, astringency or umami is referred to as zatsumi. Sometimes zatsumi results from the use of inferior ingredients or poor brewing technique, but it may also be caused by poor control during distribution. If sake is exposed to light or high temperature during the distribution stage, the level of zatsumi will increase along with changes in color and aroma.

Lightstrike
Light is the enemy of sake. The amino acids and vitamins that are plentiful in sake degrade when exposed to light, giving the sake an unpleasant musky smell.

***Hine-ka*, oxidized or stale odor**
In addition to acquiring a caramel-like smell, sake that is stored under high temperature or conditions favoring oxidation develops an unpleasant smell

like rotten cabbage or gas. This is caused by sulfur compounds in the sake. It is believed to be emitted by substances resulting from the metabolism of amino acids containing sulfur.

Musty (corky) smell

Sake bottles are not corked, but sake may on rare occasions acquire a corky smell. As with wine, this is caused by 2,4,6-trichloroanisole (TCA). Traditionally, sake brewing involves the use of many wooden items and the buildings at many breweries are made of wood. If chlorine-based fungicide is used in the wood, the lignin in the wood produces 2,4,6-trichlorophenol (TCP), which is converted to TCA through contact with mold. This may contaminate the sake during the production or storage process.

4.8 Flavor wheel for sake

The terminology used in sensory evaluation by professionals (Fig. 4.3) involved in sake brewing is arranged in a flavor wheel, with reference standards for each term.

4.9 Tasting sheet

Figure 4.4 shows the sake tasting sheet used in sensory evaluation of sake, while Figure 4.5 shows the sake tasting sheet for the National New Sake Award (see Q&A Q23). The aim of the National New Sake Award is to promote improvements by having brewers refer to their tasting results, and is based on a detailed evaluation using the terms in the sake flavor wheel.

Name: _____ Date: _____

Sample No. _____

Appearance	Color/hue	Colorless	Pale yellow	Gold	Amber	Dark amber
		-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
	Clarity	Clear				Dull
		-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
Nose	Intensity	Undetectable				Strong
		-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
	Characteristics	Undetectable				Strong
	Fruity banana	-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
	Fruity apple	-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
	Grass/green	-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
	Cereal	-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
	Caramel	-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
		-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
Palate	Sweetness	Dry		Medium		Sweet
		-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
	Body	Watery		Medium		Heavy
		-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
	Finish/aftertaste	Lingering		Fair		Fine
		-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
	Characteristics	Undetectable				Strong
	Acidity	-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
	Umami	-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
	Bitterness	-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
		-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--
Conclusions	Quality	Poor	Acceptable	Good	Very good	Excellent
		-- ☐ ----------	☐ ----------	☐ ----------	☐ ----------	☐--

Figure 4.4 Sake tasting sheet

Sample No. _____ _____

Judge _____

Aroma

Quality	Excellent		Fair		Faulty
Intensity	Fragrant		Fair		Poor

Ginjo-ka Fragrant	Fruity (banana) Isoamyl acetate	Fruity (apple) Ethyl hexanoate	Ethyl acetate	Higher alcohol
Grassy Spicy	Acetaldehyde	Isovaleraldehyde	4-Vinylguaiacol	
Fungus Sweet Burnt	Fungus	Sweet, caramel	Burnt	
Oxidized Stale Sulfury	Hine-ka	Namahine-ka	Yeasty	Sulfidic
Contaminated	Rubbery	Musty	Papery, earthy	
Fatty Rancid	Diacetyl	Fatty acid	Rancid	

Comments

Taste & Texture

Quality	Excellent		Fair		Faulty
Body	Heavy		Fair		Watery
Pungent Smoothness	Round, smooth		Fair		Rough, sharp
Aftertaste	Clean		Fair		Lingering

	Sweetness	Acidity	Umami	Bitterness	Astringency
Characteristic					
Very strong					
Imbalanced					

Comments

Overall quality

	Excellent	Good	Fair	Poor	Faulty

Figure 4.5 Sake tasting sheet for the National New Sake Award