

Japanese Sake: Service and Knowledge

The Sake Manual

(Revised)

Japan Sake and Shochu Makers Association

Contents

Chapter 1: Sake Classified into 4 Types.....	1
1. Classifying sake based on aroma and flavor characteristics	
2. Graph of the 4 types of sake	
3. Origin of aromas and aroma terminology	
Chapter 2: Serving Sake.....	12
1. Principles of service	
2. Serving temperature	
3. Tasting of sake by serving temperature	
4. Basic order of service	
5. Serving vessels	
6. Timing and serving temperature	
Chapter 3: Pairing Sake and Food.....	30
1. Need for research into compatibility of sake and food	
2. Effect of sake on food	
3. Reaction on the palate when combining sake and food	
4. Compatibility between the 4 types of sake and specific components in food	
5. Compatibility of sake and French cuisine	
6. Compatibility of sake and Western-style, Japanese and Chinese cuisine	
7. Compatibility of sake types with basic sauces	
8. Compatibility of sake with food based on service temperature	
Chapter 4: Drinking Sake.....	98
1. Sake and cocktails	
2. Sake in cocktails	
3. Ways of drinking sake	
Chapter 5: Storing Sake.....	108
1. Purchasing sake	
2. Choosing products and product ranges	
3. Managing storage	

Foreword

Every nation and people with a long history and culture has their own food culture and drinks that reflect their environment.

Japan has always been blessed with fertile soil, pure and abundant water, a climate with four distinct seasons, and a population who bring intelligence and wisdom to bear on their crafts. It is also the home of a number of strikingly original alcoholic drinks, loved by its people throughout the ages.

Today, people take the availability of commodities, food or drink from all over the world for granted.

But there is also a tendency to neglect traditions around food and drink, a special form of culture that we should pass on to the next generation.

So now is the time to look again at the native drinks of Japan, and learn about them.

Let's dive into what makes Japanese sake a unique and precious part of our food culture.

This edition is an extract version for sommelier, gastronomy and distributors all over the world who want to serve and introduce Sake. The original one was published October in 1991 by The Japan Sake and Shochu Maker Association, and carried out editing and planning by Sake Service Institute.

Chapter 1: 4 Types of Sake Classified by Flavor and Aroma

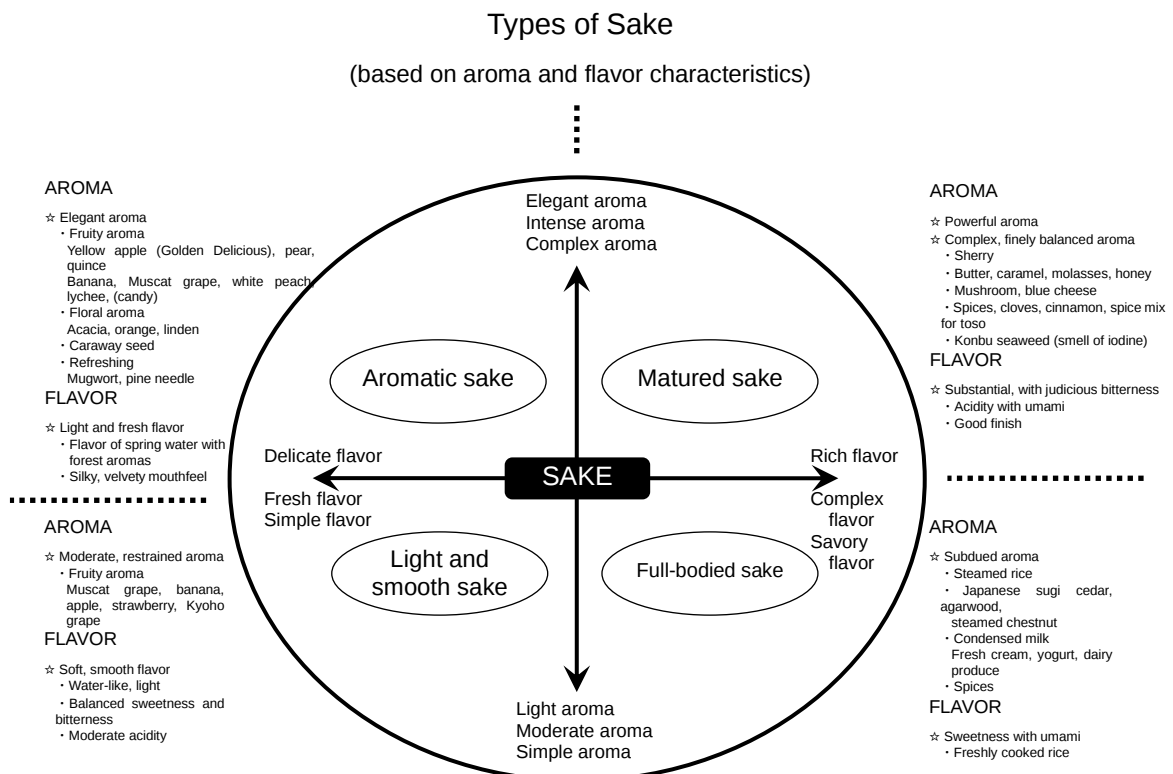
1. Classifying Sake Based on Aroma and Flavor

As part of research into compatibility between sake and food, reference sake were chosen to use for evaluation purposes. Classifications were also created to clarify the previously poorly defined characteristic flavors and aromas of sake.

(1) Principles of classifying sake into types

The flavor and aroma characteristics of sake can be roughly divided into 4 types based on the following 2 axes:

1. Aroma: axis from high to low
2. Flavor: axis from fresh to rich.





(2) Types of Sake and their Characteristics

Aromatic sake

- Ginjo is representative of this type. Can also apply to some namazake and honjozo.
- Pale in tone, has strong fruity and floral orthonasal aromas and light, fresh flavors.
- Contains high levels of aroma components, and low levels of hine-ka components and amino acids.

Light and smooth sake

- Namazake is representative of this type. Can also apply to some honjozo and junmai.
- Pale in tone, orthonasal aromas are restrained but have fresh, light notes, and flavor is soft and clear.
- Contains a moderate level of aroma components, but plenty of organic acids, such as malic acid, and trace amounts of amino acids and hine-ka components.

Full-bodied sake

- Junmai is representative of this type. Can also apply to some honjozo.
- A little darker in tone, has subdued aroma and is somewhat heavy with judicious bitterness.
- Contains plenty of organic acids, such as lactic acid, and a moderately high amount of hine-ka components.

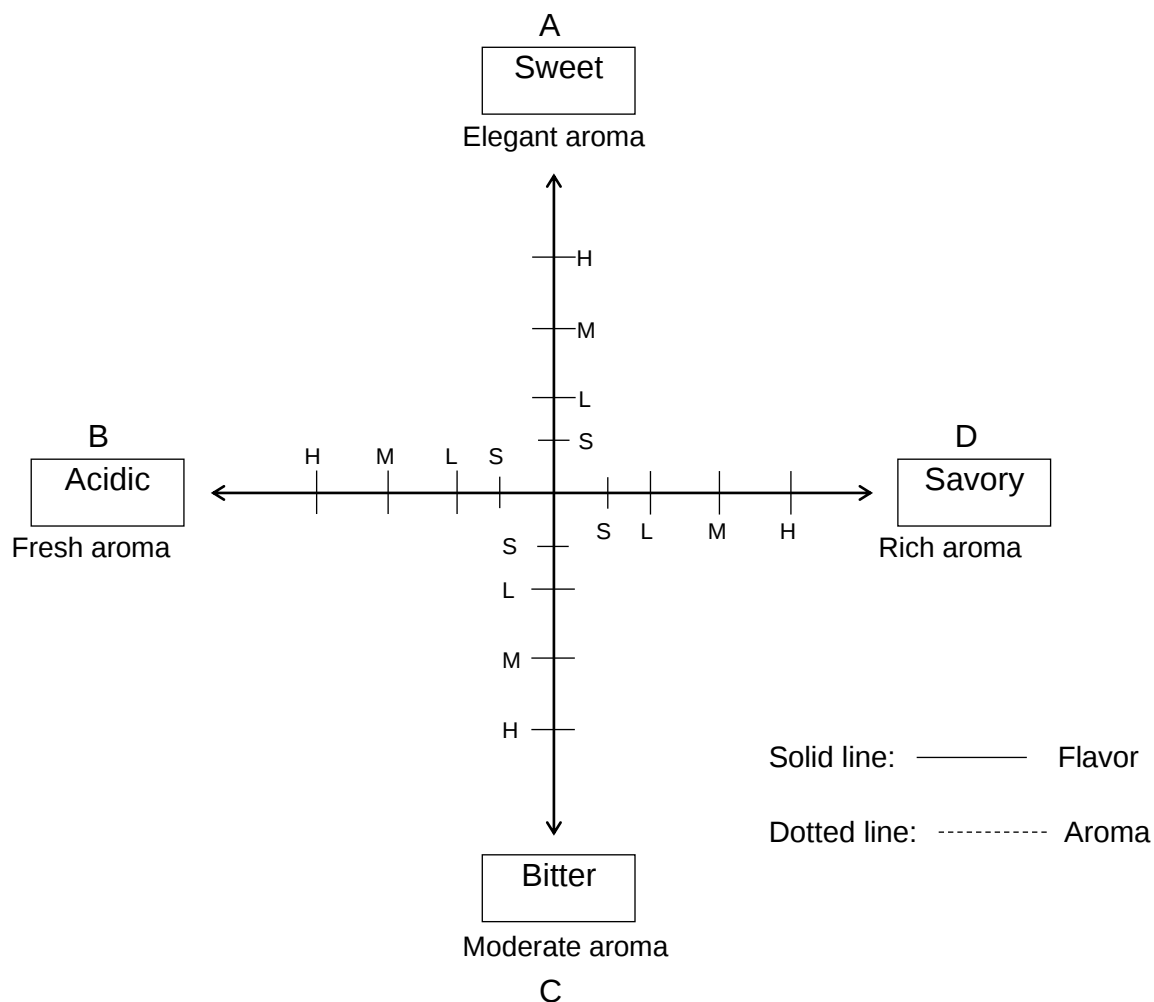
Matured sake

- Koshu is representative of this type. Can also apply to some junmai.
- Dark in tone with sherry-like aromas, heavy with judicious bitterness and a good finish.
- Contains high levels of hine-ka components, organic acids and amino acids.

2. Graph of the 4 types

There are clear differences in aroma and flavor between the 4 types. When you list the aromas and flavors of each type, and plot their strong and weak points on two axes, you get a graph of aromas and flavors that shows you how they all work together. We attempted to classify sake using the senses, by their aroma and flavor, and position them on the same 2 axes.

Here are some representative examples of the 4 types.



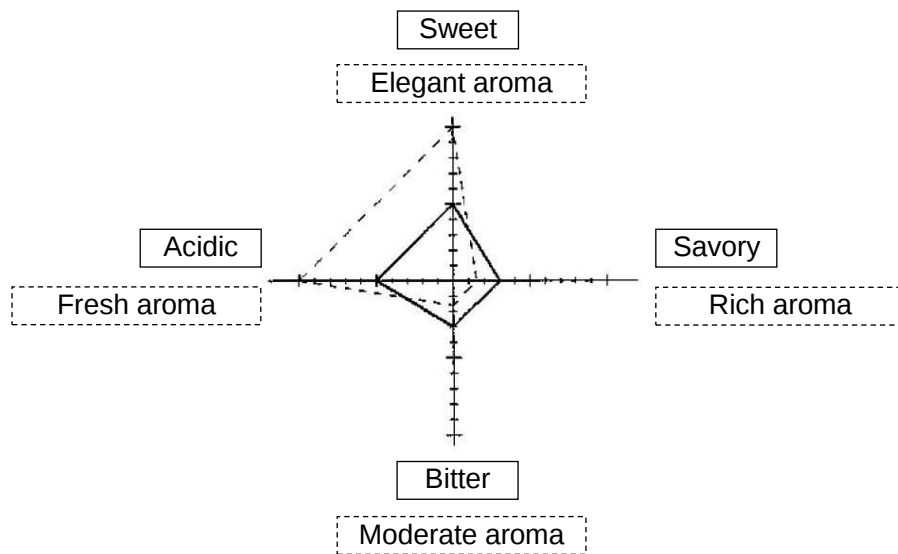
Concept of the axis graph

			Flavor	Aroma	Level
A	Sweet	with elegant aroma axis	(Sweetness and viscosity)	Fruity (sweet), floral, candy, etc.	Slight, low, moderate, high
B	Acidic	with fresh aroma axis	(Acidity or short finish)	Youthful, fruity (acidic), herbal, mineral, etc.	Slight, low, moderate, high
C	Bitter	with moderate aroma axis	(Depth of flavor or pleasantness)	Stone, wood, wild plants, spice, etc.	Slight, low, moderate, high
D	Savory	with rich aroma axis	(Umami or depth)	Grain, frankincense, honey, mushroom, nuts, etc.	Slight, low, moderate, high

Aromatic sake

Aroma: Characterized by strong, elegant and clear fruity or floral aromas, including powerful herbal and citrus fruit aromas which convey freshness. Has only a trace of aromas reminiscent of wood or spice, grain notes from the raw ingredients, or matured aromas.

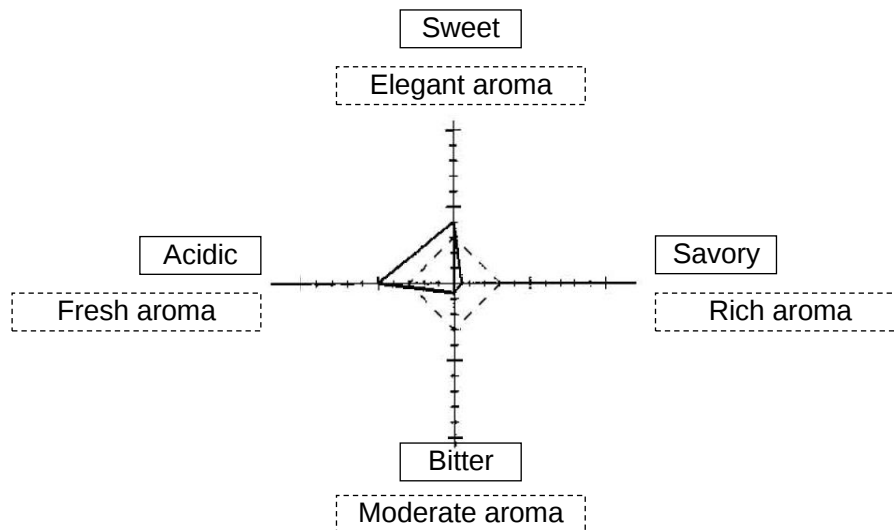
Flavor/mouthfeel: Moderate sweetness and viscosity, with balanced acidity that produces a refreshing flavor. Little bitterness or umami, resulting in a clear, fresh flavor. Highly aromatic in the mouth but has a short finish.



Light and smooth sake

Aroma: Overall moderate and restrained, with a touch of fruitiness and freshness. Few notes reminiscent of bitterness, such as wild plants, or rich aromas.

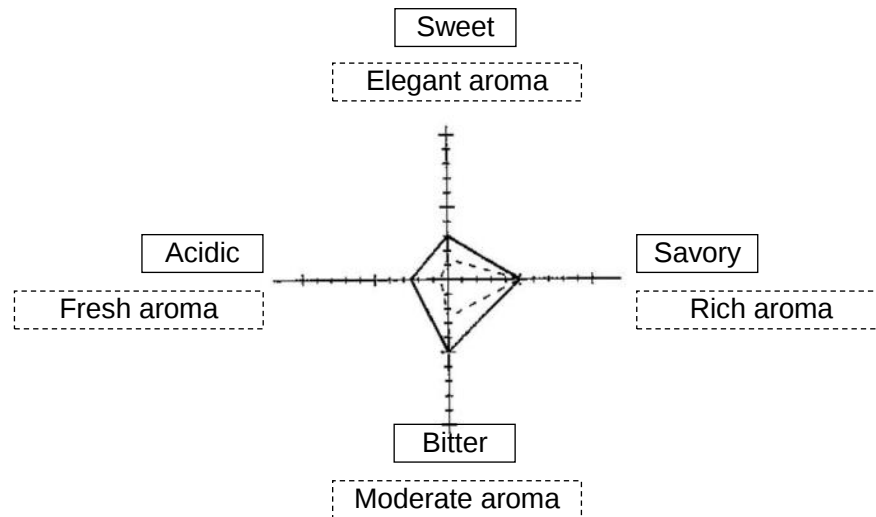
Flavor/mouthfeel: Smooth texture and refreshing flavor. Characterized by slight sweetness, fresh acidity and pleasant bitterness, which enhances the fresh nature of this type. Generally has no grain-like flavors or mature notes.



Full-bodied sake

Aroma: Very few fruity or herbal notes, instead has woody or stone notes, and lactic notes giving an impression of fullness, or complex savory aromas. Characteristically rich with mild aroma.

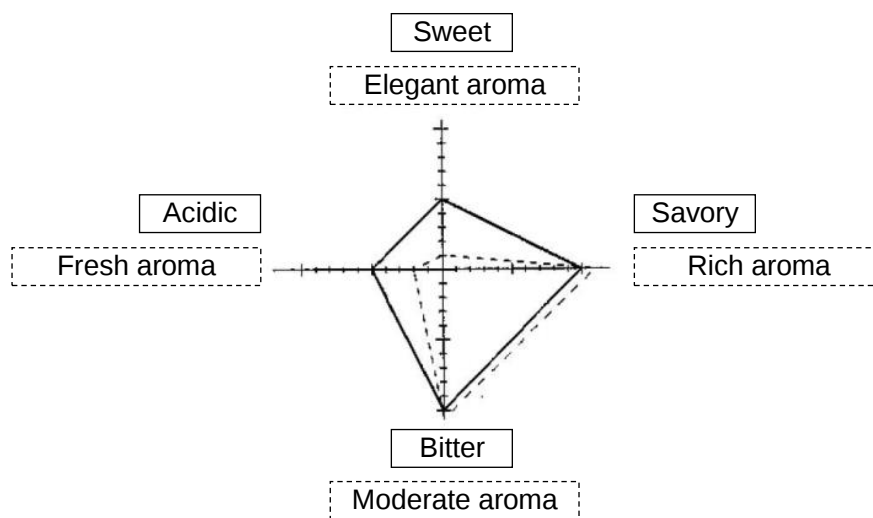
Flavor/mouthfeel: Sweetness and acidity harmonize with pleasant bitterness and rounded savoriness, producing a full and rich flavor.



Matured sake

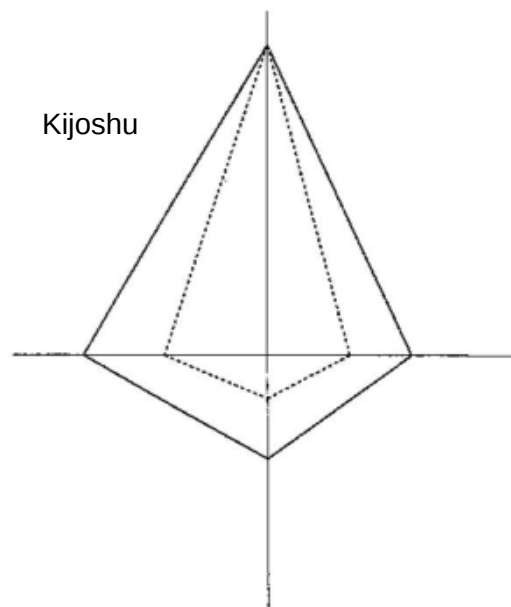
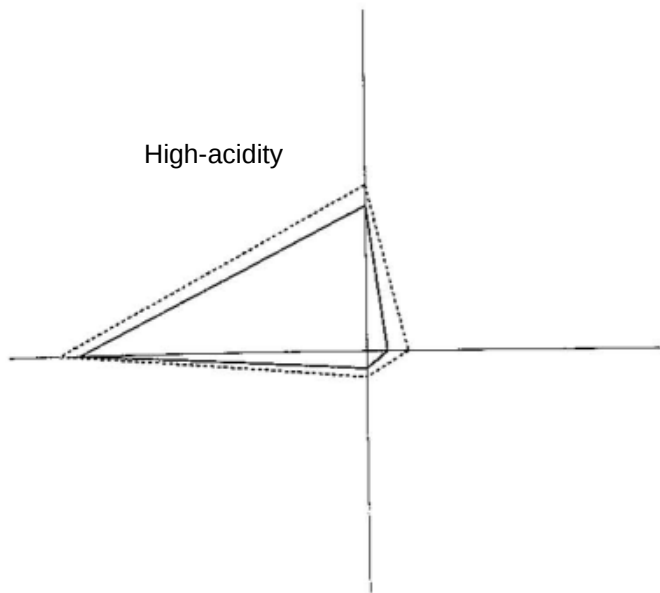
Aroma: Powerful and complex. Particularly rich in notes of dried fruit and grasses, spices and trees, and aromatic wood. Strong impression of heavy, mature savoriness with mushroom and nutty elements.

Flavor/mouthfeel: Sweet and viscous, balanced by refined acidity. Strong spicy and aromatic flavors, which make a strong impression in the mouth alongside mature, complex savoriness. Heavy finish which lingers for a long time.



Giving examples for these 4 quintessential types makes it possible to identify connections for sensory evaluation - aroma and flavor - for each one. There are also sake that cannot be clearly classified as one of the 4 types, and some types where a subset of aromas or flavors have been emphasized.

Examples



3. Origin of aromas and aroma terminology

Origin of Aromas

	Aromas
Aromas thought to come from raw ingredients	Steam from cooked rice, freshly-made mochi, fine rice flour Pleasant mineral aroma reminiscent of mineral water
Aromas thought to come from processing of raw ingredients	Steamed chestnut, mushrooms, shimeji, maitake, rice chaff, buckwheat chaff Wheat straw, Japanese hinoki cypress, Japanese beech, oak, fern, spice mix for toso
Aromas thought to come from the brewing process	Apple { Yellow apple: Deep, refined and elegant aroma Crispin, Fuji: Aroma with dynamic sweetness Ralls Janet: Tight, firm aroma that emphasises acidity Asian pear (nashi): 20th Century variety Western pear: Sharp with high-tone sweetness Muscat grape Banana { Intense sweetness, well ripened with skin turning brown Astringent and sweet, part of the skin still green Peach, muskmelon, Yubari King cantaloupe Citrus { Aroma of flesh when just opened Aroma of peel or oil Lime/green notes Lemon: high-tone acidity Orange: Sweet and rich Grapefruit, yuzu, kabosu: deeper acidity and fresh bitterness Persimmon, lychee, quince, fig Dried fruit: plum, pineapple, kiwi, papaya, mango Floral aromas: wisteria, narcissus, lilac, acacia, linden, Japanese kerria, peach, hawthorn like the leaves used to wrap sakura-mochi
Aromas thought to come from maturation	Nutty: almond, hazelnut, peanut (with/without skin), roasted chestnut, corn Caramel-like: cookie, crepe, wafer, Fino sherry, Amontillado, concentrated soy, browned butter, caramel, honey, dark sugar Spicy: clove, cinnamon, nutmeg
Origin unknown	Aromas like the air in a forest: moss or ferns Cooling aromas: mint Vegetal, root vegetable, water-like aromas: cress

	Bitter mineral aromas: Japanese butterbur bud Marine aromas: iodine aromas like nori or wakame
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Aroma Terminology

Aroma system	Aroma terms
Floral	Plum blossom, acacia, orange blossom, lotus, lily, lilac, violet, cherry blossom, white rose, lavender, osmanthus, sandalwood, camellia, magnolia, hawthorn, narcissus, linden, wisteria, Japanese kerria,
Herbal Grassy	Cherry leaf, thyme, lemon balm, clove, licorice, green pepper, cinnamon, mint, juniper berry, caraway, incense wood, bay leaves, tarragon, chervil, vanilla, cinnamon, nutmeg, green tea, rosemary, eucalyptus
Fruity (Sweet)	Lychee, melon, quince, apple, loquat, pear, banana, white peach, yellow persimmon, Muscat grape, dried fig, muskmelon, Yubari King dried banana, chocolate vine, 20th Century pear, mango, mangosteen,
Fruity (Acidic)	Lemon, apricot, pineapple, sudachi, green apple, cherry, raspberry, strawberry, lime, orange, grapefruit, unripe ume plum, kiwi, plum
Rice and grains	Rice ears, fine rice flour, freshly-made mochi, shiratako, azuki bean, kudzu, tofu, soba, warabi-mochi, brown rice, sakura-mochi, malt, sweet potato, glutinous rice
Woody	Green bamboo, bamboo, bamboo grass, magnolia leaf, buds, hinoki pine, Japanese sugi cedar leaf, dried leaves, washi paper, mushroom,
Nutty	Chestnut, cashew nut, peanut with skin, roasted chestnut, chestnut walnut, apricot, peanut without skin, cacao, coconut, hazelnut
Mineral	Mineral, spring water, charcoal, stone, oil
Vegetal	Cress, wax gourd, gourd, butterbur, mitsuba, Chinese cabbage, rape burdock, Japanese royal fern, bracken, butterbur bud
Other	Marshmallow, milk candy, fresh cream, smell of the sea, cookie, pastry shell of a cream puff, yogurt, hard candy, cottage cheese, butter, iso-nori, peat moss, soy milk, custard, ao-nori, konbu, cotton candy, sponge cake made with granulated sugar, molasses, wafer, domyoji-ko, honey, maple syrup, sherry, dried shrimp

Chapter 2: Serving Japanese Sake

1. Principles of service

The principles of sake service are surprisingly poorly systematized and documented when compared to wine. This may be because sake has existed in Japan for a very long time, and emphasis has therefore been placed on consumption according to local customs or personal preference. It is critical to carry out research from a different perspective, not based on these traditions and preferences, to determine how sake should be served in future so it will be more widely accepted and enjoyed by different generations and nationalities.

An accurate understanding of the characteristics of sake and how to serve it to the consumer makes it possible to enhance the inherent flavors of sake and give the consumer greater satisfaction in the form of sensory pleasure and enjoyment. An inquisitive mindset lets you identify ways of addressing many concerns.

Examples of important points to investigate for each of the 4 types are:

- Serving temperature
- Vessel
- Storage and aging
- Degree of compatibility with different dishes
- Plenty of examples of sake service
- Alternative preparations, such as cocktails
- Vocabulary for describing sake

Another major issue here is that there is little scope for bringing in measurement devices that can generate the data required for these investigations, so we have to rely on the senses for assessment.

The following is what we know so far through many different kinds of experiments. It goes without saying that more studies and more thorough and longer term research is needed.

2. Serving temperature

Sake has a wider range of serving and drinking temperatures than wine or beer, ranging from 5°C to 55°C.

Expressions for sake drinking temperature include not just chilled and warm, but also very vague indicators of warmth which have been sufficient in Japan until now.

Temperature can be roughly divided into cool, 5-10°C, room temperature, 10-20°C, and warm, 30-60°C. However, minor differences in temperature can influence the complexity of aroma or flavor for each type of sake.

The profile of all types changes noticeably within 1°C of 15°C, in other words between 14°C and 16°C, and start to come together around 35°C.

The table below shows evaluation at each temperature point.

Each evaluation is commented, and the key to the symbols is as follows:

✓ Orthonasal aroma (top nose) is most lively and flavor components are most balanced.

- Nuances of aroma and flavor are flattened.

✗ Balance of inherent profile is lost.

* Main transition temperatures.

All temperatures are of the sake inside the glass, and all quantities are 30 ml.

Temp		3°C	7°C	10°C	12°C	14°C	15°C	16°C	17°C	18°C
Type			*			*	*	*		
A	Light and smooth	✓	-	✓	✓	✓	-	-	✗	✗
B	Aromatic	-	-	✓	✓	✓	✓	✓	-	-
C	Full-bodied	-	✓	✓	-	✓	-	✓	-	-
D	Matured	-	✓	✓	✓	✓	✓	✓	✓	✓
E	Futsushu	✗	✗	-	-	✓	✓	-	-	-

Temp Type	19° C	20° C	21° C	22° C	23° C	24° C	25° C	30° C	35° C	40° C	45° C	50° C	60° C	70° C
	*					*		*	*		*	*		
A	X	X	X	X	X	X	X	X	-	X	X	X	X	X
B	X	X	X	X	X	-	-	-	-	-	X	X	X	X
C	-	-	-	-	-	-	-	X	-	X	X	X	X	X
D	✓	✓	✓	✓	✓	✓	✓	X	X	X	-	-	X	X
E	-	-	-	-	-	X	X	X	-	-	-	✓	X	X

Temp Type	On the rocks (1.5°C)
A	✓
B	-
C	-
D	✓
E	✓

A Light and smooth sake: Narrow temperature range. Between 10-14°C, or near freezing.

B Aromatic sake: Best temperature range is 10-16°C, gently warmed also possible, sweetness and acidity balance out.

C Full-bodied sake: Changes most dramatically depending on temperature. Extremely subtle.

D Matured sake: Widest temperature range, can be served between 7-25°C. Can also be heated.

E Futsushu: Room temperature or heated, best balance of flavor at 50°C.

3. Tasting of sake by serving temperature

When drinking sake, it is vital to understand how its aromas and flavors change with temperature, and use that understanding to set a serving temperature.

Here are examples of temperature difference.

		Aromatic sake	Light and smooth sake
55°C	AROMA	Rice aromas, reminiscent of soba or mugi shochu	Mochi, fine rice flour
	FLAVOR	Sweetness disappears. Alcohol stings the tongue Balance is lost, flavors can no longer be discerned	Tongue stung by alcohol Unpleasant bitterness in finish
45°C	AROMA	Fishy, steamed chestnut, steamed soybeans, chestnut blossom, baby powder, Maotai, fruity aroma (compote)	Aroma of steamed chestnut, steam from freshly cooked rice Scum when steaming
	FLAVOR	Balance of sweetness, acidity and bitterness improves Good balance overall Umami feels deeper overall, character of umami components is revealed Extremely dry after-impression in the mouth	First impression of sweetness, silky flavors Finish is dry with coarse bitterness, after-impression in the mouth is smooth
35°C	AROMA	Aroma of hard candy drops, reminiscent of vitamin C, aroma changes from pear to white peach, shirotamako Woody, floral aromas, candy, sensation of freshness disappears	Aroma of walnut skin and tree bark, dry almond, alcohol is noticeable
	FLAVOR	Tepid, bitterness loses its astringency, instead sweetness comes through and savoriness appears Lactic acid-type acidity becomes rounded acidity	Sweetness becomes smooth and increases, rounded savoriness appears, sweetness is clear but suppressed by acidity
25°C	AROMA	Aromas of grapefruit, apple, Western pear, sweet candy, melon, green tea, Osmanthus fragrans, complex aroma	Wood, sugi cedar plank, hinoki cypress, cherry, marshmallow, butter, Fuji apple, lotus, shiratomako, domyoji-ko
	FLAVOR	Sweetness and acidity are well balanced, savoriness becomes rounded Sugar content is relatively low, so overall light and smooth	First impression is fresh, smooth sweetness Lactic acid-type savoriness, subtly linked to bitterness

15°C	AROMA	Aroma shrinks Cress, green tea, jasmine-like aromas	Mineral (calcium, chalk), Muscat grape, woody aromas that feel dry
	FLAVOR	Sweetness is minimized, becomes hard and mineral Refreshing bitterness increases Sharp acidity appears	Flavor starts to come together Well-connected sweetness, acidity and bitterness, positive tactile sensation from temperature
10°C	AROMA	Sweet aroma returns, steamed Western pear Refreshing aromas disappear, but there are hints of apple and Prince melon	Mild, woody aromas disappear, Notes of apple and rice chaff, complex aroma emerges with cherry, marshmallow, sakura-mochi
	FLAVOR	Flavor no longer detectable due to cold temperature Due to temperature flavor of lingering notes is felt at the back of the mouth	Acidity becomes sharper, hidden acidity also becomes sharper Acidity becomes concentrated, no bitterness Apple and woodiness in the retronasal aroma
5°C	AROMA	Bean sprouts, cress, jasmine, soy bean, soy milk, grapefruit, fresh lemon, leaves of oolong tea	Aroma decreases, hints of sakura-mochi, marshmallow, mizu-ame Aroma disappears
	FLAVOR	Cold so feels extremely dry Inside of mouth becomes dry Flavor appears suddenly in the mouth as the sake warms up	No flavor Impact is lost

		Full-bodied sake	Matured sake
55°C	AROMA	Straw, rice husks, boiled egg	Stings the nose, aromas such as almond, concentrated smell of yolk of boiled egg, barley straw become stronger
	FLAVOR	Sweetness disappears, savoriness is most strongly emphasized Umami and lactic-type acids with depth come to the forefront Flavors of chestnut savoriness, shiitake, sea vegetables increase	Feels dry as it pricks the tongue, front half of the tongue is numbed, rear half is tickled
45°C	AROMA	Sponge cake, kirsch, steamed bread Aroma is well balanced, but lactic notes are reduced	Sweet miso aroma disappears, flavors of caramel and nuts, notes of roast almond, peanut, custard, alcoholic smell disappears
	FLAVOR	Overall flavor is harmonious, overall savoriness and bitterness are integrated Level of flavor is high, depth is felt	Flavors become soft, first impression is higher sweetness, so it engulfs savoriness and bitterness From first impression to lingering
35°C	AROMA	Alcohol mellows Creamy aromas, aroma of cottage cheese appears (lactic acidity)	Increase in savory aromas suggestive of miso, soy sauce, mushroom, iodine (sea vegetables), caramel, etc.
	FLAVOR	Balance of sweetness and savoriness is harmonious, overall flavors become fuller but fresh acidity disappears	Sweetness becomes stronger and bitterness (burnt flavors) appears, lingering notes have strong savoriness with aromas of miso and iodine After-impression in the mouth is dry, and the mouth dries out
25°C	AROMA	Lactic aromas such as yogurt and fresh cream Lotus, pheasant's eye, fig, banana, daikon radish, turnip	Roasted chestnut, miso, nuts, cashew nuts, pistachio, hazelnut, white pepper, mushroom, marshmallow, butter, candy, apricot, dried fig, Osmanthus fragrans, aromatic wood, pine resin, sugi cedar resin Aromas come together
	FLAVOR	Swells roundly, sensation of rounded acidity that gives the impression of savoriness, extremely well balanced	Good balance of soft savoriness and acidity Bitter notes of nuts, fragrant wood, hazelnut skin and spices in the finish, turning to savoriness and providing long-lasting lingering flavor.

15°C	AROMA	Aroma weakens, hints of domyoji-ko, cherry, sponge cake Fruity and yogurt-like aromas decrease, grainy aromas appear	Turns mild and flavors come together Aromas of butter and candy, cashew nuts, pancakes, custard Aggressive and complex aromas decrease, rounded aromas increase
	FLAVOR	Sweetness falls, refreshing acidity appears Bitterness like cress or turnip suddenly appears	First impression is of viscosity Savoriness and flavors that bring depth become concentrated, savoriness and sweetness decrease
10°C	AROMA	Smell of alcohol, aromas of kirsch and Astragalus sinicus, hint of mochi Lactic aromas no longer detectable	Aroma disappears Iodine smell reminiscent of savoriness appears Aroma of fresh yuba and fermenting soybean koji, koshu aroma is reduced
	FLAVOR	First impression is reminiscent of minerality Fresh acidity completely engulfs sweetness, mouthfeel becomes dry and smooth	Rounded second half transitions to fairly sharp, refreshing acidity, bitterness (of root vegetables) in finish, Korean ginseng, light savoriness which lingers smoothly Aromas in the mouth are plain wood, wood, white pepper
5°C	AROMA	Aroma is reduced, aromas of charcoal fire, charcoal, coke,	Bitter, Korean ginseng, iodine smell, shrimp shell
	FLAVOR	Sensation of hard minerality, refreshing acidity and bitterness, but depth disappears	Mouthfeel becomes light, sweetness is suppressed and acidity becomes more lively Green vegetable bitterness and nutty astringency appear Retronasal aroma is fragrant and astringent, Korean ginseng

4. Basic order of service

From a physiological perspective, the tongue's sensitivity and ability to perceive depend on experience, and require stronger stimulation over time. So the principles for serving several sake in succession are:

- From sake with simple aromas to more complex types.
- From ones with smooth and refreshing flavors to more complex and full-bodied types.
- From ones with light flavors to heavier types.
- From ones drunk chilled to types drunk at room temperature.
- From ones with fresh flavors to aged types.
- From dry ones to types rich in umami.

The sake must be set out in this order.

5. Serving vessels

Vessels (glasses) for drinking sake come in different shapes, and produce remarkable changes in the aroma and flavor of a sake.

Here we will focus on vessels that have until now been chosen or offered indiscriminately by bar or restaurant owners, or individual consumers.

There are subtle differences in the composition of components in the 4 types of sake. Their aromatics and the time it takes for them to emerge are all different, and they change their expression continuously from the moment the sake is poured from the bottle into the vessel. Differences in the construction of each vessel lead to differences in how these changes occur. The main causes of change are as follows.

Air contact

Activation and suppression of esters and aroma components through oxidation is affected by the surface area exposed to air. A larger area causes faster oxidation and more volatilization.

Speed of temperature change

Pouring a small amount of sake into an unnecessarily large vessel results in fast temperature change. Conversely, the opposite happens with a vessel that is too small. It is vital to serve an appropriate amount.

Vessel shape

The amount of air flowing in to the vessel is affected by its total capacity, maximum surface area and distance (height) between the surface of the sake and where the consumer drinks from (rim) when the appropriate amount for the vessel's total capacity (amount required) is poured, as well as the diameter of the rim and angle of the vessel wall. The amount of air then affects speed of oxidation and degree to which aromas are concentrated, as well as the quantity of sake and position where it falls onto the tip of the tongue.

Vessels can be classified into the following shapes:

a: Deep dish b: Funnel c: Trumpet d: Cylinder e: Oval
f: Balloon g: Gourd h: Apple

A	b	c	d
			
E	f	g	h
			

The same sake, poured into any of these vessels, will react and change to a greater or lesser extent depending on the following.

- Quantity of sake poured: alters the relative proportions of sake and air.
- Initial temperature of the sake
- Time since the bottle was opened
- Cleanliness of vessel: dirt or smell

With the above in mind, a combination of 45 shapes of glass and quantities of sake were used to test the same quantity of each of the 4 types of sake, observe how they reacted, and determine which shape was generally suited to each type.

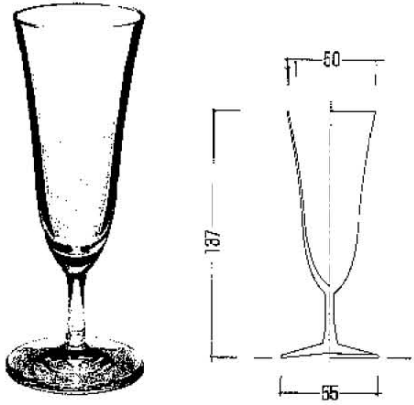
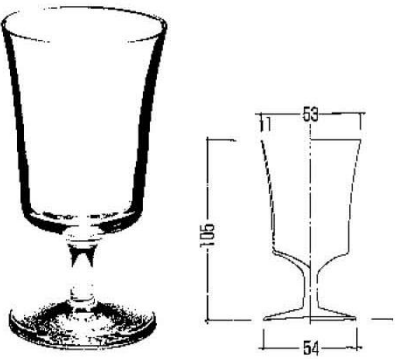
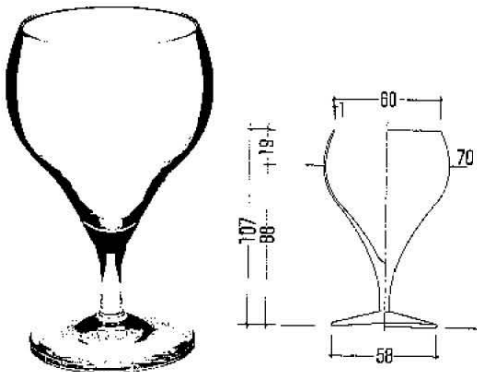
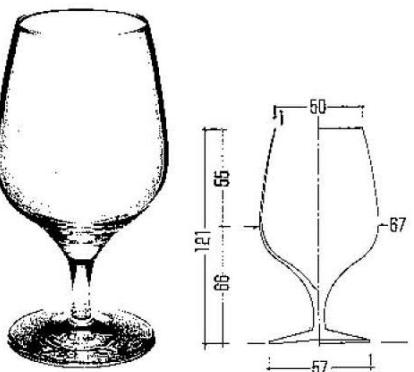
Applicable to all types

- Amount: The flavor of a sake is not communicated in vessels with capacity 60 ml or less (for sake served at room temperature).

When 180 ml of sake is poured into a 450 ml or larger vessel, the changes go too far, or aroma dissipates.

- Diameter: A glass of any shape with a rim diameter of 2 cm or less does not allow aromas to be perceived.
- Shape: A gourd-shaped glass of any size pares off major aroma components, or emphasizes only components that are volatile to some extent. In other words, this shape distorts aroma.
- Other: The ISO tasting glass is suitable for any type.

Suitable glasses for the 4 types of sake: at temperature 10°C, 60 ml poured

 A (light and smooth sake) 70-110 ml in a trumpet-shaped glass.	 B (aromatic sake) 120-175 ml in a cylindrical glass, or a near-cylindrical trumpet-shaped glass.
 C (full-bodied sake) 200-250 ml in an oval glass.	 D (matured sake) 300-360 ml in a tall oval glass.

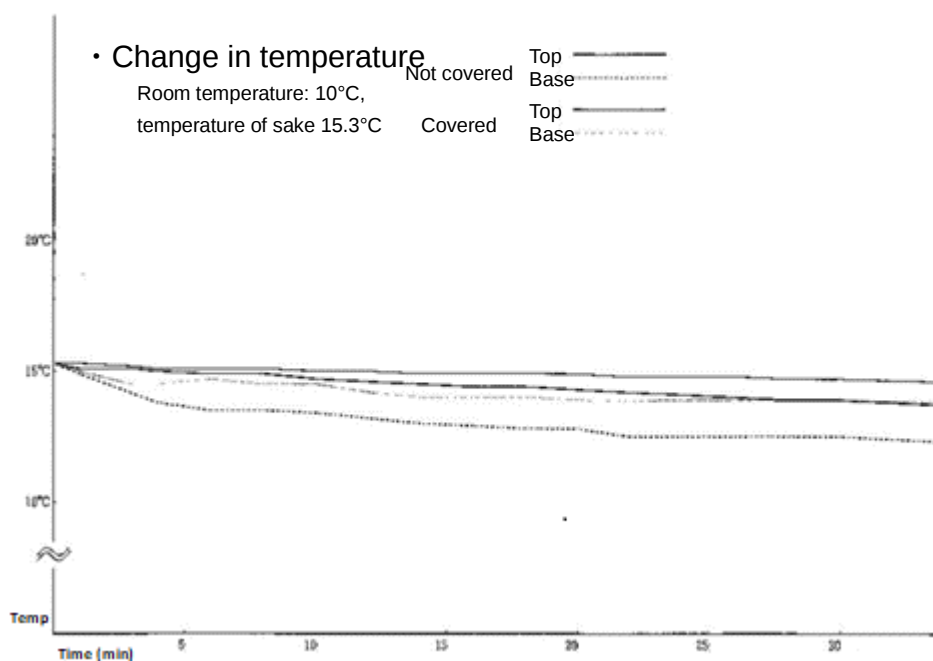
That is all for this topic for now.

5. Relationship between time and serving temperature

Any thermometer used should measure in 0.1°C increments and have a range of -20 to 100°C

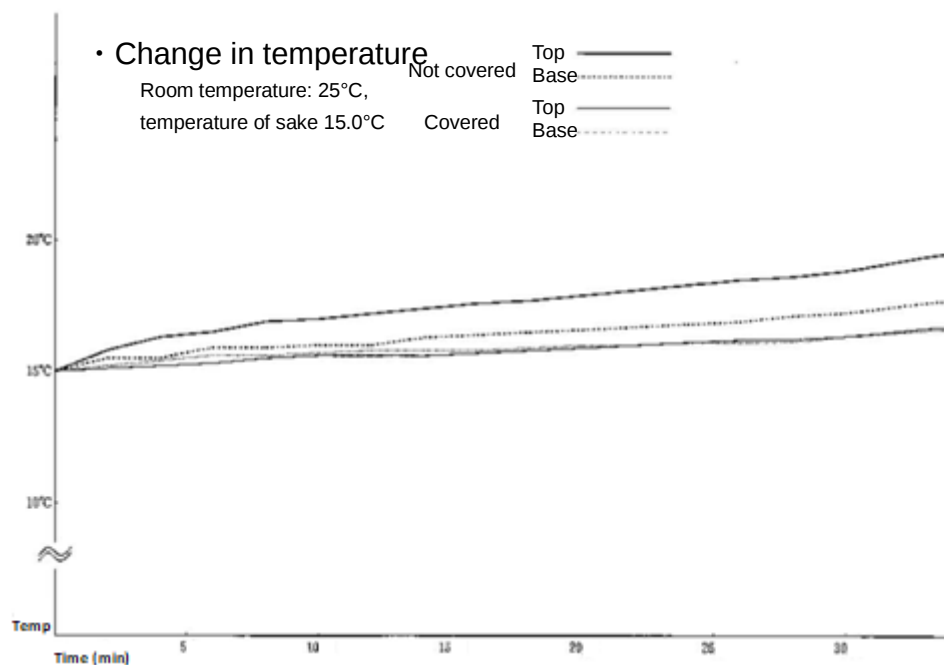
(1) 720 ml bottle, sake temperature 15°C , room temperature 10°C

Difference in temperature of sake at the top and bottom of the bottle, with and without an insulating jacket (Graph 1).



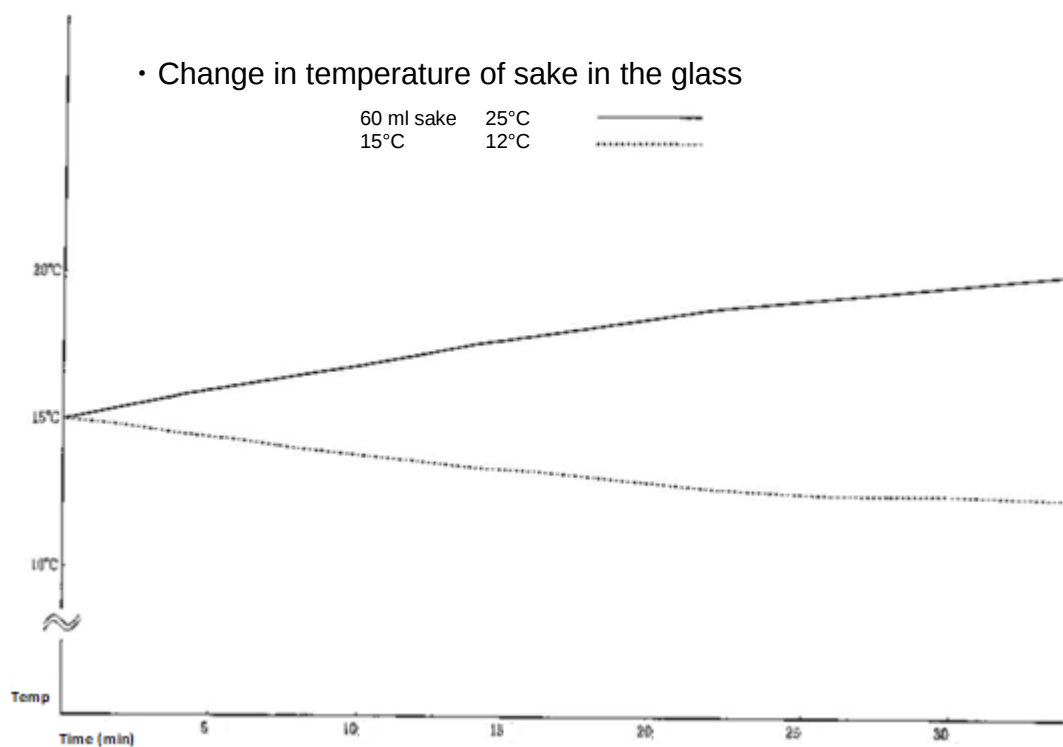
(2) 720 ml bottle, sake temperature 15°C, room temperature 25°C

Difference in temperature of sake at the top and bottom of the bottle, with and without an insulating jacket (Graph 2).



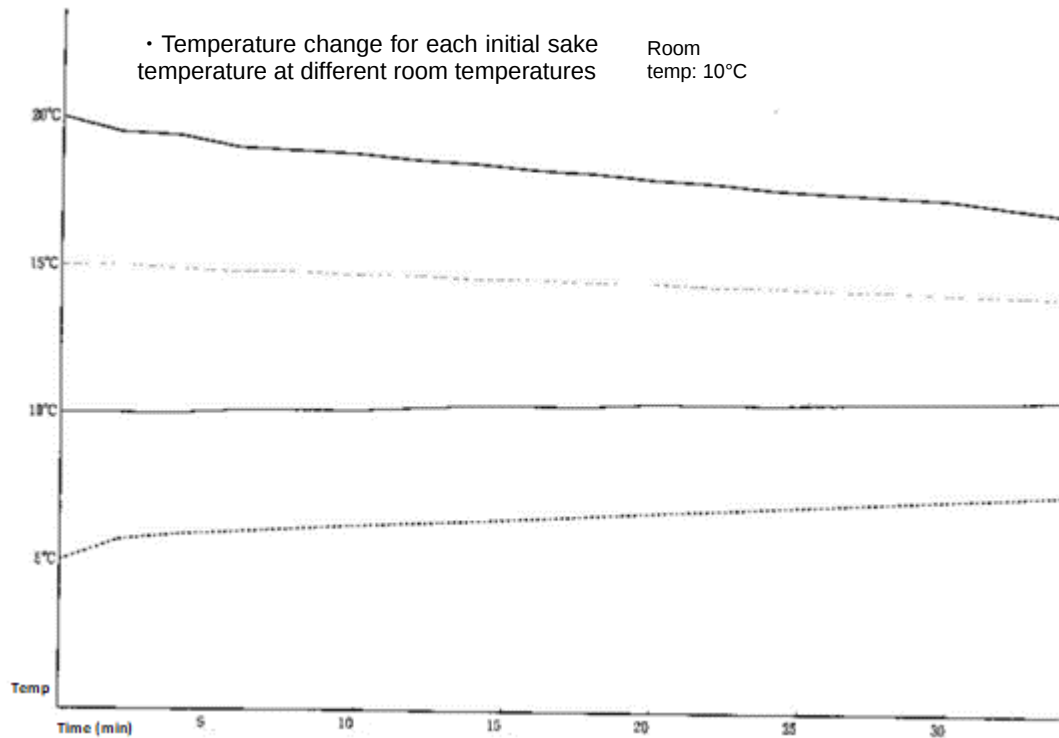
(3) Change in temperature of sake in the glass, standard temperature 15°C

At room temperature 25°C and 10°C (Graph 3).



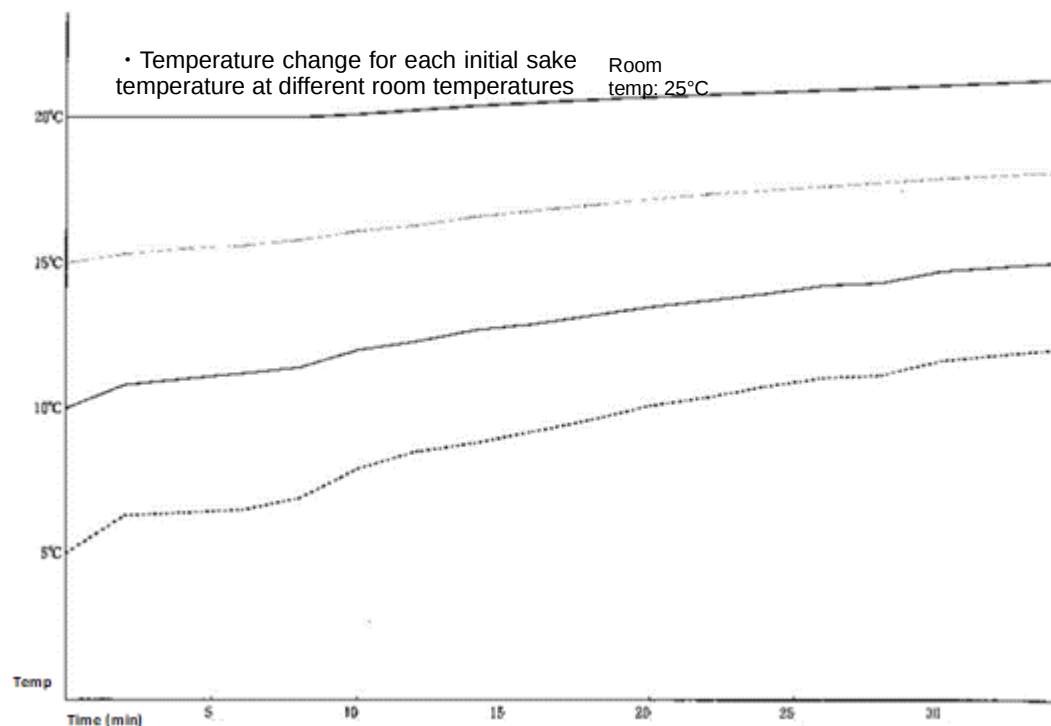
(4) 720 ml bottle, change in temperature of sake from different initial temperatures, at room temperature 10°C

Initial sake temperature 5°C, 10°C, 15°C, 20°C (Graph 4)



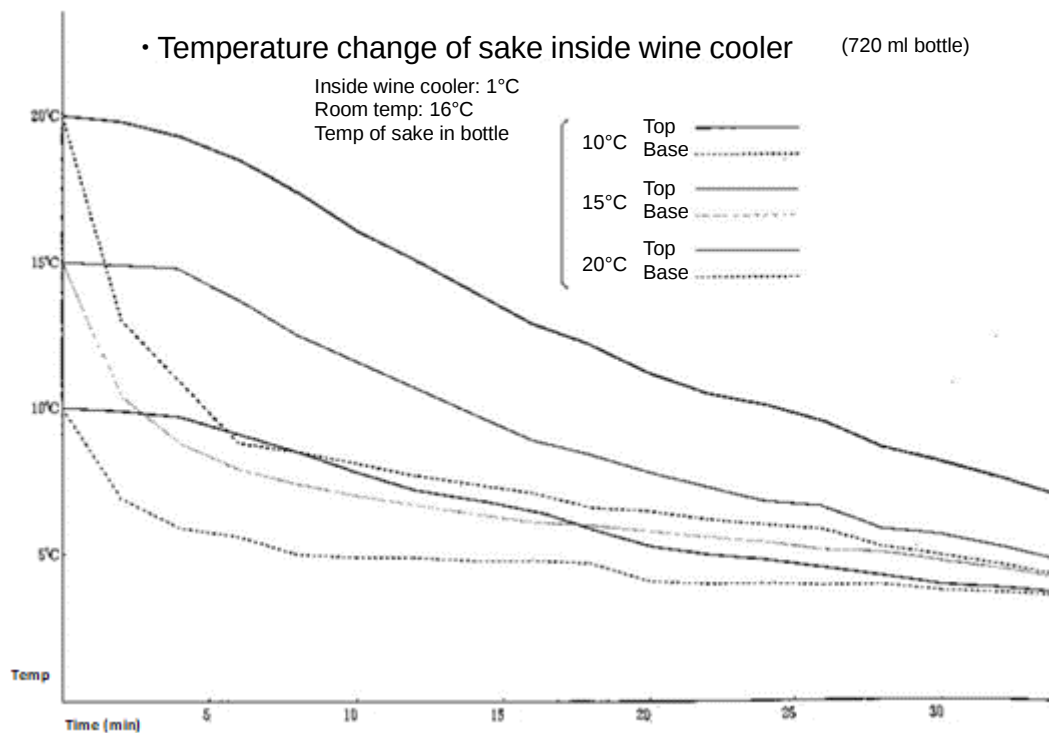
(5) 720 ml bottle, change in temperature of sake from different initial temperatures, at room temperature 25°C

Initial sake temperature 5°C, 10°C, 15°C, 20°C (Graph 5)



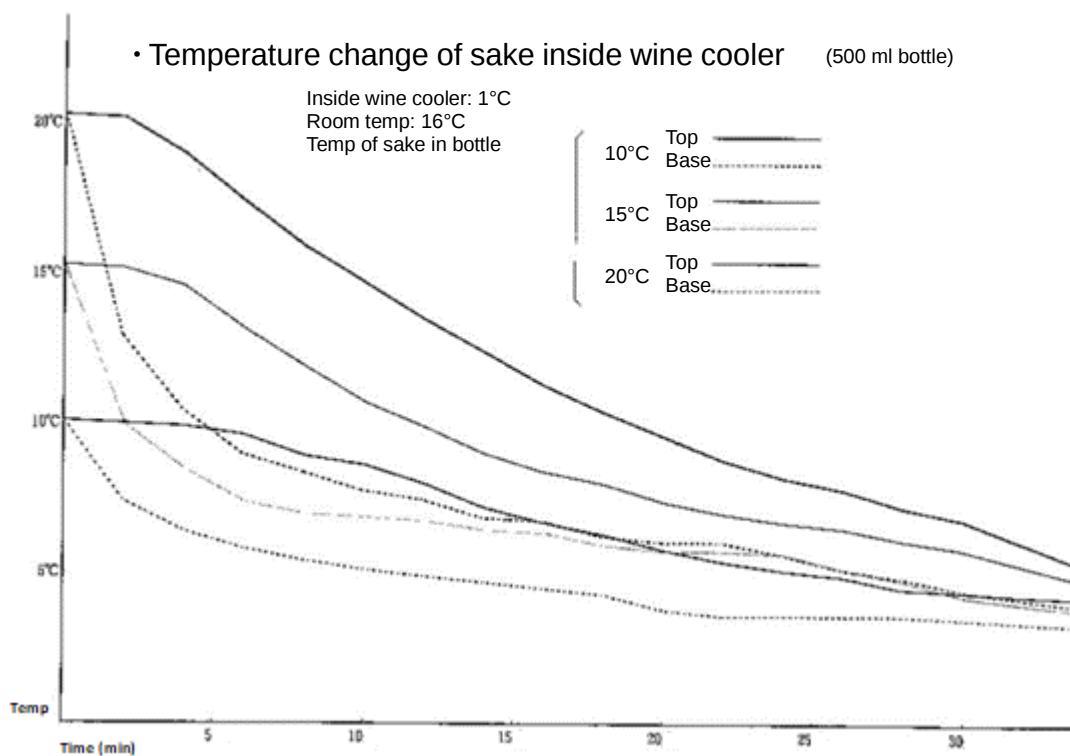
(6) Chilling sake in a wine cooler, temperature change, 720 ml bottle, ambient temperature 15°C

Initial sake temperature 10°C, 15°C, 20°C (Graph 6) Temperature difference between top and bottom of bottle



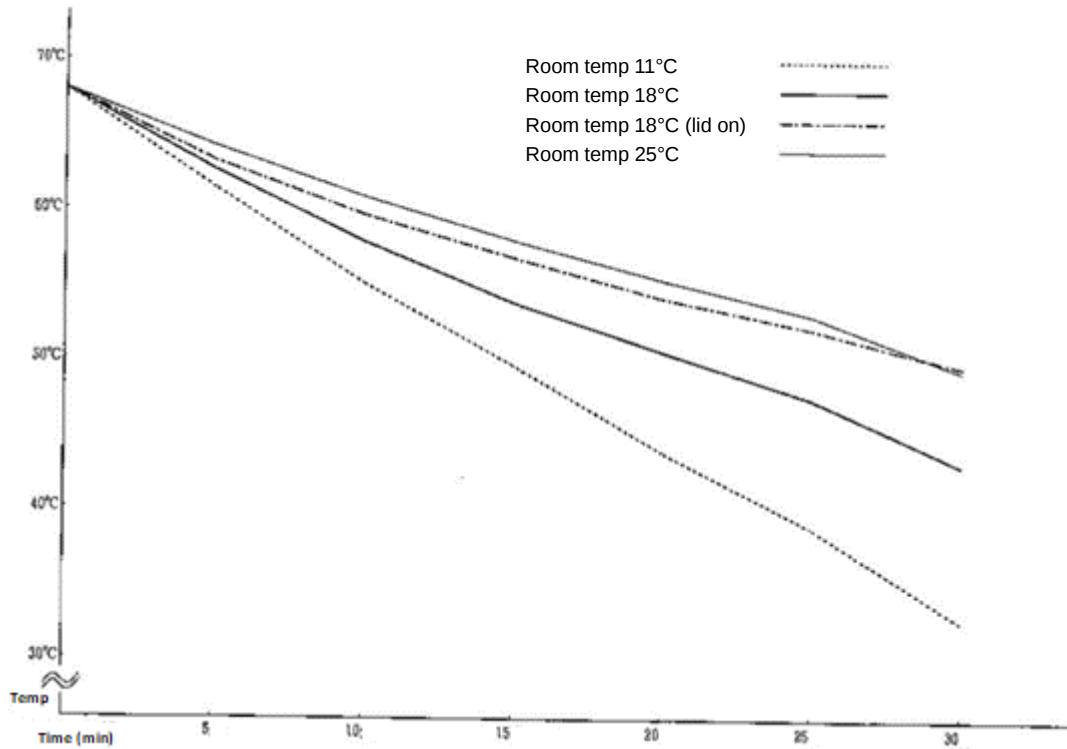
(7) Chilling sake in a wine cooler, temperature change, 500 ml bottle, room temperature 15°C

Initial sake temperature 10°C, 15°C, 20°C (Graph 7)



(8) Time for warmed sake to cool, standard sake temperature 70°C, room temperature 25°C, 18°C, 11°C

Warmed sake (15°C to boiling) allowed to cool, 70°C to 35°C (room temperature 18°C, left to stand for 35 min) (Graph 8)



(9) Methods of warming sake

Target temperatures 35°C, 50°C, standard temperature always 15°C, flask containing 200 ml

- a: Using boiling water - 97-98°C
- b: Using hot water at target temperature - Using water at 35°C Using water at 50°C.
- c: When raising from water temperature - from 1.4°C ice water. From 12°C water.
- d: Heating in microwave (set to 500 W)

(10) Time required for heating and effect on flavor

Method of warming and temperature °C	a Heating with boiling water	a Heating with boiling water	b Heating with water at 35°C	b Heating with water at 50°C	b Heating with water at 50°C	c Heating from ice water
Standing time	1 min 40	2 min 30	17 min 30	4 min 30	16 min 00	6 min 30
A	✓	✓	-	✓	✗	-
B	✓	✓	✗	✓	-	-
C	✓	✓	-	✓	-	-
D	✓	✓	✗	✓	✓	✓

Method of heating and temperature °C	c Heating from ice water	c Heating from water temperature	c Heating from water temperature	d Heating with microwave	d Heating with microwave
Standing time	9 min 00	4 min 30	6 min 30	40 sec	55 sec
A	-	✗	✗	✗	✗
B	-	-	-	-	✗
C	-	-	-	-	✗
D	✓	-	-	-	✗

✓ Changes in a straightforward way from room temperature, retains the original flavor of the sake.

- Nothing particularly unpleasant in the aroma or flavor.

✗ Aroma and/or flavor unbalanced, original aroma and flavor lost.

Chapter 3: Sake and Food

1. Need for research into compatibility between sake and food

Sake is a prized cultural tradition for the Japanese, a treasure formed from rice produced by fertile soils, koji grown under tightly controlled conditions, crystal clear water that springs forth from the earth, and the steadfast commitment of sake brewing artisans.

Japan has always been blessed with areas of fertile sea and land, as well as a rich culture of food preservation that has produced inventive dishes and ways of eating.

Both sake and Japanese cuisine have adapted to the passing of time without losing their essential nature.

However, it is difficult to study compatibility of food and sake by classifying combinations of sake and traditional side dishes. There are many barriers, such as local customs and order of food preparation, as well as individual drinking styles. There is no clear and simple method of food pairing like there is for wine in the West.

While keeping this state of affairs in mind, we must recognize that we live in the modern world with its high mobility of people and goods, increasing internationalization and demand for a healthier food culture. We must start our search from here, and from the perspective of passing sake and food culture down to the generations to come.

Pursuing this line of thinking, we will first look at connections between sake and the style of cooking which seems furthest from it, namely French cuisine. Then we will investigate the compatibility of sake with familiar Japanese home cooking, then do the indisputably necessary work of filling in the space between them.

2. Effect of sake on food

- (1) Water content: dilutes salt, some amino acids and seasonings such as spices
- (2) Alcohol: works on most oils and fats, softens protein components
- (3) Acidity: works on fats and protein. Makes salt content feel gentler
- (4) Sugars: Make the inside of the mouth smooth and soften acidity

(5) Amino acids: Support the flavors in the dish, make the finish more complex and refreshing

3. Reaction on the palate when combining sake and food

Evaluation of compatibility with food relies heavily on personal preference. However, based on the results of many studies, compatibility between sake and food can be classified into one of the three following reactions irrespective of race, gender, age or place of residence.

A: Clashing - produces unpleasant flavors when the food and sake (or their flavors) meet in the mouth

B: Neutral - No significant change. Includes cases where the sake adds to or cancels out the food (or flavors) in the mouth

C: Harmonious - produces positive flavors not present in either the food or sake alone, they combine powerfully to produce a resonant harmony

4. Compatibility between the 4 types of sake and specific components in food

(1) Aromatic sake: draws out the flavor of fish and shellfish

(2) Light and smooth sake: suited to food with little lactic acidity, such as fish and shellfish, rather than red meat. Strong action of washing away oils and fats in the mouth

(3) Full-bodied sake: suited to foods with high amino acid content

(4) Matured sake: Suited to meat with lots of lactic acidity, high-protein dishes

5. Compatibility of sake and French cuisine

(1) Main components of French cuisine

Animal proteins: Meat and poultry, gelatin, etc.

Oils and fats/animal oils and fats: butter, cream, meat, oil in fish, etc.

Vegetable oils and fats: olive oil, walnut oil, sunflower oil, etc.

Salt: mostly contained in sauces.

Sugar: mostly contained in sauces. Fruit, fruit wines and liqueurs, honey, etc.

Amino acids: components of protein or fermented foods, anchovies, cheese, sake, etc.

Acids (lactic acid): contained in red meat

(Other acids) contained in sauces or dressings

Acids from citrus fruit, vinegar, fruit wines/liqueurs

Spices/herbs: used to season dishes

Other: vegetables, flour, nuts and seeds, garnishes, steamed vegetables, raw vegetables, etc.

Most of the components above are not water-soluble but instead fat-soluble.

(2) Compatibility with French cuisine

- The effect of sake in the mouth does not change with the salt content of the ingredients or the dish.
- Sweetened dishes do not change the balance of the sake (making acidity prominent, etc.).
- Sake almost never emphasizes fishiness in marine products, and in particular does not create negative flavors or odors from caviar, cod roe or other fish eggs.
- Sake does not react with side dishes such as fermented food or salted pickles.
- Does not clash with fresh fruit. For example, melon and ginjo or strawberries and aged sake are harmonious combinations.
- Sake is generally tolerant of dishes containing any vinegar.
- The characteristics of sake allow it to blend well with soup, potage and consommé.
- The range of amino acids in sake amplifies the savoriness in most fish, shellfish and meat.
- Sake is not overwhelmed by wasabi, mustard or other strong condiments.

This quality is not seen in fruit wines and liqueurs, beer, grain alcohols or spirits.

Sake also:

- Acts to dissolve animal and vegetable oils and fats.
- Is highly compatible with dairy products, cream, butter and cheese.
- Combines well with flour-based products such as pastry and French bread.
- Combines well with flavors of dishes with roasted or highly fragrant notes.
- Harmonizes adeptly with highly aromatic secondary ingredients such as herbs, aromatic vegetables and spices.
- Supports citrus fruits used during cooking, such as lemon, lime, yuzu and kabosu.
- Is particularly compatible with many kinds of hors d'oeuvre served as part of French multi-course meals.

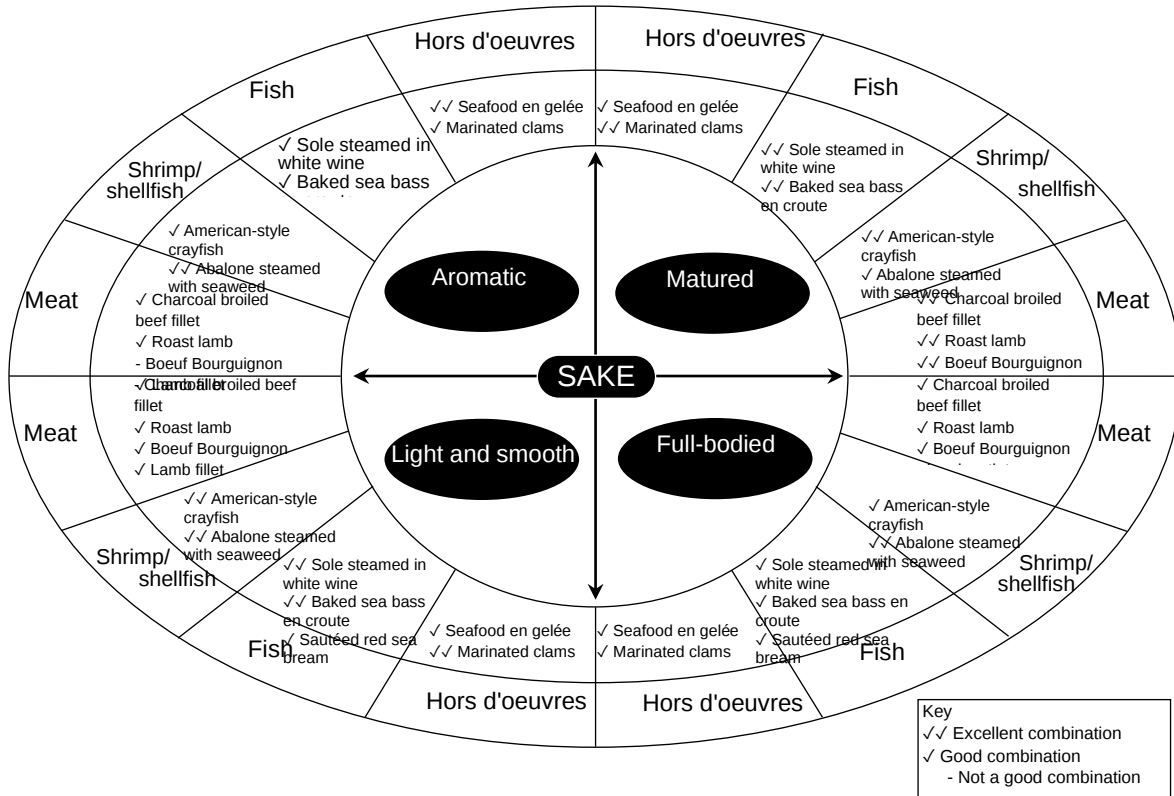
As you can see from the above, sake does not clash with the vast majority of ingredients and cooking methods. It also does not distort the flavor of dishes, instead possessing a wide-ranging ability to add to, take away from or harmonize, which means it has extensive potential for use.

(3) Model of compatibility with the 4 types

Further developing the patterns of compatibility described above, the following permutations present themselves when we try pairing sake with French multi-course meals.

Dish		Sake
Hors d'oeuvres	← →	Aromatic sake
Fish dishes	← →	Light and smooth sake
Shrimp and shellfish dishes	← →	Full-bodied sake
Meat dishes	← →	Matured sake

Compatibility of sake types and French cuisine



6. Compatibility of sake with Western-style, Japanese and Chinese cuisine

(1) Compatibility with Western-style cuisine

Aromatic sake: tends to need careful pairing

This sake has the strongest aroma of the 4 types, with a complex mixture of notes including fruity, floral and forest-like, producing a spectacular overall bouquet that tends to need careful pairing. This type is more compatible with dishes such as fish or vegetables with butter or cream.

Light and smooth sake: overall good compatibility with Western-style cuisine

Gentle in both aroma and flavor and harmoniously balanced. This makes it compatible with a wide range of dishes, particularly those with subtle flavors or dishes with ingredients with their own slight sweetness.

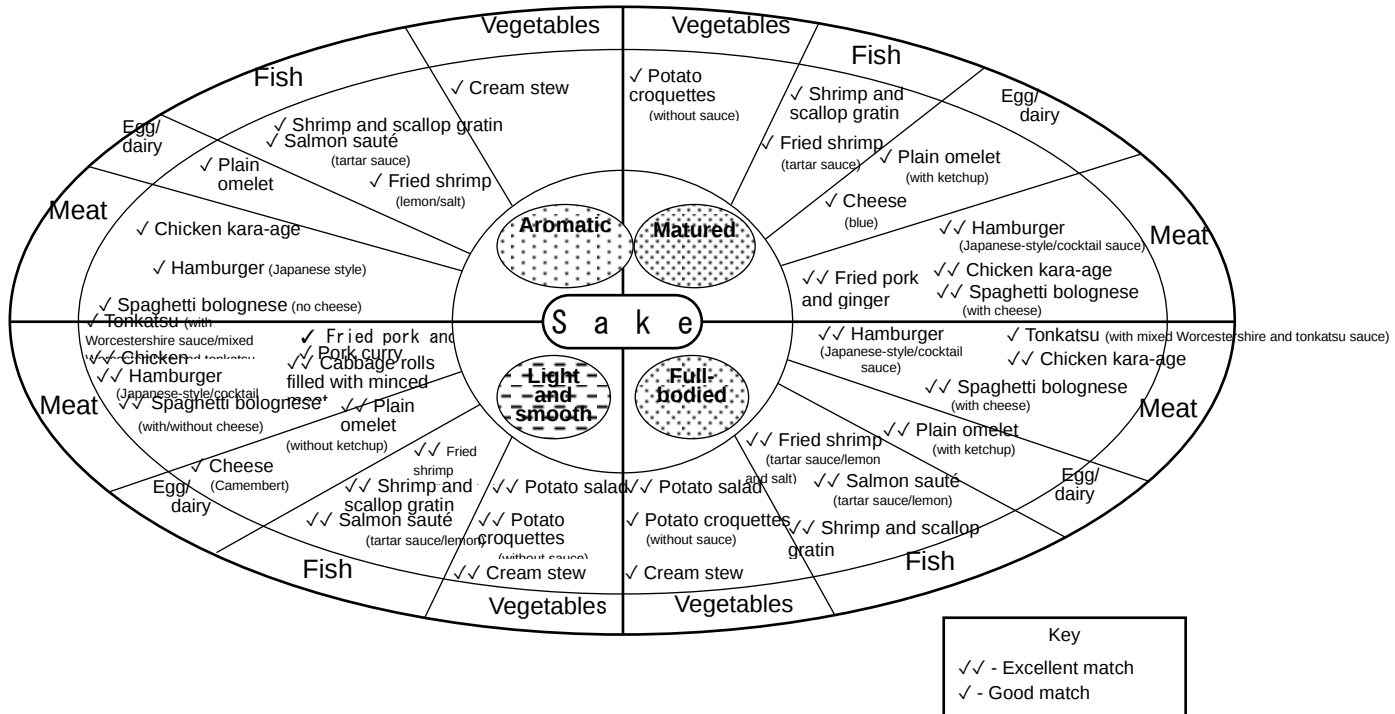
Full-bodied sake: pairs well with strongly flavored dishes

Aromas are fragrant, reminiscent of dairy produce and grains. Flavor contains an appropriate level of pleasant acidity, followed by harmonious bitterness which gives depth to the finish and makes it a good pairing for strongly flavored dishes.

Matured sake: pairs well with meat dishes or fatty dishes with strong flavors

Highly complex aroma of mixed spices, nuts and iodine, with an overall balance of flavors. Features layers of umami and flavor, making it a good match for rich and heavy dishes.

Western-style dishes compatible with sake (examples)



(2) Compatibility with Japanese cuisine

Aromatic sake: also tends to need careful pairing with Japanese food

Light and smooth sake: goes well with any dish regardless of ingredients or depth of flavor

Full-bodied sake: compatible with a wide range of dishes

Matured sake: has the most distinctive and different character of the 4 types, goes well with rich and heavy dishes or fatty dishes

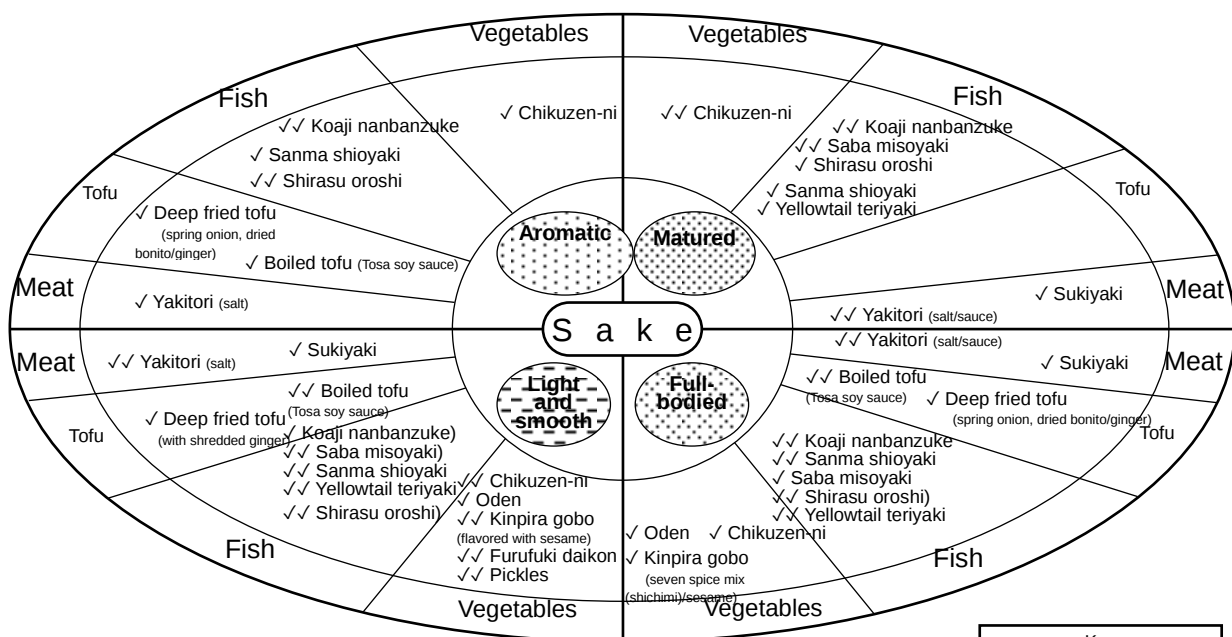
Potential for expansion with Japanese cuisine and sake

The hint of sweetness and spiciness in shredded daikon radish makes sake refreshing, and brings the flavors of the dish and the sake together.

Soy sauce is essential for elevating the compatibility of sake and food.

As sake has both umami and sweetness, if the ingredients or the dish are also sweet and savory the flavors will synergistically enhance each other.

Japanese dishes compatible with sake (examples)

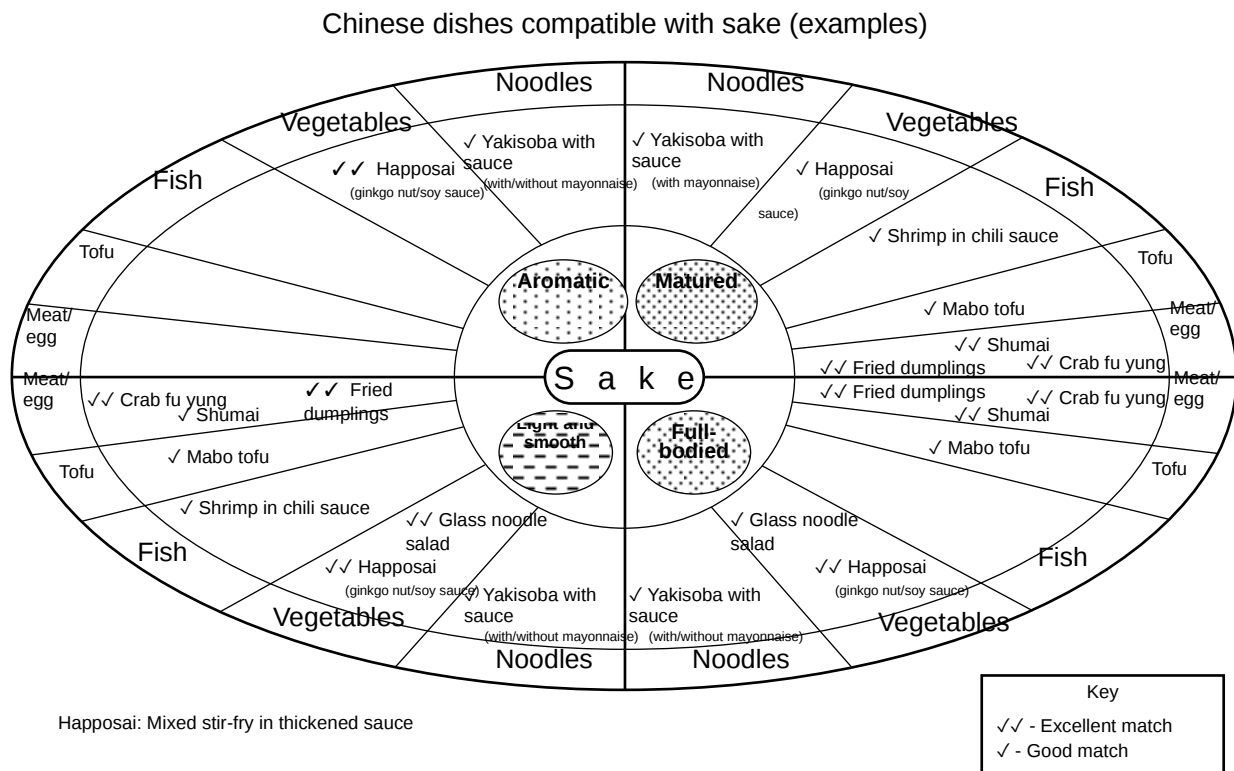


Chikuzen-ni: Chikuzen style boiled chicken and vegetables
 Kinpira gobo: Burdock root and carrot with sweet soy sauce
 Furufuki daikon: Daikon radish topped with miso
 Koaji nanbanzuke: Small horse mackerel marinated in vinegar and fried
 Sanma shioyaki: Salted and grilled pacific saury
 Shirasu oroshi: Whitebait with shredded daikon radish
 Saba misoyaki: Mackerel grilled in miso

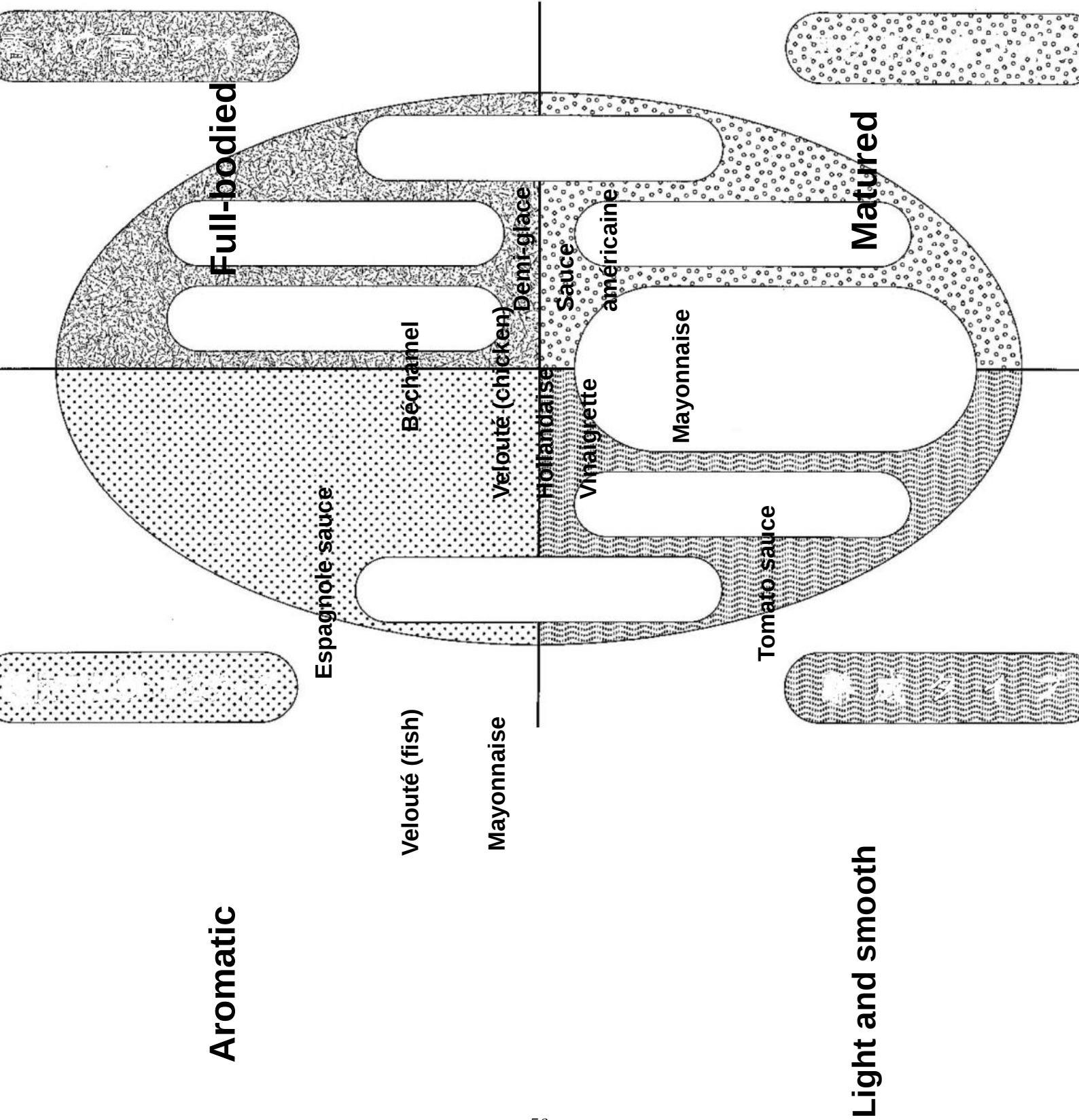
Key
 ✓✓ - Excellent match
 ✓ - Good match

(3) Compatibility with Chinese food

All 4 types of sake tend to go with Western-style and Japanese cuisine. However, the matured type goes extremely well with Chinese dishes.



7. Compatibility of sake types with basic sauces



Examples evaluating compatibility of sake and basic sauces

Aromatic sake

Sauce	Rating	Comments
B é c h a m e l	-	The flavor of the sake is subdued by the sauce, leaving both well balanced. The finish is well integrated, and the acidity and bitterness in the sake leave the mouth refreshed.
Velouté (chicken)	-	Ginjo aromas come through softly. The umami, salt and acidity of the sauce become separate and scattered.
Velouté (fish)	✓→✓✓	Ginjo aroma comes through clearly, flavor of sake is enhanced. The acidity of the sake sharpens the flavors of the sauce, overall harmoniously balanced.
Hollandaise	-	Acidity in the sake is softened, harmonizes with the acidity in the sauce. Aroma of the sake is enhanced, umami and flavor of the sauce disappear. The flavor of the egg and viscous texture cannot be erased.
Mayonnaise	✓→✓✓	The acidity in the sake and the mayonnaise combine harmoniously. The sauce becomes smooth, and ginjo aromas come through strongly. Each merges with the other, becoming even more harmonious and synergistic.
Vinaigrette	✓	Ginjo aroma is present. Acidity of the sauce is softened, sweetness appears. Hint of umami appears in the sauce.
Espagnole s a u c e	✓	Elegant acidity of the sake harmonizes with the sauce, pleasant bitterness appears. Sauce makes a stronger impression. Umami in the sauce fills the mouth.
Demi-glace	-	Nothing negative, ginjo aroma is enhanced. Acidity in the sake destroys the roundness of the sauce. Acidity and bitterness in the sake come together and create dryness.
T o m a t o s a u c e	-	The acidity and sweetness in the sauce erase the acidity and sweetness in the sake. Brings out the umami in the sauce, lengthens lingering notes of tomato.
S a u c e américaine	-	Sweetness in the sake emphasizes the sweetness in the shrimp. Adding sake makes the umami of the shrimp and aroma of seasonings fill the mouth.

Light and smooth sake

Sauce	Rating	Comments
B é c h a m e l	-	The acidity in the sake comes out rough, but as buttery notes unfold it harmonizes with the smooth flavors of the sauce.
V e l o u t é (c h i c k e n)	-	The sake engulfs the sauce, enhancing its flavors. Both increase and become rounded. Aromatic elements of the sauce are enhanced, leaving umami in the mouth.
Velouté (fish)	- → ✗	Produces fishy flavors. Acidity and alcohol in the sake erase the umami in the sauce.
Hollandaise	✓	The sake has a cleansing sharpness, which minimizes the depth of the sauce and produces a sensation of sweetness. The acidity in the sake makes the flavor of the sauce thinner and longer lasting, allowing it to be experienced for longer.
Mayonnaise	-	The acidity of the sake is left up in the air. The roundness of the mayonnaise is present, but the flavor does not intensify in the finish. Changes from bitter at first to savory.
Vinaigrette	✓	Engulfs and rounds out the acidity of the sauce. Smoothness of the sauce harmonizes with the flavor and acidity of the sake.
E s p a g n o l e s a u c e	-	Fattiness of sauce remains, acidity in the sauce is enhanced to no effect. Sake feels watery. Aroma and umami of the sauce increase slightly.
Demi-glaze	-	The sake and sauce become thin in the mouth and cancel each other out. Flavors of both become flabby and dull. Aromatics of the sauce are felt as bitterness or roasted notes.
T o m a t o s a u c e	✓	Sweetness in both harmonizes. Sweetness and roundness of the sake neutralizes the acidity of sauce pleasantly, bringing out its sweetness. Alcohol becomes noticeable as a separate element.
S a u c e américaine	✓	The acidity in the wine cleanly erases the sauce, leaving a refreshing impression. The shrimp and vegetable umami in the sauce change to an unpleasant harsh taste. Umami from the shrimp fills the mouth and lingers.

Full-bodied sake

Sauce	Rating	Comments
B é c h a m e l	✓	Umami and depth of the sake harmonize well with the mellowness of the sauce. Draws out the sweetness of the sauce.
V e l o u t é (c h i c k e n)	✓	Saltiness of the sauce is absorbed by the sake and neutralized. Umami in the sauce and the sake come together to give a mellow impression.
Velouté (fish)	-	Slight fishiness present. Umami and depth of sake disappears. Acidity of the sake is felt strongly.
Hollandaise	✓	Umami in the sake is drawn out, subtle flavors present from the sauce. The heavy flavor and acidity of the sake thin the viscosity of the sauce, drawing it out for longer.
Mayonnaise	✓	Sake becomes extremely light, rice flavors appear. Adding sake increases the depth of the sauce.
Vinaigrette	✓	The acidity and smoothness of the sauce harmonizes well with the flavor and acidity of the sake. Flavor of the sauce is drawn out without distortion.
Espagnole s a u c e	✓	The flavor of the sake melds smoothly with the umami of the sauce. The depth and sweetness of the sake expand.
Demi-glace	✓	The acidity of the sake and saltiness of the sauce harmonize and become rounded. The sweetness of the sake adds to the umami of the sauce, giving it volume. The depth, heavy flavors and powerful umami of both the sake and the sauce fill the mouth.
T o m a t o s a u c e	✓	The sake becomes fresh, and the sweetness of the tomato is enhanced. Depth of the sake is felt powerfully, and sauce becomes more intense and rounded.
S a u c e américaine	✓	Sake becomes rounded, becomes one with the notes of the sauce. Sweetness of the sake is also enhanced, with all elements of the flavor in harmonious balance.

Matured sake

Sauce	Rating	Comments
B é c h a m e l	✓	Matured aromas feel more mellow, sauce feels more rounded. Both come together with good balance.
V e l o u t é (c h i c k e n)	✓✓	Umami in the sauce is increased and lingers. Umami in the sake fully present and both meld together. Umami in the sauce and acidity in the sake come together as one.
Velouté (fish)	-	Flavors of the sauce increase the depth and flavors of the sake. Bitterness in the sake is present, but only the fish notes from the sauce remain in the finish.
Hollandaise	✓	Adding sake brings pleasant bitterness with the sweetness of the sauce, the umami in the sauce and sake harmonizes, creating gentle aromas.
Mayonnaise	✓	The acidity in the sake and sauce clash, but then become rounded and finally harmonize. The notes of the sake feel like they expand and rise.
Vinaigrette	✓→✓✓	Matured aromas become very lively. Pleasant flavors enhance the acidity and umami in both.
Espagnole s a u c e	✓	Hints of the aromatic flavors of the sake are present, and enhance the umami and aromatics of the sauce. The sauce and sake gradually merge and linger.
Demi-glace	✓	The matured flavors of the sake engulf the sauce. There is some bitterness from the sake, but it produces subtle balance and harmony.
T o m a t o s a u c e	-	Enhance each other at first, but followed by a strong bitterness. Body of the sake erases the subtlety of the sauce. Pleasant acidity from the sake remains.
S a u c e américaine	✓	Aromatic flavors from the sake fill the mouth. The sauce and sake harmonize and meld, and the matured flavors harmonize with the umami of the shrimp.

White wine

Sauce	Rating	Comments
B é c h a m e l	-	Acidity of wine is increased, its fruity aromas dominate but the aroma feels normal. Smooth flavors of the sauce disappear.
V e l o u t é (c h i c k e n)	-	Acidity of wine becomes stronger. Flavors of sauce disappear.
Velouté (fish)	-	Fruity aromas of wine become stronger. Acidity of wine is pronounced, umami of sauce disappears.
Hollandaise	-	Acidity of both clashes. Acidity of wine flattens the overall umami of the sauce.
Mayonnaise	-	Acidity in both creates synergy, only acidity becomes stronger. On the other hand, the flavors of the wine become watery and diluted and disappear.
Vinaigrette	- → X	Bitterness emerges and tongue becomes heavy. Acidity in both clashes. Sauce and wine cancel each other out.
E s p a g n o l e s a u c e	-	Acidity in sauce and wine clashes, acidity from wine remains, flavor of sauce disappears.
Demi-glace	-	Sharp acidity and strong bitterness of wine remains. Fruity aromas disappear, all components of the sauce and wine separate.
T o m a t o s a u c e	✓	Not unpleasant, but sauce becomes thin and the wine comes across more strongly. Comes together, but umami is not felt from either.
S a u c e américaine	✓	The acidity in the wine cleanly erases the sauce, leaving a refreshing impression. Umami of the shrimp and vegetables in the sauce changes, unpleasant harsh taste appears. Umami from the shrimp fills the mouth and lingers.

Red wine

Sauce	Rating	Comments
B é c h a m e l	-	Depth of the wine suits the umami and sweetness of the sauce. Red wine tannins emerge suddenly and linger in the mouth.
V e l o u t é (c h i c k e n)	-	Tannins increase in strength in the mouth, umami and sweetness of the sauce is suppressed. Sauce and red wine do not mix.
Velouté (fish)	- → X	Wine tannins linger strongly. Salt in the sauce and acidity in the wine do not meld and instead clash. Produces unpleasant fishy flavor.
Hollandaise	-	Acidity of the wine cuts the oiliness of the sauce. Strong tannins erase the rounded flavors of the sauce.
Mayonnaise	- → ✓	Sauce becomes rounded. Red wine engulfs sauce, tannins become rounded. Cancel each other out.
Vinaigrette	X	Astringency and bitterness appear. Acidity in the sauce and sake are cumulative, producing an unpleasant, extremely strong acidity. Tannins produce an unpleasant harsh taste.
Espagnole s a u c e	✓	Both enhance the other. No new flavors created. The umami of the sauce is strengthened, but a hint of tannins remains.
Demi-glace	✓	Produces more gentle flavors than white wine. Tannins disappear, and umami of sauce fills the mouth.
T o m a t o s a u c e	-	Tannins feel rough, and an unpleasant taste comes from the sauce. The acidity of the sauce disguises the sweetness of the wine.
S a u c e américaine	-	Umami ends quickly, tannins drop out. Texture feels like the sauce and wine remain separate. Unpleasant fishy notes from the shrimp.

8. Compatibility of sake with food based on service temperature

When we think about how to alter the compatibility of Western-style food and sake, experimenting with the way temperature changes the flavor of sake shows that this increases its range of compatibility.

Here are examples of increasing temperature for the different types of sake, noting transitions in flavor with food.

(1) Compatibility with Western-style food

The following 7 dishes were chosen.

- a. Shrimp terrine
- b. Salmon sautéed in butter with lemon
- c. Sautéed pork roast
- d. Sautéed flatfish with cream sauce
- e. Eel terrine
- f. Grilled chicken thigh
- g. Pan-fried Wagyu beef fillet

Ratings:

- ✓✓ Enhances flavors of both the sake and the dish, creates pleasant new flavors.
- ✓ Combination enhances both the sake and the dish.
- Increases the flavor of either the sake or the dish. And one is decreased by the pairing.
- ✗ Flavor of both the sake and the dish are lost. Pairing also exhibits peculiar features. Unpleasant taste or smell

Aromatic sake

Temp Dish	5°C	15°C	40°C	55°C
a	• Draws out sweetness of shrimp and spicy notes in terrine (juniper needle) • Well balanced.	• Sweetness of shrimp harmonizes with rounded sweetness and aroma of sake.	• Draws out umami of shrimp, but also increases acidity of sake. • Alcohol notes appear suddenly. • Terrine breaks down due to temperature of sake.	• Flavor of terrine becomes indistinct. • Alcohol and acidity of sake linger.
	✓	✓✓	-	X
b	• Flavor of salmon disappears. • Lemon thins flavor of sake and salmon.	• Aromas and flavors of sake are fully present. • Flavor of salmon rises up.	• Flavor of salmon becomes stronger, both flavors cancel each other out.	• Only alcohol becomes stronger, flavor of salmon disappears.
	-	-	-	-
c	• Does not meld. Sake and pork remain separate. • Not suited to the fattiness.	• Aroma and alcohol of sake come out strongly, and pork, fat and sake cancel each other out.	• Sweetness of the sake melds with the soft fat of the pork.	• Only alcohol becomes stronger, taste of pork remains. • Fat completely erased.
	-	-	✓	-
d	• Flavor of flatfish disappears, only fatty flavor of cream remains. • Bitterness of sake is present.	• Flavor of flatfish and cream and flavor of sake disappear.	• Acidity and alcohol of sake erase flatfish and fat.	• Flavors of both flatfish and sake disappear.
	-	-	-	-
e	• Bitterness emerges from sake and skin of eel.	• Sake becomes more fragrant, without bitterness, umami appears from eel.	• Aroma of sake disappears. • Flavor of eel becomes stronger, aroma also becomes noticeable. • Sake becomes thin.	• Only sweetness of sake is present. • Terrine melts immediately, aroma of eel is present. • Erases the aroma and flavor of the sake.
	X	✓	-	-
f	• Sake becomes fresh. • Oiliness/fattiness of chicken is erased.	• Sake becomes rounded, umami of chicken is brought out.	• Alcohol feels stronger and flavor of chicken is erased.	• Flavor of both chicken and sake are erased. • Can only feel heat of alcohol.
	X	✓	-	X
g	• Sake becomes sweet. • Flavor of beef disappears.	• Aroma of sake and umami of meat emphasize each other.	• Umami of meat disappears. • Alcohol content of sake remains, aroma disappears.	• Can feel alcohol and sweetness of sake, but umami of meat disappears.
	-	✓	-	-

a = shrimp terrine, b= salmon sautéed in butter with lemon, c = sautéed roast pork, d = sautéed flatfish with cream sauce

e = eel terrine, f = grilled chicken thigh, g = pan-fried Wagyu beef fillet

Light and smooth

Temp Dish	5°C	15°C	40°C	55°C
a	- Flavor of sake becomes firmer, harmony between softness of terrine and sweetness of sake. - Acidity produces a short finish. ✓✓	- Flavor of sake is somewhat unfocused. - Terrine is powerful, aroma and flavor of sake disappear. -	- Flavors of both are enhanced. - Flavor of terrine is enhanced and lengthened. ✓	- Flavor of terrine disappears. - Flavor of sake becomes indistinct. ✗
b	- Distinct flavor of chicken. - Aroma and flavor of sake disappear. -	- Sake seems sweet. - Flavors of chicken and sake are equal, umami pronounced in both. ✓	Flavors of chicken and sake disappear, lemon flavor and acidity of sake become stronger. -	Acidity of sake becomes stronger, flavor of both disappears. -
c	- Pork fat solidifies. - Flavor of sake becomes watery. -	Can feel consistency of pork. -	Flavor of meat and strength of alcohol in sake become equal, flavors of meat and sake cancel each other out. -	Flavor of sake erased by fat in meat. -
d	Thin sweetness and umami from the salmon are present, but cream lingers in the finish. ✓	- Flavors of both cancel each other out. - Some cream sauce flavor remains. -	Flavors of both cancel each other out. -	- Only the umami of the cream is enhanced. - After the acidity of the sake and the cream disappear, the sweetness of the sake remains. -
e	Bitterness emerges in both. ✗	- Enhances flavor of both eel and sake, umami of both merges. - Pleasant finish and lingering flavors. ✓✓	- Strong aroma emerges from eel skin. - Bitterness emerges from sake. ✗	Flavor of sake becomes indistinct, flavor of eel canceled out by acidity and heat. ✗
f	Draws out sweetness from chicken, but conceals flavor of sake. -	Aroma and flavor of both cancel each other out, sweetness of sake remains. -	Flavor of chicken canceled out by acidity and alcohol of sake. -	Acidity and alcohol from sake remain. -
g	- Sake feels watery, flavor of meat disappears. - Sweetness of sake remains. -	- Flavor of meat becomes thin. - Lushness and sweetness of sake harmonize with notes from the meat. ✓	Acidity in sake draws out fat, makes it possible to sense flavor of meat juices. ✓	Sake becomes watery, leaving only flavor of meat. -

a = shrimp terrine, b= salmon sautéed in butter with lemon, c = sautéed roast pork, d = sautéed flatfish with cream sauce
e = eel terrine, f = grilled chicken thigh, g = pan-fried Wagyu beef fillet

Full-bodied

Temperature Dish	5°C	15°C	40°C	55°C
a	Powerful sensation of sweetness of shrimp and sweetness of sake. ✓	- Sake becomes rounded. - Sweetness of shrimp and sake harmonize with and heighten each other. ✓	Flavor of terrine disappears. X	- Sake becomes sweet. - Terrine disappears completely just from flavor of the sake. X
b	Flavor of sake is clear, but bitterness is strong and flavor of salmon disappears. X	Depth of flavor of sake and fat in salmon harmonize, whole becomes rounded. ✓✓	Flavors of salmon and lemon, and fat in salmon and sake enhance each other. ✓	Flavor of salmon disappears, only bitterness from both remains. X
c	- Sake dominates and flavor of pork becomes indistinct. - Coarseness of fat remains. X	Umami in meat becomes rounded, roundness also felt in the sake. ✓	Tastiness of pork and fat merge with umami of sake. ✓	Fat from pork disappears and umami is enhanced, flavor of sake becomes soft. ✓✓
d	Bitterness of sake remains. X	- Flavor of cream remains, flavor of salmon disappears. - Bitterness of sake is reduced. -	Flavor of salmon disappears, but umami of fish and cream sauce are enhanced. ✓	Just brings out a fishy smell from the salmon and sauce. X
e	- Bitter. - Flavor of sake is overwhelmingly strong. -	- Sweetness of eel, rounded flavor of sake and overall flavor of terrine merge into one. - Brings out flavor and sweetness of terrine. - Long finish. ✓✓	- Aroma of eel remains, but flavor of sake disappears. - Alcohol remains. -	Only bitterness of eel and sake remains. X
f	Coldness solidifies flavor of chicken. X	Umami in sake and chicken harmonize. ✓	- Umami and fat of chicken disappear. - Can feel rounded umami of sake well. ✓	- Can feel the sweetness and umami of the chicken. - Flavor of sake becomes milder than flavor of chicken. ✓
g	- Umami of meat and sake emphasize each other. - Coarseness of fat remains. -	- Flavor of sake is strong. - Umami of meat is drawn out thinly. -	Flavor of the whole disappears. -	- Draws umami of meat out slightly. - Flavor of sake melts into meat juices, mostly undetectable. ✓

a = shrimp terrine, b= salmon sautéed in butter with lemon, c = sautéed roast pork, d = sautéed flatfish with cream sauce
e = eel terrine, f = grilled chicken thigh, g = pan-fried Wagyu beef fillet

Matured sake

Dish Temperature	5°C	15°C	40°C	55°C
a	Terrine disappears completely just from flavor of sake. -	Flavor of shrimp disappears, but spicy notes emerge. ✓	- Sweetness emerges from sake, but terrine melts and its flavor becomes indistinct. - Umami emerges from sake. -	Disappears altogether into terrine, only sweetness of sake remains. -
b	- Bitterness emerges. - Can only sense flavor and umami of koshu. X	Saltiness of salmon and umami of sake clash. X	- Sweetness of sake expands. - Draws out flavor of chicken thinly. -	Sweet aroma of koshu is drawn out, but other flavors and flavors of the dish disappear. -
c	- Freshness of sake disappears, sweetness emerges. - Flavors of pork and sake do not merge. -	- Increases sweetness of sake. - Draws out umami and aromatics of pork. ✓	- Sweetness of pork fat merges with delicious sweetness of sake. - Matured aromas are weakened. ✓✓	- Flavors of both disappear. - Matured aromas and sweetness increase. -
d	Bitterness becomes stronger, cream makes koshu flavors disappear. X	Flavors of cream sauce and salmon merge and become delicious. ✓✓	Amplifies umami of both. ✓✓	Bitterness emerges, cancels flavor and aroma of fish, only aroma of koshu remains. X
e	Eel and sake are well balanced, but bitterness emerges from both. X	- Eel becomes bitter. - Bitterness from both remains in the finish. X	Can sense only strong bitterness. X	Only flavor of sake is detectable, bitterness remains. X
f	- Bitterness emerges from sake. - Flavor and fat from chicken disappear. X	- Aroma and umami of chicken and flavor and umami of sake harmonize. - Flavors of both become rounded and expand. ✓✓	Feel alcohol strongly, umami of chicken is drawn out and fat melts slowly. ✓	- Flavor of chicken disappears. - Only aroma of sake is strong, aroma of burnt protein present. X
g	- Fat and umami of meat merge into umami of sake. - Aromatic nature of meat and matured aromas come together as one. ✓	Delicious flavor, umami and aromatic nature of meat and aroma, sweetness and fragrance of sake harmonize overall. ✓✓	- Oil/fat of meat disappears. - Umami of meat disappears in the sake. ✓	Alcohol and umami of sake become stronger, canceling out the flavor and aroma of meat. -

a = shrimp terrine, b= salmon sautéed in butter with lemon, c = sautéed roast pork, d = sautéed flatfish with cream sauce
e = eel terrine, f = grilled chicken thigh, g = pan-fried Wagyu beef fillet

(2) Compatibility with Japanese cuisine (home cooking)

Example dishes

- | | |
|----------------------------------|-----------------------------------|
| a. White fish sashimi with ponzu | e. Vegetable tempura (green bean) |
| b. Tuna sashimi with soy sauce | f. Chicken kara-age |
| c. Fish tempura | g. Grilled fish |
| d. Shrimp tempura | h. Teriyaki |

Aromatic sake

Temp Dish	5°C	25°C	45°C
a	Aroma of sake dominates, bitterness emerges	Flavor of fish mostly erased, slight umami from fish detectable	Bitterness and fishy flavor emerge Emphasizes many flaws of both sake and fish
b	Retronasal aroma of soy and sweet fruity aromas do not go together, bitterness emerges	Balance of flavors is good, but aroma of sake is strong and makes its affinity with the tuna strange	Warming the sake removes its rich aroma, but increases flavor and umami of tuna and a pleasant umami lingers
c	Fishy smell detectable from coating Finish is bitter	Flavor of fish becomes stronger, interferes with elegant aroma of the sake	Aroma of sake disappears, so also does feeling of strangeness
d	Sake and shrimp, coating and oil all separate Bitterness emerges	Elegant aroma erases the flavor of the shrimp and interferes	Aroma of sake disappears, so also does feeling of strangeness
e	The fruity aroma of the sake and the fresh aroma of the green bean come together mildly, enhancing the aroma and sweetness of the vegetable	Vegetable tastes sweeter	Alcohol of sake stands out Sweetness of vegetable is erased
f	Temperature is too low, oil and fat solidify	Alcohol mostly erases flavor of the chicken, sake predominates and the flavor of the chicken disappears	Bitterness and alcohol separate Flavor of chicken becomes indistinguishable
g	Aroma reminiscent of cherry tree leaf with no bitterness, can feel freshness and sweetness	Presence of sake is stronger, flavor of fish disappears	Strong alcohol negates flavor of fish
h	Ingredients and seasonings become sweet, fat from fish feels rounded Aroma makes flavor rounded, flavor of both is extended	Becomes smooth and delicious Cherry blossom-like aroma emerges from sake	Sake feels slightly strong

Light and smooth sake

Temp Dish	5°C	25°C	45°C
a	Ponzu and flatfish flavors separate, feels bitter	Flavor of fish disappears, balance is lost	Both overall well balanced
b	Soy sauce and tuna become bitter but sweetness emerges from sake	Flavor of both disappears	Umami of sake and tuna are in harmony
c	Sake becomes bitter and clashes with oil	Sweetness of fish is drawn out, flavors of oil and sake are in harmony	Oil is cleared, umami increases
d	Ingredients become bitter	Both shrimp and sake appear sweet	Produces too much umami, delicate notes of shrimp are lost and it becomes heavy
e	Bitterness of vegetables erases the bitterness of sake, freshness of vegetables is emphasized	Flavor of vegetables becomes complex, but flavor of sake disappears	Flavor of vegetables disappears
f	Sake and chicken become bitter, hardened fat remains and lingers	Flavor of both runs parallel	Increases umami of chicken
g	Sake becomes sweet, umami of fish becomes sweetness, bitterness disappears	Only sake is felt strongly	Sake becomes bitter
h	Fat of fish becomes rounded with the sake, but then disappears immediately	Brings out fat and umami in the fish	Fat is removed, becomes dry Flavor of fish has a short finish.

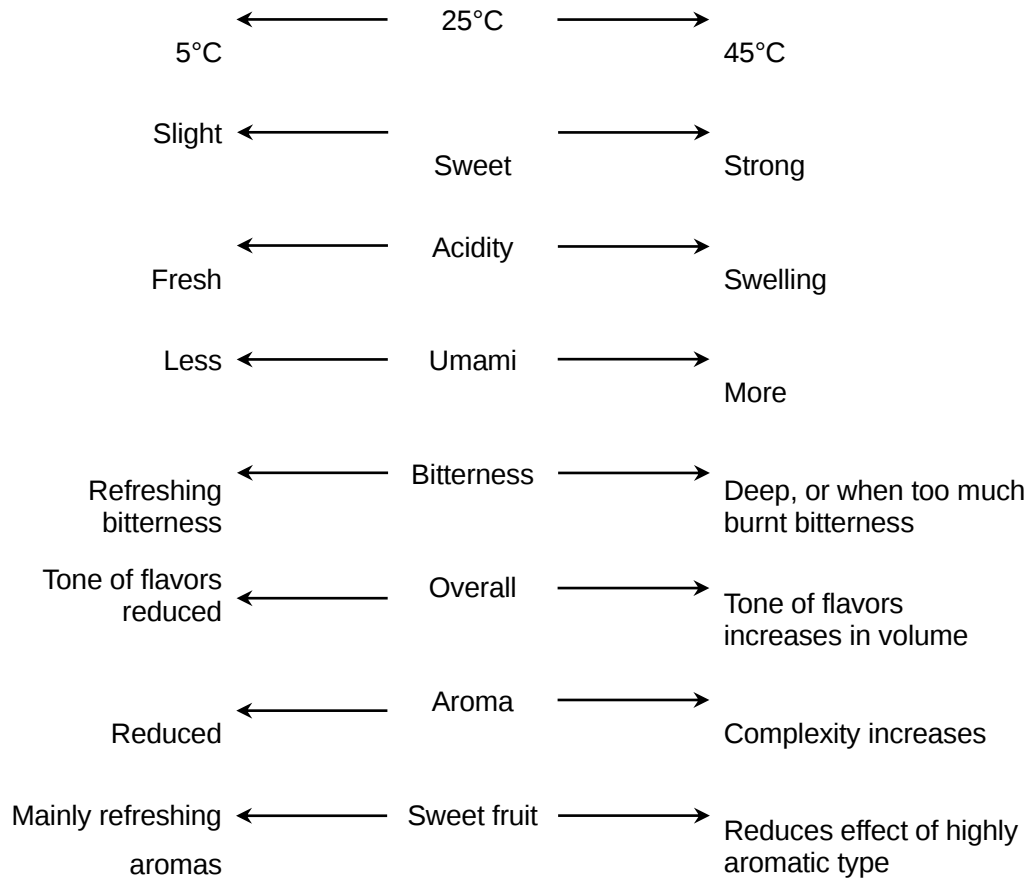
Full-bodied sake

Temp Dish	5°C	25°C	45°C
a	Sake becomes sweet and umami of fish is drawn out Flavor of both is clean	Sake is felt strongly in the first impression, but umami from fish gradually increases Umami of both is increased	Umami of sake is too strong, aroma and umami of fish disappears
b	Emphasizes lactic acidity of tuna and erases fishy smell Also enhances aroma of wasabi	Sake feels sweet, umami of sake and tuna harmonize and cancel each other out	Umami of sake is slightly strong, erases flavor of akami tuna For chutoro tuna, fat of fish and umami of sake melt into each other and fill the mouth
c	Umami of fish increases, but oil in coating does not melt	Sake brings together flesh of fish and coating, making this an ideal pairing Coating also becomes mild	Umami of fish increases and umami of each intensifies that of the other Saltiness and flavor of sake are reduced
d	Shrimp becomes sweet and delicate Cannot taste flavor of coating	Increases umami of shrimp, brings together shrimp and coating, excellent pairing	Increases umami but also brings out bitterness
e	Gives a refreshing sensation, pleasant green bitterness	Sake becomes bitter and green bitterness of vegetables emerges	Increases bitterness of both
f	Emphasizes umami of the chicken, but cannot taste coating Chicken seems nutty	Umami of chicken increases and it feels more refined, coating clashes with sake	Flavor of chicken disappears Can taste seasonings in the coating, such as ginger
g	Sake clarifies flavor of fish	Emphasizes fattiness and umami of fish, erases fishy flavors	Umami of sake is strong so both flavors cancel each other out and bitterness appears
h	Only sweetness-spiciness of glaze clashes	Flavors of both disappear, only sweetness of glaze left in the mouth	Sweetness of glaze harmonizes with umami of the sake

Matured sake

Temp Dish	5°C	25°C	45°C
a	Only flavor of sake remains	Only the acidity of the ponzu rises, cannot taste fish	Flavor of fish disappears completely because flavor of sake is strong
b	Flavor of tuna disappears Soy sauce emphasized by sake	Flavor of tuna disappears, soy sauce emphasized by sake	Umami of sake is strong, tuna (akami) and soy sauce disappear Flavor of chutoro is reminiscent of nuts
c	Flavor of fish disappears Aromatic nature of coating is slightly perceptible	Sake becomes dry	Flavor of fish, coating, flavor of oil/fat disappear, and sake and tempura both become bitter
d	Umami of shrimp and coating emphasized by sake	Aromatic nature of sake increases umami of shrimp and coating	Sake becomes bitter and clashes with coating
e	Different bitterness emerges that emphasizes green notes and makes the taste bitter	Sense bitterness	Increases umami of sake, only sake seems sweet
f	Increases aroma and umami of the chicken, aromatics and spiciness	Both become smooth Emphasizes positives of both sake and chicken, flavor becomes sophisticated. Chicken feels of higher quality	Sake is overwhelming, bitterness and koshu aroma emerge
g	Sake is strong so fish feels subdued, iodine aroma appears	Sake is strong Umami of fish and sake clash and become bitter	Bitterness is strongly emphasized Umami of sake is too strong and bitterness increases
h	Caramel aroma makes the glaze feel more sophisticated, in general flavors are more lively	Umami of sake is emphasized, strength of fish flavor gradually increases	Umami of sake is too strong, only sake is detectable

Summarizing compatibility with dishes by temperature, we come to the conclusions shown below.



At or over 55°C, the alcohol in the sake stings the tongue

Chapter 4: Special Ways of Serving and Drinking Sake

1. Sake and cocktails

It goes without saying that sake is a very complete drink. Each type has a superb combination of sweetness, acidity, bitterness and umami, as well as water, alcohol and other components that form a harmonious whole where no one element stands out on its own. However, there can also be no objections when it comes to trying to create new flavors by adding another element to this integrated one.

One very significant approach when dealing with Japanese consumers with little knowledge of sake, or for introducing another facet of sake to non-Japanese who do not have it as part of their food culture, is to use sake as the main ingredient of a cocktail. This also showcases sake's potential.

Below are the outcomes of some experiments to validate this idea.

(1) Altering the sake

Heat

- (1) Add secondary ingredients to heated sake.
- (2) Dilute room temperature sake with hot water, add secondary ingredients.

In either case, the connection with the secondary ingredients is weak and they do not merge with the sake except when using matured sake.

Add sugar

- (1) Granulated sugar or simple syrup: Balancing sweetness is very subtle and difficult.
- (2) Sugar in liqueur: Compatibility is mostly good, but can have unexpected results due to the components of different liqueurs. The sweeter the liqueur, the better it goes with sake.
- (3) Fruit sugar: Fructose is a very poor match for sake. It erases the refreshing sweetness of sake and produces acrid bitterness.

Cool

Cool with ice and add secondary ingredients.

- (1) On the rocks: Flavor changes noticeably over time.
- (2) Stirred: Using sake suited to low temperature and agitating quickly gives good results.

(3) Shaken: Using sake suited to low temperature and agitating quickly gives good results.

Add secondary ingredients to chilled sake: Difficult to get the sake and secondary ingredients to connect.

Other

(1) Add carbon dioxide gas to sake: Makes it sparkling but destroys balance of acidity.

(2) Mixing

Mix secondary ingredients

(1) Citrus juice (fresh)

Orange, lemon, lime, grapefruit all negate the flavor of sake from its foundations.

Fructose and sugars in sake cancel each other out, and only the smell of alcohol comes through. Orange juice in particular produces an unpleasant smell.

(2) Citrus juice (canned)

As above. Can also add a metallic taste.

(3) Apple

Does not go with sake at all. Sake becomes indistinct. Unpleasant smell.

(4) Fruit peel

Lemon peel, orange peel, lime peel, yuzu peel all match well. However, bitterness and oiliness dissolve out from all the peel except yuzu, so it is best not to put the peel in the sake.

(5) Tropical fruit and juice

Pineapple: Negates the sake, produces a strong prickling sting.

Banana: Sake goes extremely well with banana.

Kiwi: Same as for apple.

Papaya: Produces an unpleasant flavor.

Tomato: Very vegetal and bitter, salt in tomato juice comes to the fore.

(6) Carbon dioxide gas, carbonated water

Theoretically lowers pH, but negates the sake and a strange roughness appears after the effect of the carbon dioxide gas. Emphasizes a tepid kind of umami from the sake.

(7) Fresh mint leaves

Surprisingly does not make the sake indistinct, creates a crisp note. Basically, sake goes well with mint oil. Leaves go with sake moderately well, stem produces intense bitterness.

Need to be careful to use leaves only and watch the amount.

(8) Egg

Egg yolk: Does not go with sake at all. Produces sulfurous odors when heated.

Egg white: Neither a good nor a bad match. When shaken the foam can produce a soft texture in cocktails. Can smell of egg white depending on the amount used.

(9) Fresh cream

Extremely good match, and does not separate when heated, cooled, or diluted with water.

(10) Butter

A fair match only with koshu. Produces flavors reminiscent of miso soup. Does not match with ginjo sake or namazake at all.

●Compatibility of sake with other drinks

Liqueurs

Harmonious (Extremely good match)	Neutral (Neither good not bad)	Clashing (Poor match, negative flavors)
Melon liqueur Coffee liqueur Cacao liqueur Chocolate liqueur Violet liqueur (Parfait d'Amour) White peach liqueur Banana liqueur Chartreuse Coconut Amaretto	Cassis liqueur Drambuie Vermouth Campari Bénédictine Heering cherry liqueur Raspberry	Cointreau Brandy Pernod Southern Comfort Ume liqueur Grand Marnier Mint liqueur Lime juice (cordial) Tonic water

Cocktails

Midori style Sake + melon liqueur	Manhattan style	Saketini Moscow Mule style
Sake Kahlua Sake + coffee liqueur	Sake cooler	Screwdriver style Bloody Mary style
White Russian style Sake + cocoa liqueur (white) + fresh cream	Bull Shot style Sake + consommé	Salty Dog style Sidecar style
Sake Chocolat Sake + chocolate liqueur	Pink Lady style	Sake fizz Sake Pernod
Mint Julep style Sake + granulated sugar + fresh mint leaves	Hot Buttered Rum style (koshu only)	Sake & ume liqueur
Blue Moon style	Grog style (koshu only)	Hot Buttered Rum (Ginjo, namazake)
Alaska style	Martini style	Grog style (Ginjo, namazake)
Sake Peachtree		Hot eggnog

●Level of compatibility between cocktail styles and the 4 types of sake

	A	B	C	D
Martini style	✓	✓		
Manhattan style	✓		✓	
Sake cooler	✓	✓		
Pink Lady style		✓		
Sake Kahlua	✓	✓	✓	✓
Sake Chocolat	✓	✓	✓	✓
Mint Julep style	✓	✓		
Blue Moon style	✓	✓	✓	
Midori style	✓	✓		
Sake Peachtree	✓	✓		
Alaska style	✓	✓	✓	✓
Bull Shot style			✓	
Hot Buttered Rum style				✓
Grog style				✓

A Aromatic
 B Light and smooth
 C Full-bodied
 D Maturede

●Compatibility of sake with cocktail garnishes

We investigated compatibility with namazake and long-term matured sake, which sit at opposite ends of the types of sake.

Sake samples were as-is, at 10°C.

	Namazake	Koshu
Salted rim Decoration made using water	✗ Flavor of sake disappears, leaving only intense saltiness. Destroys the delicate freshness of namazake. Stinging sensation.	✗ Neutralizes the characteristics of koshu and the deep flavor of long-aged sake, erasing their charm. Sake becomes indistinct. Produces bitter flavors.
Sugared rim Decoration made using water	✗ Namazake turns into something like simple sugar water. Sake becomes indistinct. Bitterness emphasized.	✗ Off flavor, negative earthy notes, damp mushroom, bitter/astringent note like chemical seasonings, strong unnatural sweetness.
Olives (stuffed)	✓ The strong oily flavor of olives is a little stronger than namazake in bitterness, but it becomes gentler in the mouth when it meets the freshness of the namazake. Produces woody aromas.	✓✓ The mature aromas and depth of flavor of the koshu merge with the strong flavors of the olive. Result is smooth and aromatic.
Maraschino cherry	✓ Adding the sweetness of the cherry and fruit stone aroma to the simple flavor of namazake creates a delicious harmony of sweetness.	✓ Rich sweetness of the cherry mingles superbly with the flavor of aged sake. Long, crystalline sweetness reminiscent of hard candy.
Green cocktail cherry	✗ Mint flavor and sweetness destroy the delicate nature of the sake. Sake becomes indistinct.	✗ Flavor of koshu becomes indistinct. Misses all the important points. Mint dissolves out.
Yuzu peel	✓✓ The refreshing, slightly oily aroma of yuzu merges with the freshness of the namazake.	- Koshu aroma is much stronger. Reduces yuzu aroma by half.
Cocktail onion (pickled)	✗ Flavor of sake disappears. Pickled flavor increases.	✓ Weakens the strong flavors of koshu slightly. Sake becomes more flavorful. Pickled notes become more muted.

2. Sake in cocktails

To make sake even more enjoyable, we created some cocktails that maximize its inherent umami. Other than the examples given here, you can mix ingredients you have close at hand and discover more new ways to enjoy sake.

Mint Julep style

Ginjo sake	60 ml
Mint leaves	6 (stem removed)
Sugar	2 tsp

Excellent match with mint leaves, very refined aroma, sweet aroma and flavor of ripe pear.

Blue Moon style

Ginjo sake	40 ml
Parfait d'Amour	15 ml
Lemon juice	1 tsp

Adding Parfait d'Amour produces a sophisticated flavor.

Alaska style

Ginjo sake	45 ml
Chartreuse yellow	15 ml

The aroma of fragrant herbs and ginjo-ka meet to produce elegant notes. Flavor has slight bitterness from medicinal herbs which goes well with the acidity in the sake.

Sake & chocolate

Ginjo sake	40 ml
Chocolate liqueur	20 ml

The sweetness of the cacao and sake are a good match, and the fragrant aromas of the cacao combine harmoniously with ginjo-ka.

Martini style

Ginjo sake	55 ml
Cinzano	5 ml

The fragrance, acidity and sweetness of the sake are all preserved.

Sake & melon

Ginjo sake	40 ml
Melon liqueur	20 ml

Makes a cocktail with refined sweetness, The heavy sweetness of melon liqueur on its own are softened by the sake, the gentle aroma of melon mixes well with the aroma of the sake, producing a sake with well-balanced color, aroma and flavor.

White Russian style

Ginjo sake	40 ml
Kahlua	20 ml
Cream	10 ml

The sake, Kahlua and cream blend together well, and the delicate sweetness of the sake becomes one with the sweetness of the Kahlua. The cream suppresses bitterness, creating a cocktail with mellow flavors.

3. Ways of drinking sake

Traditional ways of drinking sake in Japan developed mainly from the Edo period.
Here are some examples and some precautions.

With water

Drinking sake with mineral water containing no impurities.

With hot water

Add hot water. Ratio is 50% water. Adding more than that thins the sake so it has no body and destroys its balance.

With water from cooking soba

Add water from cooking soba, and a sprinkle of salt and shichimi spice blend to emphasize the buckwheat aroma. Warming. Another way is to pour a little sake over just-boiled soba noodles, which stops them tangling and going soft.

With grilled fugu fin

Pour extremely hot sake over a grilled fugu fin. (Winter)

With fish bones

Usually made by pouring extremely hot sake over grilled fish bones. Fat comes to the fore and the umami from the grilled notes comes through strongly.
Smells fishy when cooled. (Winter)

With egg

Add hot sake to well beaten egg. Egg will solidify if sake is too hot.

With salted dried ume or konbu

Add salted dried ume or konbu to hot sake. Saltiness and acidity resonates with acidity in the sake. Warming.

With cherry

Put a salted cherry leaf into the sake.

In dried squid

Pour sake into a soft-touch container made from the dried torso of a squid. If used with heated sake, it will smell fishy from the squid after cooling.

Chapter 5: Storing Sake

1. Purchasing sake

When purchasing sake, you must select the distribution route and frequency of purchase in advance for each item.

The distribution route can be direct from the producer or purchasing via a wholesaler or general liquor store.

Whichever one you choose, leaving price aside, you must consider factors such as quality control of products and ability to reliably supply the required quantity.

In particular, as sake is sensitive to heat and light, unless the products are shipped refrigerated directly from the producer, you must be aware of storage conditions at the wholesaler or liquor merchant and investigate them in advance so you know you will always get products in peak condition.

Also, depending on how much of each item is consumed, you must document how orders are placed and the delay between order and delivery.

To decide on frequency of purchase, consider the differences between types of sake, such as unpasteurized/pasteurized or matured, and the changes in appearance, aroma, taste and flavor that occur in the time that elapses between the time of production and bottling and the time of consumption.

2. Choosing products and product ranges

Until recently, sake has been broadly divided by serving temperature, hot or cold. We think to think about what product range is relevant for bars and restaurants serving sake.

The reasoning behind selecting a range is firstly to choose sake that will go with the food served. Even if you stock famous brands, you must be able to explain the differences between their characteristic aromas and flavors. The importance of sales talk for sake lies not in trademarks or limited availability, or technical characteristics such as rice variety, polishing ratio, sake meter value or acidity. It is found in the aroma and flavor of that sake, or the characteristics of the region where it was produced, or how those characteristics make it a good match for an individual dish.

Make sure you know this information before deciding on what variety of products you will stock.

Important points for selecting a product range include:

- A range of price points.
- A choice of different quantities.
- A wide variety of flavor profiles.
- A range of strengths of flavor.
- A range of distinctive aromas and flavors.
- Different serving temperatures.
- Differing levels of compatibility with each dish.

3. Managing storage

Sake is very sensitive to heat and light while in storage. Ideally it should be stored at a cool temperature of between 1-8°C, with little fluctuation in temperature, protected from sunlight and with minimum exposure to light, including no sterilizing lights or fluorescent lights.

Unlike wine, most sake does not have a cork and so has no need for high humidity to in order to preserve quality. In fact, high humidity can cause mold to grow on the cap or screw cap, and mold on the label can soil it and produce unpleasant smells.

There is also no need to lay sake bottles on their side in storage, they can be left standing upright in a fridge. With serving temperature in mind, it's convenient to have a space for longer term storage at around 1°C, and one like a day cellar set at a suitable temperature for immediate use.

Namazake and ginjo, with their delicate aromas, and types of sake with plentiful amino acids need particularly careful handling.

Keep in mind that some negative perceptions of sake, for example that it smells of alcohol, are a result of handling and not due to the sake's intrinsic nature. This will continue to be a very serious concern in future. More and more specialist stores and even general liquor stores are getting wine cellars, but it seems like sake does not yet have the same level of recognition as wine.

It is vital to thoroughly monitor all stages from distribution through to purchase, storage and management so your customers know that the sake they drink at your bar or restaurant is always excellent, and so create trust and satisfaction.

Types of bottle and ranking for likelihood of light-induced color change

Bottle	Ranking
1,8 L brown	7
1.8 L blue (issho bin)	2
720 ml blue (4-go bin)	1
720 ml clear	3
630 ml brown (beer bottle)	8
500 ml green	6
300 ml green (3 dl bottle)	4
180 ml clear (bottle for heating)	5

Managing sake

When receiving sake, you must create and fill in a warehousing control sheet for each brand and make it so that anyone can tell at a glance how much of each variety of each brand is currently in stock, where it is stored, and when the next expected order date is. Some information to record on the warehousing control sheet is: a list number, brand, breakdown by type, production area, dealer, bottle sizes, date received, purchase price, sale price, cost rate and number of bottles in stock.

- Hints and tips for management

1. Keep clear records of warehouse movements in a daily record form so you can keep accurate control over how much of what type of sake you have in stock. (See Figure 1, p. XXX)
2. Create a report of goods coming in and out every month, and record and know what type of sake is selling each month. (See Figure 1, p. XXX, Figure 2, p. XXX)
3. Use the warehouse control form as a guide to when to reorder sake and ensure you never run out. (See Figure 1, p. XXX)
4. Keep up to date with fluctuations in price and supply/demand for brands, and make notes in the warehousing control form or other places as needed. (See Figure 1, p. XXX)

The way each restaurant or hotel manages stored sake is a serious concern, and storage management can have a major impact on improving profit. (See reference figures on pp. XXX, XXX)

The amount of space available to businesses in the service industry can differ considerably. Sales analysis and forecasting, thinking about where to hold stock and securing a suitable storage space must be carefully considered in order to significantly increase sales effectiveness for a small cellar. A suitable storage space should have enough room to store the number of bottles consumed in an average month.

Running out of stock is a particular problem with sake. To ensure a reliable supply until the next list revision, talk to your supplier about quality and price, and come to an agreement whereby they will reorder brands as soon as they run low to keep sufficient stock. To do this, you of course have to consider overall how much sake the supplier handles, where it is stored, their sales analysis and forecast.

You can use this method of ordering set numbers of bottles alongside having the supplier responsible for storage, so you get the amount of sake you need, when you need it, like turning a tap on and off. Ordering when stocks have run out will mean you won't get the products in time, so have the supplier report their stock to you regularly. In cases of unavoidable loss or damage, setting up a system in advance for buying large quantities on the spot will minimize any disruption.

Sake purchased in this way, as explained above, must always be scrupulously protected from heat and light and stored in the most appropriate conditions for each one so as to have everyday peace of mind for stock management

