



WSET
WINE & SPIRIT
EDUCATION TRUST



*An introduction
to sake*

An accompaniment to the
WSET® Level 1 Award
in Sake



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An introduction to sake

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WSET® Level 1 Award
in Sake

A world of knowledge

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Introduction

Welcome to the WSET Level 1 Award in Sake, a one-day sake course designed for those studying sake for the first time.

Sake is intimately linked with Japan. Indeed, one of the official names for sake, *nihon-shu*, literally means 'Japanese alcoholic drink'. With sake you have something that is truly, intricately and deliciously Japanese.

This course is designed to show you how a humble grain of rice can be made to deliver such a diversity of styles with different flavours and textures. You will also get to know the all-important Japanese names for these styles. These are the fundamental reference points that will enable you to navigate the fascinating world of sake.

We hope that you enjoy the course and in the future you experience the benefits knowledge and understanding brings.

Kampai! (Cheers)

A handwritten signature in blue ink that reads "Ian Harris". The signature is written in a cursive style with a long, sweeping underline that extends to the right.

Ian Harris
Chief Executive, Wine & Spirit Education Trust



What is Sake?

Sake is a Japanese alcoholic beverage that is made from rice. Most sake are clear and colourless in appearance but some are a pale yellow or green. They are typically 15–17% abv, slightly sweet and lightly acidic. They have light and delicate cereal, lactic or fruity flavours.

The Ingredients of Sake

All sakes are made using four main ingredients:

- steamed white rice
- *kōji*
- water
- yeast

There is one other ingredient that is optional:

- high-strength distilled alcohol

Where Does the Steamed Rice Come From?

Sake brewers typically buy rice from suppliers. When it is delivered to the brewery, the rice has not been steamed. It is hard and dusty.

The brewers steam the rice to soften it so that it can break up in the water.

Where Does the *Kōji* Come From?

Sake brewers take a small proportion of the steamed rice and grow mould on it to create *kōji*.

Without this ingredient it is not possible to make the alcohol that is found in all sakes.

Where Does the Water Come From?

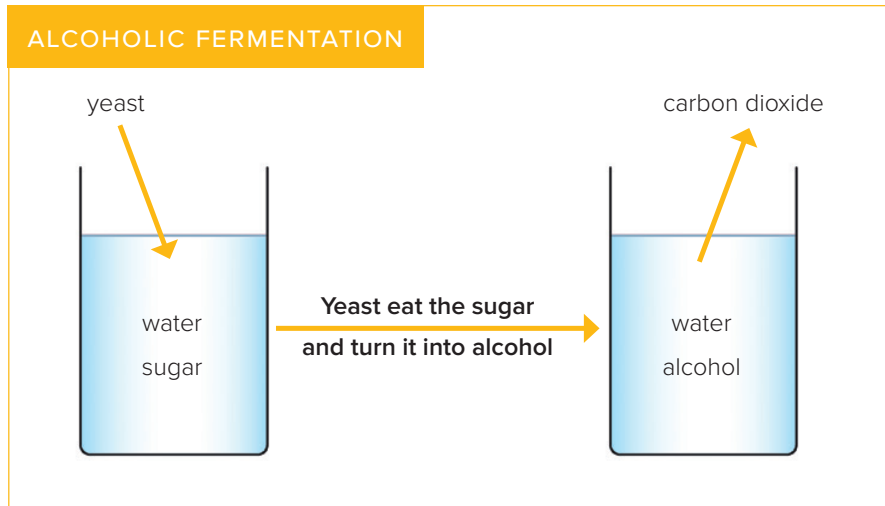
Sake brewers use local supplies of water. Almost any water can be used to make sake so long as it is clean.

Where Do the Yeast Come From?

Yeast are tiny microorganisms. Sake brewers use specific varieties of yeast that they typically buy from specialist suppliers.

How Do you Make Alcohol?

In order to make alcohol you need to begin by dissolving sugar into water. Yeast are added to this sugary liquid and they eat the sugar, turn it into alcohol and produce the gas carbon dioxide.



Where Does the Sugar Come From?

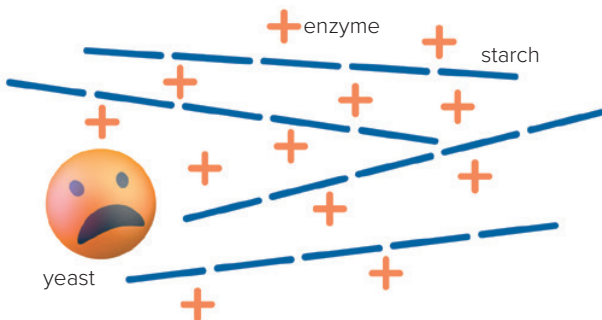
There is no sugar in rice, instead it is full of a substance called starch.

Starch is made up of sugar molecules that are bonded together into long chains. Chemicals called enzymes are able to unlock these bonds and break up the starch into its individual sugar molecules. This is called starch conversion.

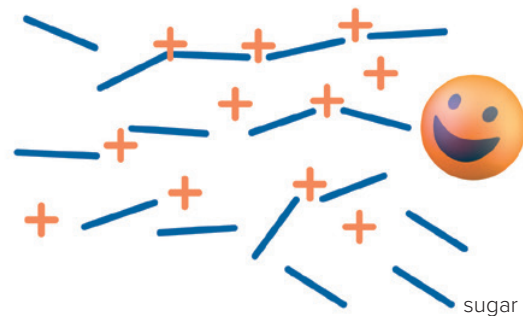
The special kind of mould that the brewer grows on steamed rice creates these enzymes. This is why *kōji* is so important.

When the steamed rice and *kōji* are mixed with water, the enzymes created by the mould convert the starch into sugar which in turn is turned into alcohol by the yeast.

Starch Conversion



Yeast are unable to eat starch.



Enzymes from the *kōji* break the starch into sugar, which the yeast can eat.

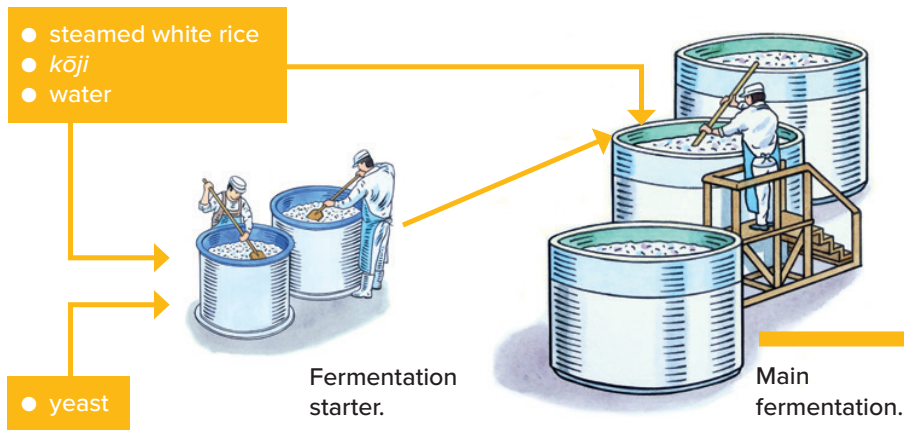


How is Sake Made?

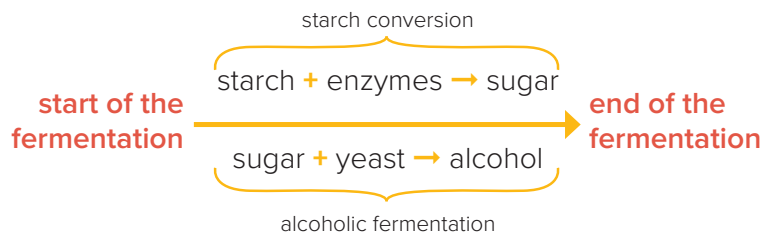
Once the steamed white rice, *kōji*, water and yeast are ready, brewing can get underway. There are three steps that always happen: fermentation, filtration and bottling. There are three other steps that are optional: adding alcohol, adding water and pasteurisation.

Fermentation

The ingredients are mixed together. Initially the brewer makes a small starter fermentation to create a healthy and active yeast population. The starter is then slowly mixed with more of the ingredients to make a larger batch for the main fermentation.



In a sake fermentation the enzymes create sugars at the same time as the yeast eat the sugar. This is unique to sake brewing and is often referred to as 'parallel fermentation'.



When the fermentation is finished the new sake typically has about 20% abv.

Fermenting sake. The white colour comes from the rice.





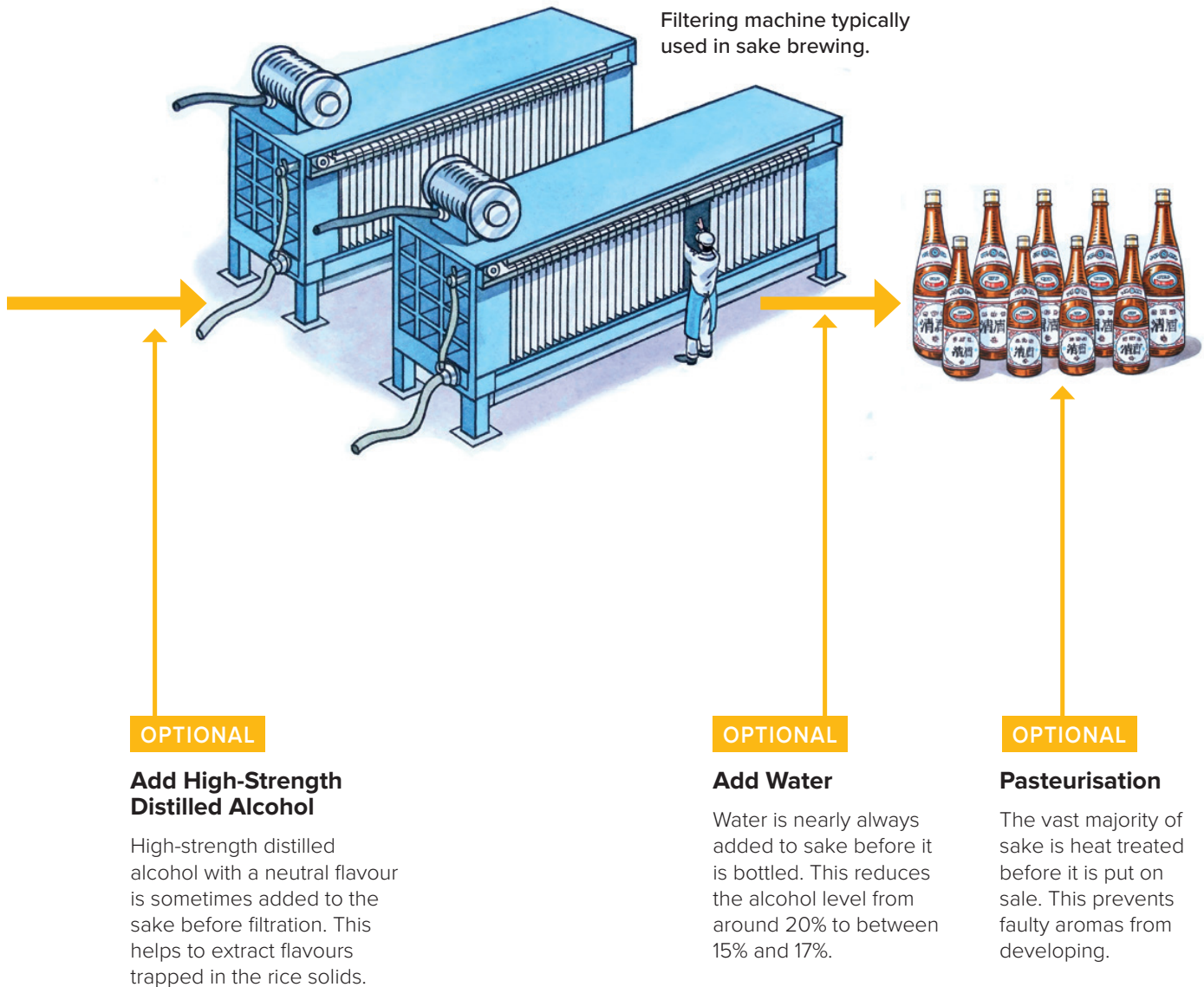
Freshly-filtered clear sake.

Filtration

Once the fermentation has finished, all sake must, according to the law, be filtered. This removes the rice solids and typically produces a clear liquid.

Bottling

Nearly all sakes are packaged in glass bottles of various sizes.



Categories and Grades of Sake

Sake is divided into a number of categories and grades. The principal division is into basic and premium sake. Premium sake is divided into a number of grades.

Basic Sake

This simple style of sake is known as *futsū-shu* in Japanese.

Most *futsū-shu* are clear and colourless in appearance but some are pale yellow or green in colour. They are 15–17% abv, slightly sweet and lightly acidic with delicate lactic and fruity flavours.

Premium Sake

Here we will cover the six most important grades of premium sake. The majority of these sakes have the same alcoholic strength and colour as basic sake. However, these six grades can be broken down into two styles that are quite different from the majority of typical sakes:

1. Sakes that typically have pure floral and fruity aromas. The word that indicates this style is *ginjō*. *Daiginjō* literally means 'big *ginjō*' and these sakes have the purest fruity and floral flavours.
2. Sakes that typically have cereal and lactic aromas. These sakes typically have more acidity and umami than the *ginjō* styles.

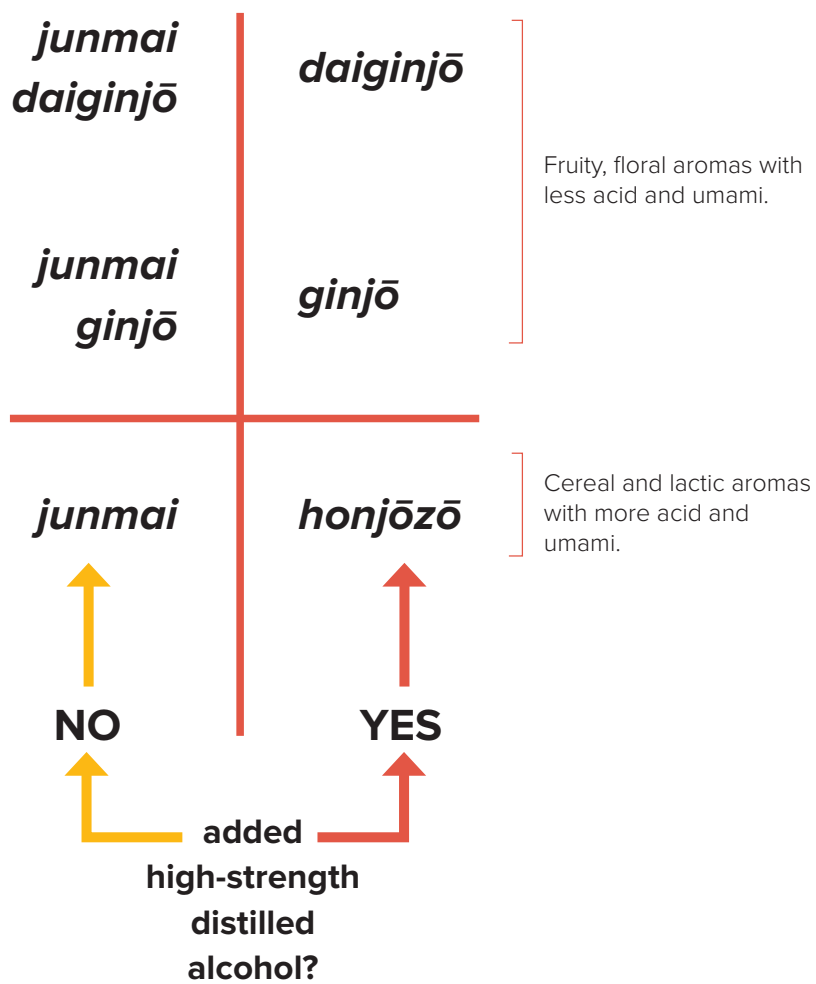
These six grades are also divided in another way. Three of the grades feature the word *junmai*, which means 'pure rice'. This indicates that high-strength distilled alcohol was not added before filtration. Bearing this all in mind *junmai ginjō* is a similar style to *ginjō*. The only difference is that the sake labelled *junmai* has not had distilled alcohol added.



Basic sake

futsū-shu

Grades of Premium Sake





An Introduction to Tasting Sake

In order to get the most out of tasting a sake, you need to take a consistent approach with every sample. If you take this approach you will be able to write tasting notes that accurately describe a sake, which you can refer back to in the future.

The WSET Level 1 Systematic Approach to Tasting Sake will help you to do this and your educator will show you how to use it.

WSET Level 1 Systematic Approach to Tasting Sake®

APPEARANCE	
Clarity	clear – cloudy
Other observations	e.g. bubbles, colour
NOSE	
Aroma characteristics	e.g. fruity/floral, cereal/grain/nut, lactic/dairy, other
Other observations	e.g. intensity, faults
PALATE	
Flavour intensity	light – medium – pronounced
Flavour characteristics	e.g. fruity/floral, cereal/grain/nut, lactic/dairy, other
Other observations	e.g. sweetness, acidity, texture, umami, rice particles, bubbles, finish

Preparing for a Tasting

Before you start tasting you should make sure that:

- there are no distracting smells
- you have a white surface to help you assess the appearance of the sake
- you have a glass that has a wide bowl that narrows towards the top. This type of glass helps to concentrate the aromas, making it easier to assess the nose
- you have a clean palate that has no lingering flavours, such as toothpaste or coffee.

Sake Name:	
Appearance	
Nose	
Palate	

Sake Name:	
Appearance	
Nose	
Palate	

Sake Name:	
Appearance	
Nose	
Palate	



Preparing Steamed White Rice

A sake brewer starts with grains of brown rice, which need to go through a four-stage process in order to become steamed white rice. The steps are: polishing, washing, soaking and steaming.

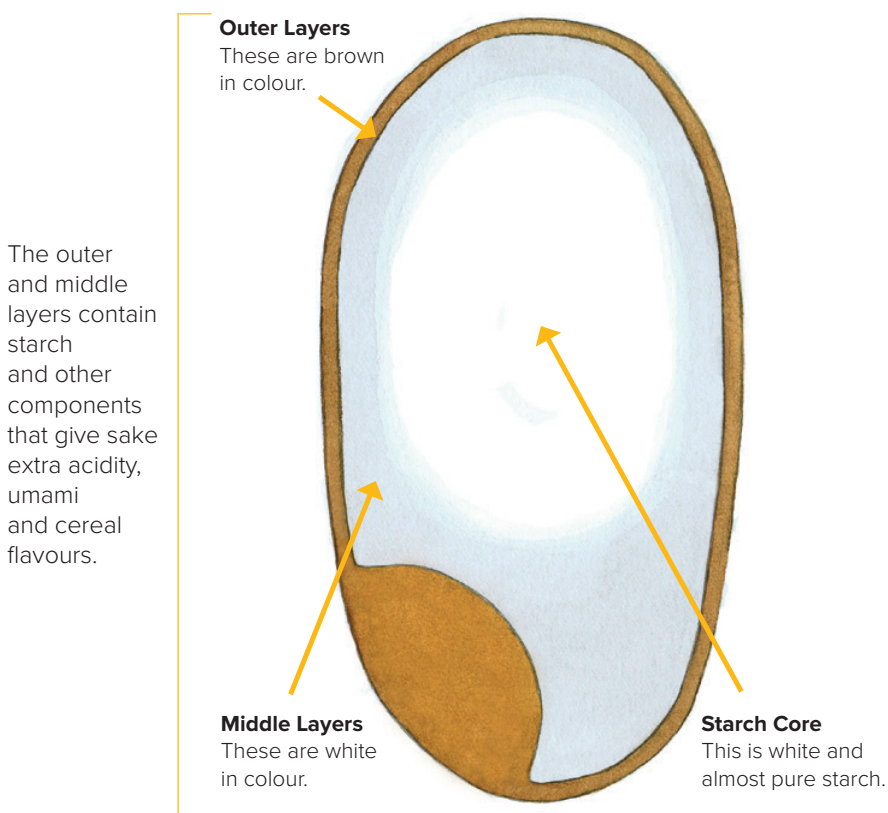
Polishing

During polishing, the grains are passed between two rough surfaces which, over the course of a few hours, slowly remove the outer as well as some of the middle layers of the grains. This creates white rice.

The outer layers are nearly always removed and the brewer can choose how much of the middle layers to remove; this has a significant impact on the style of the sake produced. The outer and middle layers contain starch but they also have a lot of other components. These can give a sake more acidity and umami as well as cereal and lactic aromas.

- If a brewer only polishes away some of the middle layers, the resulting sake will have more acidity and umami, with cereal and lactic aromas.
- If the brewer decides to remove most or all of the middle layers to leave just the core, which is almost pure starch, then the resulting sake will typically have less acid and umami and more fruity, floral aromas.





A Rice Grain



Polishing Ratio

The amount of polishing that is required in order to make one of the premium styles of sake is defined in Japanese law. This is called the polishing ratio. This ensures that the labelling terms are a good indication of the style of sake.

The polishing ratio is expressed as a percentage. If the law requires a ratio of 60 per cent, this means that only 60 per cent or less of the original grain remains after polishing.

100%		Rice with a polishing ratio between 100% and 70% can be used to make <i>junmai</i> but this is very rare.
70%		<i>honjōzō</i> and most <i>junmai</i> Rice is polished to 70% or less.
60%		<i>ginjō</i> or <i>junmai ginjō</i> Rice is polished to 60% or less.
50%		<i>daiginjō</i> or <i>junmai daiginjō</i> Rice is polished to 50% or less.

Washing, Soaking and Steaming

After polishing the grains have rice dust residue all over them, left over from the polishing process. This dust is made up of the outer and middle layers that the brewer wanted to remove and therefore it needs to be washed off.

Soaking and then steaming is necessary to soften the grain and ensure that it has the correct texture and level of moisture so that it can break up into the water during fermentation.



washing



soaking



steaming



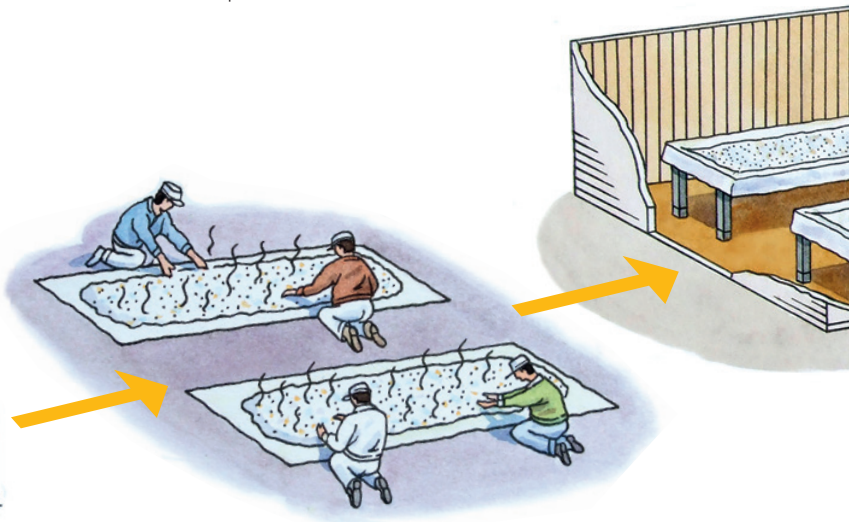
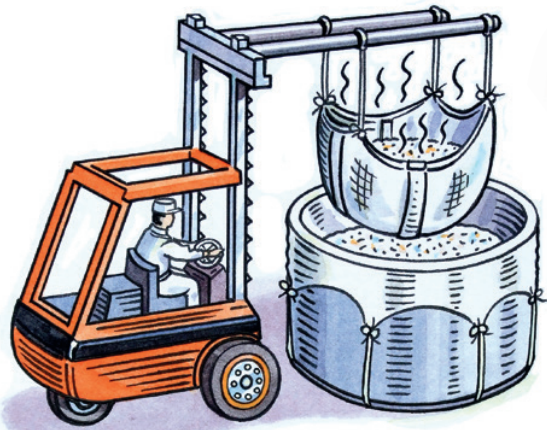
Making *Kōji*

Kōji making takes place in a special series of rooms in a sake brewery. In these rooms the brewer is able to control the temperature and humidity very precisely. There are four stages in making *kōji*. They are:

- 1 cooling the steamed rice
- 2 spreading the mould over the steamed rice
- 3 initial mould growth
- 4 controlling and stopping the mould growth.

1 Cooling the Steamed Rice

When it is taken out of the steamer the rice is too hot to make *kōji*. It is spread out on mats to cool naturally.



2 Spreading the Mould

When the rice has cooled enough it is moved into the warmest and most humid part of the *kōji* room. It is spread out in a thin layer on a large table and the mould spores (seeds) are spread over the steamed rice.



Steamed rice.

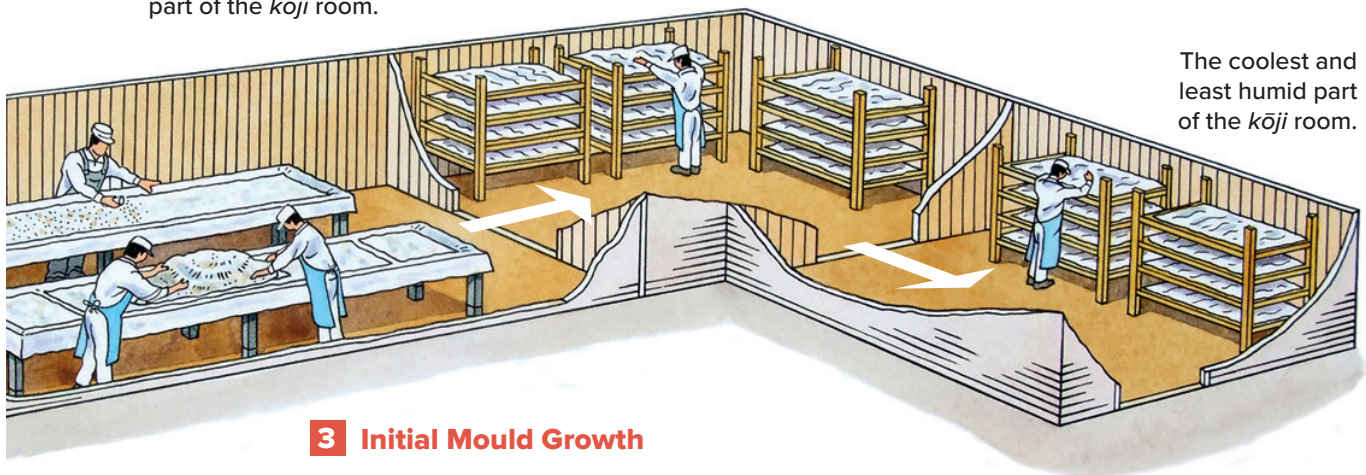


Spreading the mould spores.

4 Controlling and Stopping the Mould Growth

The rice is sometimes transferred to racks and moved to cooler and less humid parts of the *kōji* room. The aim of the brewer is to slow the mould growth so that exactly the right amount of mould can be grown. To stop the growth the rice is moved to the coolest part of the *kōji* room.

The warmest and most humid part of the *kōji* room.



The coolest and least humid part of the *kōji* room.

3 Initial Mould Growth

In the warmest and most humid part of the *kōji* room the mould grows rapidly over the rice. The rice is regularly turned by hand to ensure the growth is even.



Kōji.



Fermentation

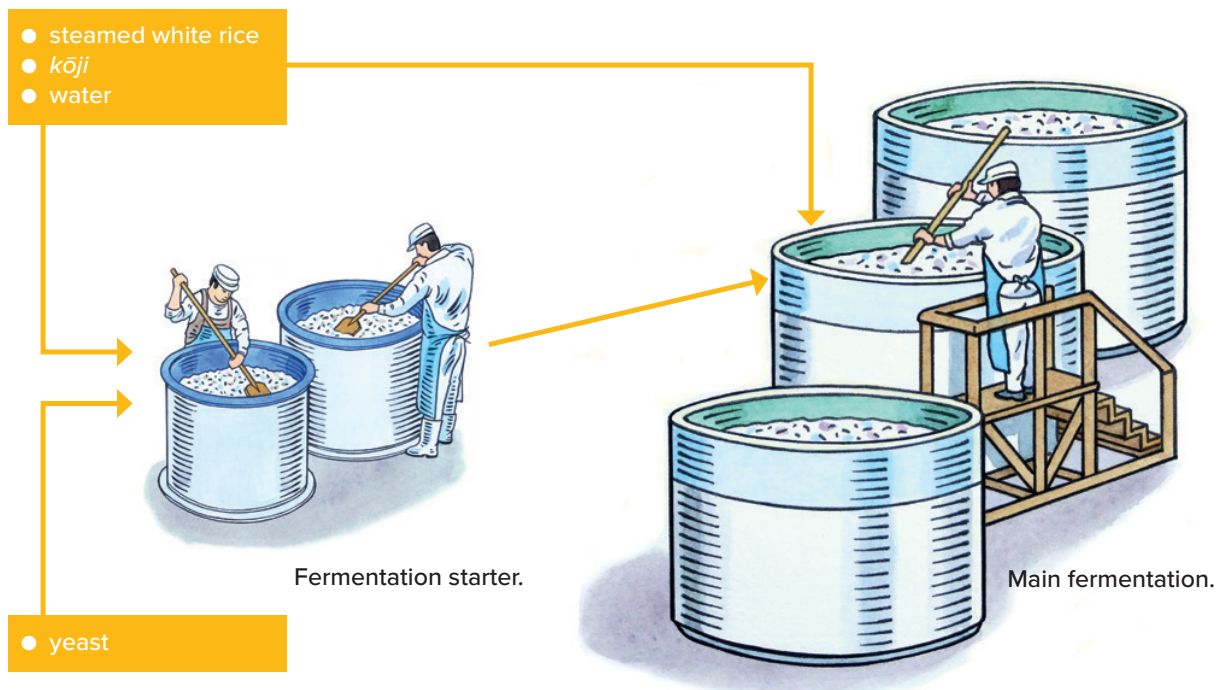
For many styles of sake the steamed white rice, *kōji* and water give relatively little flavour. However, in nearly all styles of sake the yeast contribute a significant amount of flavour.

The brewer starts off the fermentation by using a small amount of the four main ingredients to build up a healthy population of yeast. This is called the fermentation starter. This is then moved to a larger vessel where it is carefully mixed with more steamed white rice, *kōji* and water to make a larger batch for the main fermentation.

During fermentation, the brewer can use their choice of yeast and the temperature of the fermentation to affect the style of sake.

Special strains of yeast and lower fermentation temperatures must be used in order to create the fruity and floral aromas characteristic of *ginjō* styles.

In contrast, warmer fermentation temperatures produce cereal and lactic aromas.



Special yeast strains

Cooler fermentation temperatures

Fruity, floral *ginjō* aromas

Warmer fermentation temperatures

Cereal and lactic aromas

Tasting Notes

WSET Level 1 Systematic Approach to Tasting Sake®

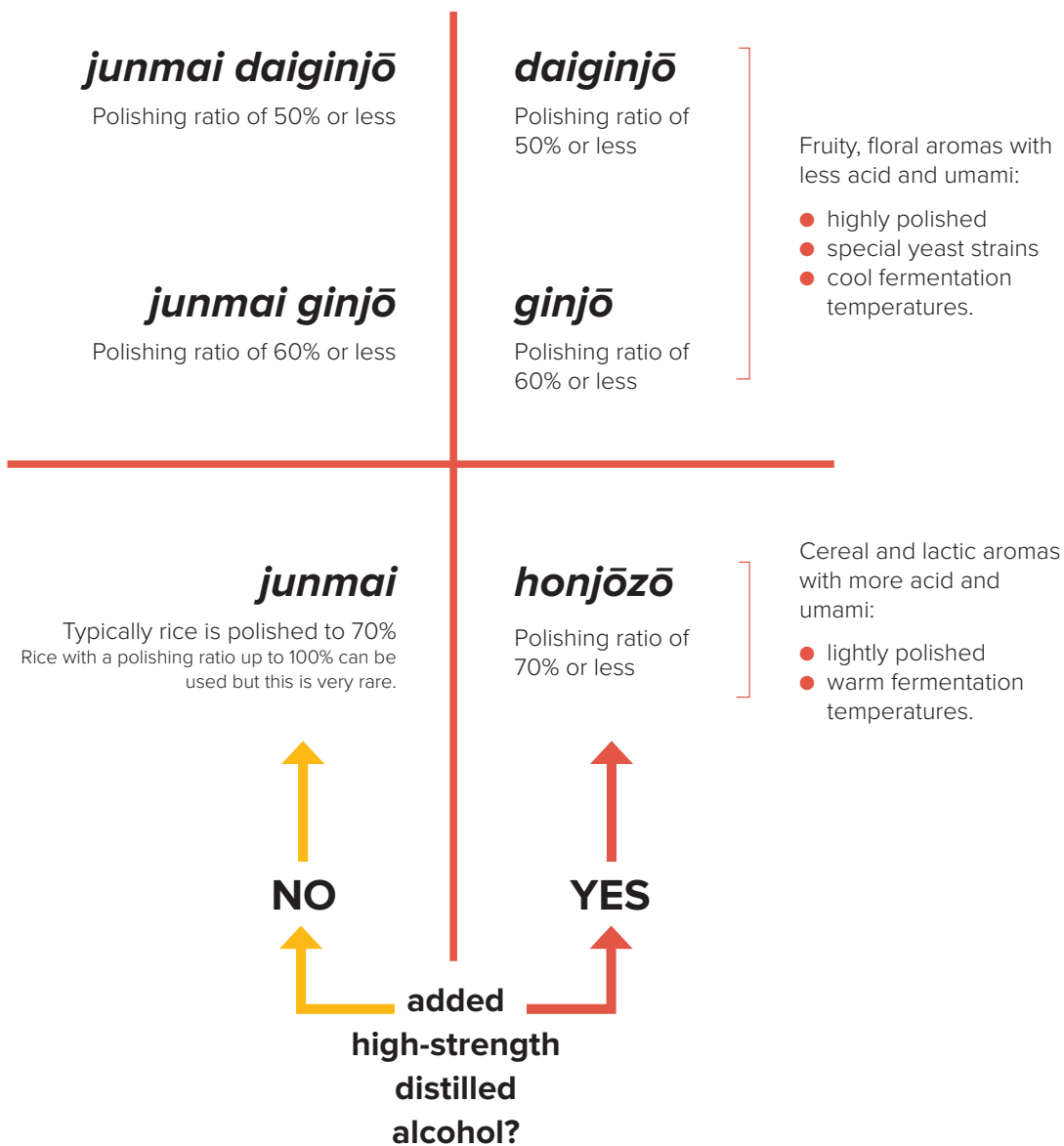
APPEARANCE	
Clarity	clear – cloudy
Other observations	e.g. bubbles, colour
NOSE	
Aroma characteristics	e.g. fruity/floral, cereal/grain/nut, lactic/dairy, other
Other observations	e.g. intensity, faults
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Flavour intensity	light – medium – pronounced
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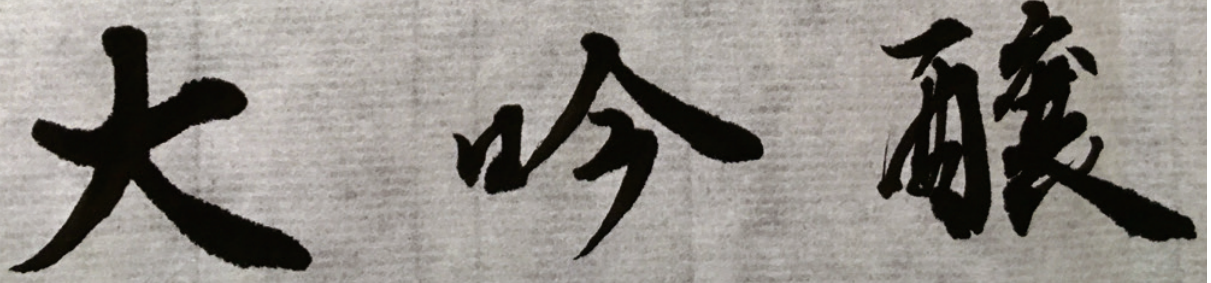
Sake Name:	
Appearance	
Nose	
Palate	

Sake Name:	
Appearance	
Nose	
Palate	

Premium Sake Revisited

The information about yeast and fermentation temperature can be linked to the detail about polishing ratios to create a chart showing how these factors combine to affect the style of premium sakes.





Japanese Labelling Terms

Most sake labels are written in Japanese with only a few words written in the Latin alphabet. It is helpful to be able to recognise four key labelling terms: *junmai*, *honjōzō*, *ginjō* and *daiginjō*.

In the table below the Latin alphabet spelling of the three labelling terms is split into their sounds. Each symbol, called *kanji*, represents one of these sounds. Note that there are only seven *kanji* to learn because the symbol for 'gin' and 'jō' are repeated.

<i>junmai</i>
<i>jun mai</i>
純 米

<i>honjōzō</i>
<i>hon jō zō</i>
本 醸 造

<i>ginjō</i>
<i>gin jō</i>
吟 醸

<i>daiginjō</i>
<i>dai gin jō</i>
大 吟 醸



Speciality Styles of Sake

There are four important speciality styles of sake: *nama*, *nigori*, sparkling and *koshu*. They can also be a grade of premium sake or a *futsū-shu*. For example, a *junmai ginjō* could also be *nama*, *nigori*, sparkling or even a combination of some of these speciality styles.

Nama

Sakes that have not been pasteurised are called *nama*. Because they are less stable than other sakes, most *nama-zake* should be consumed shortly after release, and should be kept refrigerated at all times. Skipping the pasteurisation step means that on release these sake can taste particularly lively and fresh, but they can rapidly develop spicy, malty aromas that are not to everyone's taste. Note that because Japanese people soften the 's' to a 'z' when talking about *nama-sake*, it is usually spelled *nama-zake*.

Nigori

Sakes that have been roughly filtered are called *nigori*. These sakes are cloudy, due to the suspended particles of rice. The style can vary, depending on how much solids are kept; some are lightly cloudy, and others are thick textured with lumps of rice fragments.



Sparkling Sake

In common with any sparkling beverage, the bubbles in sparkling sake are caused by carbon dioxide gas dissolved in the liquid. Various techniques exist for dissolving carbon dioxide gas in bottled sake. Some of these sakes are very light in texture and low in alcohol, and others are more richly textured and more complex, and can even be *nigori* too. Note, there are Japanese terms for sparkling sakes, but we do not give them here because they are not widely used outside of Japan.



Koshu

Aged sakes are called *koshu*. Sake can be aged in various vessels (storage tanks, terracotta, glass bottles, wood – though oak is very rarely used). Some brewers age sake at room temperature, and others age it at low temperatures (sometimes below freezing). This leads to a wide range of different styles. Most *koshu* is amber or brown in colour, richly textured and sweet, and has pronounced aromas of nuts, dried fruit, and even meat and pickled vegetables. But aged sakes can be paler and more delicate.



Tasting Notes

WSET Level 1 Systematic Approach to Tasting Sake®

APPEARANCE	
Clarity	clear – cloudy
Other observations	e.g. bubbles, colour
NOSE	
Aroma characteristics	e.g. fruity/floral, cereal/grain/nut, lactic/dairy, other
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Sake Name:	
Appearance	
Nose	
Palate	

Sake Name:	
Appearance	
Nose	
Palate	

Sake Name:	
Appearance	
Nose	
Palate	

Sake Name:	
Appearance	
Nose	
Palate	

Sake Name:	
Appearance	
Nose	
Palate	



Storage and Service of Sake

Storing Sake

Sake is easily damaged if it is exposed to heat or strong light. The following points should be followed when storing sake:

- **Keep it cool.** Even for short-term storage, sake should be kept cool and ideally refrigerated. Refrigeration is especially important for *nama-zake* and for protecting the fruity aromas of *ginjō* sakes.
- **Drink it young.** Most sakes are intended to be consumed within about a year of being put on sale. After a year they typically lose their freshness. Most *nama-zake* lose their freshness in a few months.
- **Store the bottle upright.** Sake bottles are best stored upright.
- **Avoid bright light.** Keep sake away from strong sunshine and bright artificial light which can cause faulty aromas to develop.

Once opened, a sake bottle should be sealed and stored in a refrigerator. Open bottles of sake generally last two weeks, and sometimes even longer. The more delicate *ginjō* styles remain fresh for about one week after opening.

Sake Faults

The most common faults are caused by bad storage. The main ones to look for are:

- **Oxidation** – A bottle that has been open too long develops unwelcome aromas of caramel and toffee. It also becomes deeper in colour.



- **Out of Condition** – A bottle that is too old develops unwelcome aromas of caramel, toffee and pickled vegetables. It also becomes deeper in colour.
- **Nama-hine** – *Nama-zakes* can develop unpleasant aromas of malt, meat and rotting vegetables.

Note that aromas linked to oxidation and out of condition are similar to those of *koshu*. The processes that cause these aromas to develop are the same but for other sakes they are not welcomed by consumers.

Alcohol and Health

When consumed in moderation, alcohol is not regarded as being harmful to one's health. However, alcohol can significantly affect the behaviour of anyone who consumes too much (often in very socially unacceptable and dangerous ways).

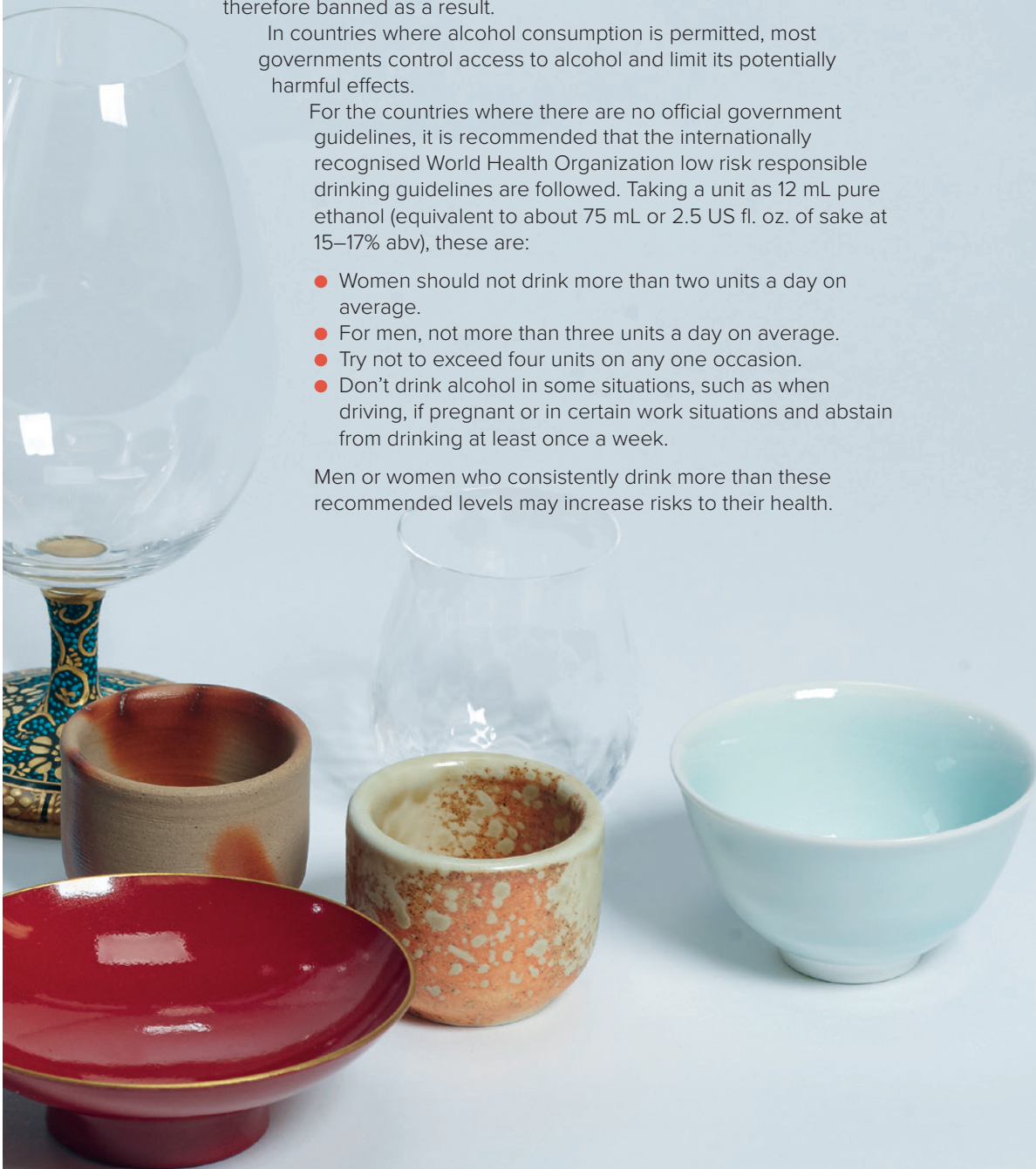
For some people it can be highly addictive and, when consumed to excess, it can have a negative impact on both short- and long-term health. In some cultures alcohol is not considered socially acceptable and its consumption is therefore banned as a result.

In countries where alcohol consumption is permitted, most governments control access to alcohol and limit its potentially harmful effects.

For the countries where there are no official government guidelines, it is recommended that the internationally recognised World Health Organization low risk responsible drinking guidelines are followed. Taking a unit as 12 mL pure ethanol (equivalent to about 75 mL or 2.5 US fl. oz. of sake at 15–17% abv), these are:

- Women should not drink more than two units a day on average.
- For men, not more than three units a day on average.
- Try not to exceed four units on any one occasion.
- Don't drink alcohol in some situations, such as when driving, if pregnant or in certain work situations and abstain from drinking at least once a week.

Men or women who consistently drink more than these recommended levels may increase risks to their health.



Serving Sake

Serving Chilled Sake

Sakes should be chilled in a fridge. They can either be served straight from a bottle that has been refrigerated or decanted into a *tokkuri*. Some *tokkuri* have a compartment for iced water to keep the sake cool.

Sake Serviceware

Sake can be served in a variety of different traditional Japanese vessels as well as wine glasses.

Wine Glasses

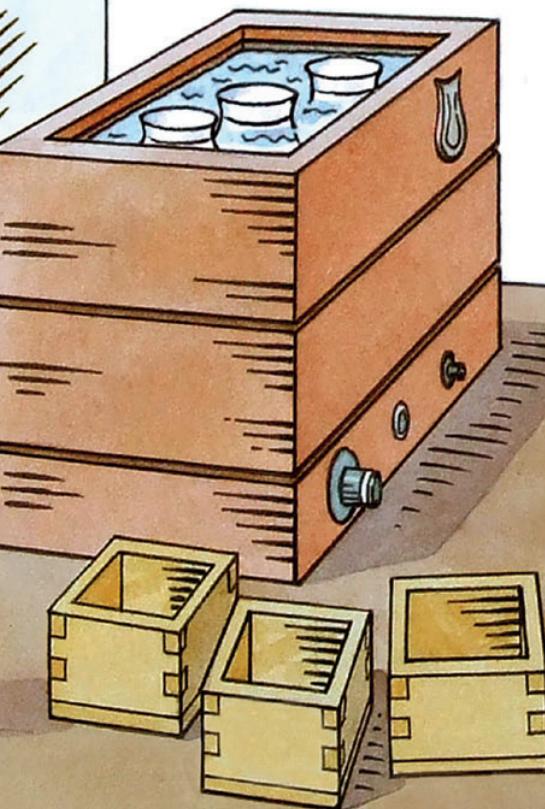
These are ideal for serving premium sake either chilled or at room temperature. The most suitable glasses are small enough that the sake stays at the right temperature while it is being consumed, and tulip-shaped to enhance the aromas.

Service Temperature

Sake can be served at a wide range of temperatures, though not all styles of sake are suitable for serving warm. Warming sakes makes them seem more intense, richer in texture and higher in acidity. This can help when pairing with food. However, *ginjō* style sakes lose their aromas and flavours when heated and are best served chilled.

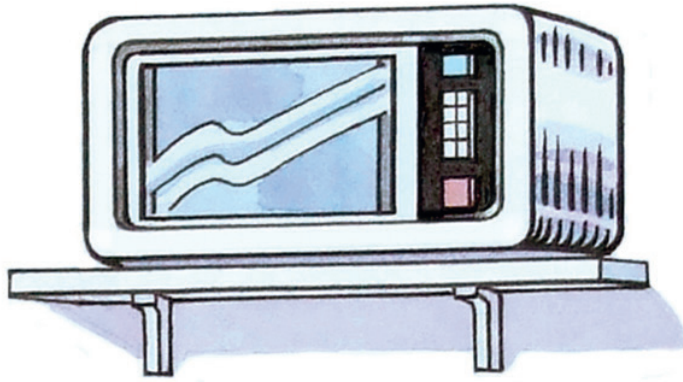
Warming Sake using a Waterbath

Place the *tokkuri* in a container filled with water heated to about 80°C (176°F). It takes about two to four minutes to warm a small *tokkuri* of sake, and you should always check the temperature using a thermometer.



Masu

This is the Japanese word for a small box made of cedar. It is not an ideal sake service vessel because the wood adds flavour to the sake. Historically they were used for measuring rice rather but sake is occasionally drunk out of a *masu* at ceremonial occasions.

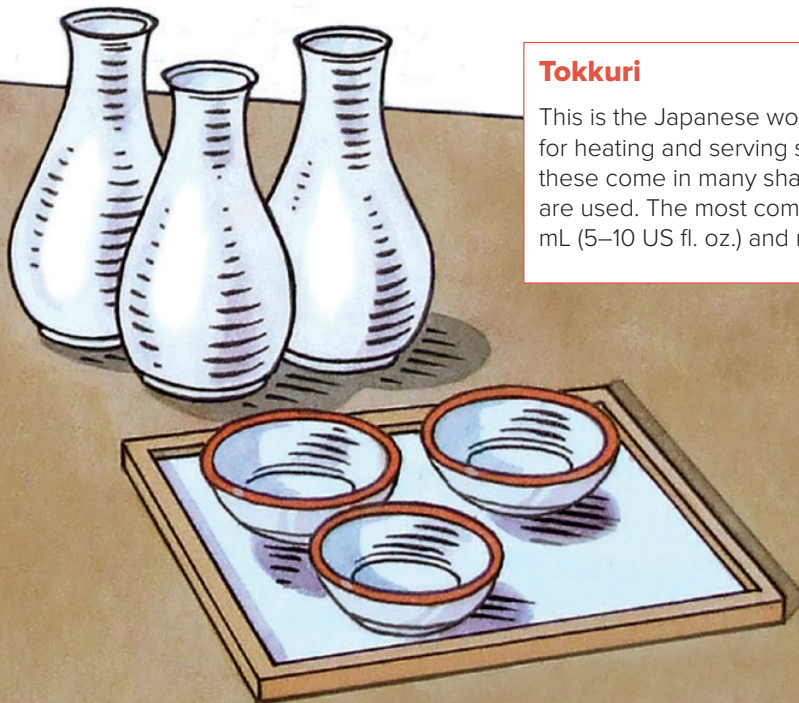


Warming Sake using a Microwave

Use a microwave, ensuring that the container you use is suitable for microwaving. This takes about 20–40 seconds to warm 180 mL of sake, depending on the microwave and the temperature change needed. Because water heats at almost the same speed as sake, you can practise first by warming water.

Recommended Service Temperatures

Style of sake	Chilled 6–13°C (43–55°F)	Room temperature 15–18°C (59–64°F)	Warm/hot 40–50°C (104–122°F)
<i>Futsū-shu, junmai, honjōzō</i>	✓	✓	✓
<i>Ginjō styles</i>	✓	personal preference	✗
Sparkling sake	✓	✗	✗
<i>Koshu, nigori</i>	These sakes are generally best served chilled, but some can be served warm.		



Tokkuri

This is the Japanese word for a sake carafe, used for heating and serving sake. Like traditional cups, these come in many shapes, and many materials are used. The most common are about 150–300 mL (5–10 US fl. oz.) and made of pottery.

O-choko

This is the Japanese word for a traditional sake cup. These come in a range of sizes, shapes and materials. The most common kinds are small pottery or glass cups that have a flat base. The small size means that they must be frequently refilled, reflecting a tradition of Japanese hospitality.

Practical Exercise: Heating Sake

Sake can be served either chilled or warm but not every sake benefits from being heated prior to service.

In this exercise you will taste two different sakes:

- *Junmai*
- *Ginjō* style

How the Exercise will Work

- **Step 1.** Taste the sakes once they have been chilled to 6–13°C or 43–55°F and on the opposite page record your impressions of their aromas and texture.
- **Step 2.** Your educator will then heat both the sakes until they reach 40–50°C or 104–122°F. This may be done in a waterbath or a microwave depending on what is available.
- **Step 3.** Taste the sakes again and note if or how they have changed. In particular think about how the texture and the aromas of the sake have been affected. Are any changes positive or negative?



Sake being heated in a waterbath. A thermometer is used to check the temperature of the sake.

WSET Level 1 Systematic Approach to Tasting Sake®

APPEARANCE	
Clarity	clear – cloudy
Other observations	e.g. bubbles, colour
NOSE	
Aroma characteristics	e.g. fruity/floral, cereal/grain/nut, lactic/dairy, other
Other observations	e.g. intensity, faults
PALATE	
Flavour intensity	light – medium – pronounced
Flavour characteristics	e.g. fruity/floral, cereal/grain/nut, lactic/dairy, other
Other observations	e.g. sweetness, acidity, texture, umami, rice particles, bubbles, finish

<i>Junmai:</i>	
Chilled	
Warm/hot	

<i>Ginjō style:</i>	
Chilled	
Warm/hot	



Sake and Food

Sake does not just pair well with Japanese food. It can be enjoyed alongside most international dishes too. Understanding the principles behind successful and unsuccessful pairing will help you to have the confidence to match sake with a wide range of cuisines.

Food and Drink Taste Interactions

When food and drink are consumed together they affect the way each other taste. This is called a taste interaction and the principles can be applied to any combination of food and drink. An extreme example of this happens when orange juice tastes unpleasantly bitter and acidic immediately after using toothpaste.

Taste interactions between food and drinks are typically nothing like this extreme but changes do happen. Generally, food affects a drink more than a drink affects food. A knowledge of what interactions can happen helps to enhance a dining experience while at the same time helping to avoid potential problems.



Positive Interactions

Salt and **acid** in foods tend to make a drink seem less drying and bitter and less acidic. These components can also make a drink seem sweeter; and more fruity.



Negative Interactions

Umami in foods tends to make a drink taste more drying and bitter and more acidic. These components can also make a drink seem less sweet; and less fruity. Salt in food can cancel out the negative impact of umami.

Sugar and **chilli heat** in a food can have a similar effect to umami. Chilli can also increase the burning effect of the alcohol.

Bitterness in a food can make a drink taste more bitter.

Food and Sake

As you will discover in the practical exercise sake does not typically have strong negative interactions with food. These negative reactions are normally associated with umami and sugar in the food.

There are therefore only a few key points to consider when pairing sake with food.

- Most sakes go with most foods. Personal preference is therefore always the most important consideration.
- Food and sakes should have a similar flavour intensity so that one does not overwhelm the other.
- Sweet dishes should be paired with a sake that is equally as sweet.

Practical Exercise: Pairing Sake and Food

In this exercise you will try four food samples that show sweetness, saltiness, umami and acidity and you will pair them with two different sakes:

- *Junmai*
- *Ginjō* style

How the Exercise will Work

- For each food sample you will need to follow the same routine. Take a small mouthful of the sample and then take a sip of the first sake. Note if or how the food affects the aroma and texture of the sake. Then repeat the pairing but this time use the second sake.

	<i>Junmai</i>	<i>Ginjō</i> style
Sweet		
Salt		
Umami		
Acid		



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About WSET

The Wine & Spirit Education Trust (WSET) is the world's leading provider of qualifications in wines and spirits. Our programmes are designed for anyone looking to develop their knowledge in wines, spirits and sake – from beginners to professionals. We currently offer eight qualifications; from one-day beginner courses through to a specialist level Diploma.

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A world of knowledge

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