MfG_E_fermentation_industry

1. Three reason that brewing industry has been accumulated in Settaya area.

2. Japanese rice

3. Production processes of fermentation drinks and miso

4. Types of Japanese sake

5. Miso and Syoyu

Supplement

What is Japanese sake?
1. Three reasons that the brewing industry has been accumulated in Settaya area

First, fundamental conditions for the Japanese Sake brewing are considered to be the following three elements: water, rice, chief brewers. Settaya is located approximately 1.5 km from the Higashi-Yama Hills and 2 km from the Shinano-Gawa River, so Settaya is blessed with high quality, rice, and low hardness water. Actually, Settaya is located on the fan delta-tip of Ohtagawa-river, of which the origin is the Higashi-Yama Hills, a short river. And Niigata area has been well known as skillful Sake chief-brewery person are there.

Secondly, Settaya area was ruled as a territory of the Zao-Shrine, under the authority of the Edo-Kan-ei-Ji Temple of the Shogunate. So Settaya town was out of control of Nagaoka feudal domain. I guess the Settaya’s commerce regulations such as tax system, the stock acquisition were weak, and the town was easy to do business.

Thirdly, regarding raw materials transportation of liquor and soy sauce, shipment and route by land distribution route were important. Thinking from this point of view, here was a geographical convenience with “Mikuni-Kaidou” and the Ohta-Gawa river. Mikuni-Kaidou was one of the main country-routes to Edo. The Ohta-Gawa river flows to the Japan Sea, and was functioned as an inside-channel of the Shinano-Gawa River, therefore the Settaya area was blessed with transportations not only on land but also on water.

They said that “Mid-winter season is suitable for the Sake-production”. From winter to early spring, the Ohta-Gawa river has much quantity of water by melting snow, so this area should have been suitable for the shipment of new Sake in early spring. Actually, flow quantity of the Ohta-Gawa river in this area is considered to be the best condition, not too high speed, not too slow speed.
2. Japanese rice

In Japan, rice is not merely a principal food — it is just the roots and the trunks of Japanese, as well as a primary foundation of Japanese culture. There are a lot of different ways of cooking using rice, and no part of the plant is wasted.

Japanese have used rice stalks to make shoes, containers, bags, clothes, and material of thatched straw roofs. And when the thatched straw was replaced every year, the old straw was thrifty recycled, this time as fertilizers for crops or foddesr for livestocks.

And Japanese sake also made from rice grain since 2000 years ago.

Currently in making sake, both saccharification (conversion of starch to glucose sugar, grape sugar) and fermentation take place simultaneously in the same large tank (barrel). Because of this, small variations in the equilibrium of the mixture can result in large differences in the taste of the final product.

The alcohol beverages produced in the multiple parallel fermentation process are specific to the East Asian countries, known as Shaoxing rice wine from China, Makgeolli from Korea, and Japanese sake.

Among the various kinds of alcoholic beverages, ones using multiple parallel fermentation process, are said to require a high level of technical skill to make. This is very much related to the method of production.

For example, tastes and fragrance of Japanese sake vary, in particular depending on the raw material rice type, rice polishing level, and hardness of water.

Preparation of feasts is very important not only for meal but also for enjoying Japanese sake. This will be mentioned in the other chapter. (in preparation)
Production processes of fermentation drinks and miso

<table>
<thead>
<tr>
<th>Sake 並行複発酵</th>
<th>Beer 単行複発酵</th>
<th>Wine 単行発酵</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel multiple fermentation</td>
<td>Sequential multiple fermentation</td>
<td>Single fermentation</td>
</tr>
<tr>
<td>Polished rice (starch)</td>
<td>Barley (starch)</td>
<td>Grapes (glucose)</td>
</tr>
</tbody>
</table>

(Ⅰ) Saccharization  
Koji (Amirase)  
Glucose  
Saccharization  
Koji  
Saccharization  
Koji(Malt)  
(Protease)  
Maltose  
(Ⅱ) Saccharization  
Yeast  
(Ⅲ) Alcohol  
Heating  
Paeteurization

Miso (more complicated)  
Rice, Soy Beans  
Saccharization  
Koji  
(Amirase)  
(Protease)  
Glucose  
Soy beans paste  
Fermentation  
(Lactose fermenter)  
Soy beans paste

Processes of producing Japanese Sake

<table>
<thead>
<tr>
<th>原料処理</th>
<th>玄米 白米 蒸米 蒸米</th>
<th>washing steeping steaming</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I)</td>
<td>製麹(せいきく)</td>
<td>Rice polishing Steamed rice</td>
</tr>
<tr>
<td>(II)-1</td>
<td>酒母工程</td>
<td>精米 洗米 浸漬 殺菌 放冷</td>
</tr>
<tr>
<td>(II)-2</td>
<td>もろみ工程</td>
<td>蒸米麹水 酒母 yeast seed mash</td>
</tr>
<tr>
<td>(III)</td>
<td>火入れ工程</td>
<td>上樽酒 酒粕</td>
</tr>
<tr>
<td></td>
<td>貯蔵、製品化</td>
<td>冷却、調合、ろ過～清澄 [ビン詰め]</td>
</tr>
</tbody>
</table>

Processes of producing Japanese Sake:

1. **原料処理** (Raw Material Treatment): 处理原料，包括原料的清洗与初步处理。
2. **製麹** (Koji Production): 生產米糠，利用米糠生产酵母。
3. **酒母工程** (Seed Mash Process): 制作酒母，包括种子米和酵母的混合。
4. **もろみ工程** (Main Mash Process): 主要发酵阶段，包括三段发酵和微生物污染的防控。
5. **火入れ工程** (Pasteurization): 使用活性炭过滤(加热防止)和调和，火酷(杀菌，酵素失活)。
6. **貯蔵、製品化** (Storage and Productization): 冷却、调合、过滤至澄清，装瓶密封。
4. Types of Japanese sake

Jinjoshu, premium sake, produced by the process in which well polished rice is slowly fermented with low temperature. It has a specific fragrance and color.

Niigata has been one of the most famous brewery prefectures in Japan as it has more than 90 breweries, which is the largest number of all the prefectures in Japan.

Niigata is blessed with a rich natural environment to nurture its fertile land, which explains its great rice production. Also, the regular snowfall in winter results in pure and clear air as well as beautiful water, which is essential to brew great sake. So, blessed with such natural environment, Niigata is known as a great brewery prefecture producing “crisp and dry” sake.
5. Miso and Syoyu

(0) Koji (Koji malt)
Many of Japan’s fermented foods are made by inoculating steamed grains such as rice or wheat with Koji, otherwise known as the fungus Aspergillus oryzae. Depending on the grain used, the end result may be rice Koji, wheat Koji or nean Koji.

(1) What is Shoyu?
Shoyu is a soy sauce.
In Japanese cooking, seasoning is based on soup stock, and fermented soybean seasonings, such as soy sauce and miso (bean paste) that includes a lot of umami (giving good taste) ingredients, in addition to salt for salty flavor.
It is made by fermenting soybeans and wheat.
It is one of the essential seasonings in Japanese food cooking.
Soy-sauce is an essential seasoning for Japanese cooking, and the invention of koikuchi soy-sauce in the Edo period played a critical role for subsequent development of Japanese cooking.

Soy sauce is a seasoning of dark brown color. It is made from maturing malted rice, which is composed of soy bean and wheat. In maturing process, salt water is added into the malted rice. It is indispensable seasoning in cooking of Japanese food.
Depth and ”Umami” of taste are generated by using soy sauce.

(2) What is miso?
Miso is a seasoning which is first steamed soy beans, rice and malt, and next is fermented by mixed salt abd kouji.
The miso soup is the most popular classic Japanese cooking, and is indispensable on a Japanese dining table.

Various kinds of miso are produced in all over Japan, and they are frequently used for a lot of local cookings.
Miso is fermented food.
It is fermented soybean paste and is used for many kinds of dishes.
What is Japanese sake?

Based on the description [http://english.cheerup.jp/article/827](http://english.cheerup.jp/article/827)

(1) What it is?
Japanese sake is Japan’s national liquor. (spirits)
Japanese sake is brewed from rice grains.

There are many kinds of Japanese sakes such as “Junmai-shu”, “Honjozou-shu”, and “Ginjou-shu.” They have different levels of rice polish. And different brewing processes. A lower percentage of remain generally means more premium sake.

Rice polishing removes the exterior portion of the rice which is made up of protein and fat, leaving the interior which is made up of starch.

Starch is used in saccharification (the conversion of starch to sugar) which is necessary to brew alcohol. However, excessive amount of protein and fat give sake less desirable taste like bitterness or sourness. Premium sake, which has a lower percentage of rice polishing ratio, tends to be a clearer sake.

Higher polishing ratio doesn’t always mean good sake.

When it is well regulated, sake contains Umami, good taste component.

Tha sake is so complicarted, and that it is just attractive.

“Jizake” means Japanese sake brewed using locally grown rice grains and water from local sources.

There are many kinds of “Jizake” throughout Japan. Their uniqueness varies from region to region.

A bottle of premium “Jizake” sometimes costs tens of thousands of yen.
“Meishu” means Japanese sake which is specially brewed in small quantities.
It has high rarity value.

“Nama-zake” means Japanese sake which is not pasteurized at all after production.

(2) Drinking method

“Hiya” means Japanese sake served at normal temperature.
During the hot summer, drinking “Hiya” served in a cooled glass can be refreshing.
“Atsukan” means Japanese sake warmed to around 50 celsius.

Once Japanese sake becomes “Atsukan”, its aroma grows stronger.

“Hire-zake” means Atsukan served with grilled fish fins such as blowfish fins.
“Tamago-zake” means Atsukan served with well-beaten eggs.

It is said work well for a cold.

“Sakura-zake” means Japanese sake served with pickled Sakura leaves.
“Kiki-zake” means tasting various kinds of Japanese sake to make comparisons.
(3) Manners
When you are in front of your drinking partner or sitting to his/her right, you shouldn’t pour Japanese sake into a sake cup that’s on the table. When your drinking partner is pouring Japanese sake for you, please hold the sake cup with one of your hands and touch the cup’s bottom with another one. Smell the aroma of the Japanese sake while pouring a small amount of it into your mouth. Just sip it little by little. Normally, Japanese sake should be poured to fill eight-tenths of a sake cup.

(4) Influence into Japanese food, cuisine
First, Japanese sake can get rid of seafood’s fishy smells. At the same time, it can also be used to add fragrance to the food. So, Japanese sake Influences into Japanese food, cuisine, adding more fineness. Secondly, in drinking Japanese sake, we usually take several food to enjoy more pleasure time. This promotes Japanese cuisine adding more fineness.

Taste representation

<table>
<thead>
<tr>
<th>Japanese</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karakuchi</td>
<td>Dry</td>
</tr>
<tr>
<td>Amakuchi</td>
<td>Sweet</td>
</tr>
<tr>
<td>Hanayaka</td>
<td>Fruity</td>
</tr>
<tr>
<td>Koi</td>
<td>Rich</td>
</tr>
<tr>
<td>Nomiyasui</td>
<td>Easy to drink</td>
</tr>
<tr>
<td>Yawarakai</td>
<td>Soft</td>
</tr>
<tr>
<td>Karoyaka</td>
<td>Light</td>
</tr>
<tr>
<td>Shinsen</td>
<td>Fresh</td>
</tr>
<tr>
<td>Sanmi</td>
<td>Acidity</td>
</tr>
<tr>
<td>Fukuzatsu</td>
<td>Complex</td>
</tr>
<tr>
<td>Houjun</td>
<td>Mellow</td>
</tr>
<tr>
<td>Kire-ga-ii</td>
<td>Crisp finish</td>
</tr>
<tr>
<td>Yoiun</td>
<td>Afterglow</td>
</tr>
<tr>
<td>baransu-ga-ii</td>
<td>Well-balanced</td>
</tr>
<tr>
<td>Kairi-taka</td>
<td>Good aroma / Aromatic</td>
</tr>
</tbody>
</table>