manufacturing process.
Along with Kikkoman, the other major soy sauce manufacturer in Hokkaido today is Sapporo-based Hokkaido Shoyu Company, established in 1974 as the joint venture of ten soy sauce companies (currently owned by four companies). The remaining factories are small-scale, few in number, and primarily produce soy sauce products based on *kiage* raw soy sauce purchased from other manufacturers. Thus, soy sauce production in Hokkaido is centered on the two main companies mentioned above and their production of *honjozo* regular fermented soy sauce, and not the *kongo shoyu* mixture method products that add amino acid liquids to raw soy sauce. As mentioned earlier, the use of soy sauce in Hokkaido differs from that of Honshu, the mainland of Japan, because there is a culture of using *mentsuyu* noodle soup bases and kombu soy sauce products instead of straight soy sauce.

Hokkaido Kikkoman Corporation

The Birth of Usukuchi Soy Sauce and Kinki Soy Sauce

Professor Hiroshi Tachi, Tokyo University of Agriculture

1. The Birth and Development of Tatsuno Soy Sauce

Tatsuno, located in southwestern Hyogo Prefecture, is famous as the origin of *usukuchi* (light-colored) soy sauce. The former castle town of Tatsuno Domain with 53,000 *koku** in Harima, one of the oldest provinces in Japan, is called "Little Kyoto of Harima". It is also known as the birthplace of Miki Rofuu, who wrote Japan's best loved children's song *Akatombo*, Red Dragonflies. I thoroughly recommend you visit Tatsuno, the birthplace of *usukuchi* soy sauce, but please note the nearest station is not Tatsuno on the Sanyo Main Line, but rather Hon-Tatsuno on the JR Kishin Line. Head first to Himeji Station and then change for the local train, travelling about 20 minutes before arriving at Hon-Tatsuno. I once visited Tatsuno during the cherry blossom season in April, and I will never forget the wonderful sight of the cherry blossoms at Tatsuno Park.


Cherry tree-lined path


Townscape: white walls and a chimney, (Photo provided by Tatsuno City)

The conditions for successful soy sauce production have historically been easy procurement of raw materials – soybeans, wheat and salt – a rich water supply, and easy access to water routes for shipping large volumes of the finished product, as the sea was the principal trade route during the Edo Period. Tatsuno was blessed in every sense: quality soybeans were easily obtained from the neighboring town of Sayo; wheat was harvested in the local Western Harima district; high-quality salt from the Seto Inland Sea was brought in from Ako, Hyogo Prefecture; and the Ibo River flowing through the middle of Tatsuno town connects straight to the sea. The quality of the local water meant Tatsuno also flourished as a sake-producing region, with 79 sake breweries in the peak period. There was a wealth of brewing technology and facilities such as tanks and other equipment that were easily transferred, greatly contributing to the town's success in soy sauce production.


Ibo River

The water of the Ibo River running through Tatsuno is soft water with low iron content, containing only 18.3~23.2 ppm of calcium carbonate and 0.95 ppm of potassium. It is believed that the lack of nutrition in the water meant that unwanted bacteria multiplied before the sake yeast could proliferate. This meant sake spoiled repeatedly, frustrating sake brewers who were keen to try soy sauce brewing instead. I also think that a wealth of assets made it easy for sake brewers to switch to soy sauce brewing.
The soy sauce produced in Tatsuno is said to have been transported down the Ibo River by riverboat to Aboshi, where it was transferred to a vessel bound for Osaka on the inland sea, before being transferred to another riverboat to complete its journey to Kyoto. Around 1700, competition for soy sauce sales in Kyoto was fierce, with approximately 150 local soy sauce brewers. Soy sauce from Bizen, a neighbor of Tatsuno, had already entered the tight Kyoto market, in which retailers preferred to stock local varieties, so when Tatsuno brewers decided to do the same, they established their own wholesalers in Kyoto. They gradually increased their sales volumes, and the outstanding quality of Tatsuno soy sauce earned it such strong recognition in the Kyoto market that it drove Bizen soy sauce out within 20 to 30 years. The backing of Tatsuno Domain hailing Tatsuno soy sauce as a local specialty further strengthened the brewers' position in the Kyoto and Osaka markets.

* *koku* is a Japanese unit of volume that shows the productivity of the land. Historically, the annual rice tax on farmers was regulated by *koku*, as was the reward from feudal lords to their retainers, meaning *koku* determined how many retainers the lord could employ. *Koku* is still used as a unit of volume among brewers of sake and shoyu. 1 *koku* is approximately 180L or 150kg of rice.

2. Tatsuno Usukuchi Soy Sauce

The breakthrough for Tatsuno first came in 1666 with the development of innovative production methods by

Magoemon Maruoya resulting in *usukuchi* soy sauce. As mentioned earlier, the soft local water from the Ibo River was not suited to sake production, but could yield *amazake* – a traditional non- or low-alcholic sweet fermented rice drink. Word spread among brewers that when *amazake* was added to the soy sauce mash, it produced a new, flavorful style. It is thought this soft water contributed to a lighter color even in *koikuchi* soy sauce produced in this area, but that with better raw materials and the addition of *amazake*, the high-quality *usukuchi* style was realized. Tatsuno *usukuchi* soy sauce came to be used in *shojin ryori* vegetarian cuisine at the temples of Kyoto before spreading to *kaiseki* haute cuisine and on to home cooking, creating an entire *usukuchi* cultural zone in the Kansai region.

Usukuchi soy sauce

Koikuchi soy sauce

Soy Sauce Information Center

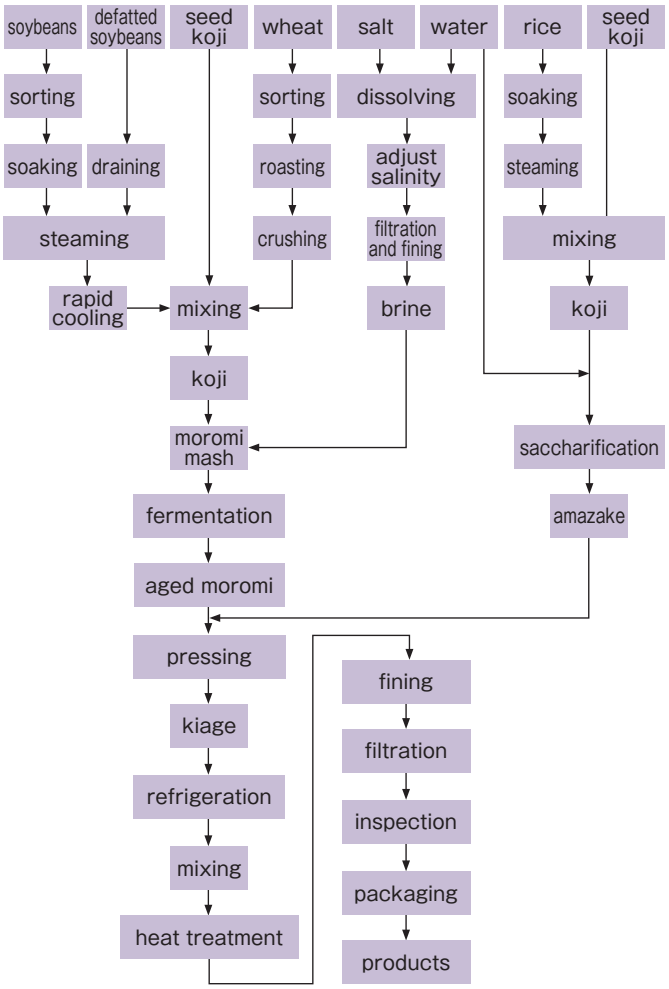
The lighter color of *usukuchi* soy sauce is achieved by using a saline solution with 18% salt concentration, compared to a 16% solution used for *koikuchi* soy sauce. The higher salt levels suppress the aminocarbonyl reaction between the amino acids and sugars, therefore limiting coloration. The well-known paradox of all this is that dishes made with *usukuchi* soy sauce typically have lower salinity than those made with *koikuchi*. Recent studies have revealed that the qualities of *usukuchi* allow cooks to better distinguish salty flavor, adjust it for the tastiest result, and enhance the unique flavors of dashi. Though *usukuchi* production volumes account for just 15% of Japan's total today, I hope people will discover *usukuchi* soy sauce and make more delicious dishes using it.

3. Usukuchi Shoyu and Usu Shoyu

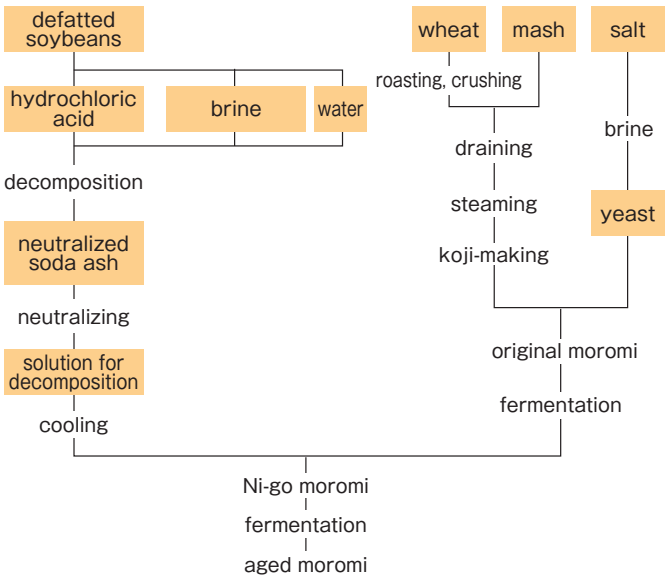
According to a survey of 93 cookbooks from the Meiji, Taisho and Showa periods (1868–1989) by Kohei Ushio, the oldest description of *usukuchi shoyu* (light-colored soy sauce) can be found in *Nihon Kaji Chouriho* (Homecooking in Japan), published in 1904. There were also references to *usu shoyu*, which seems to indicate one of three different ingredients: light-colored soy sauce, soy sauce diluted with dashi, or soy sauce diluted with water. The increase in the number of cooks from the early 1900s onwards led to more cookbooks with more detailed descriptions and amounts for each ingredient, an increase in the incidence of *usukuchi shoyu* in cookbook terminology, and a decrease in the incidence of the term *usu shoyu*. The latter is thought to have occurred because readers sought specific details and it was not sufficient to simply say "diluted soy sauce". Despite initial confusion on appropriate naming for Tasuno's soy sauce, its light color and premium quality earned it great recognition, solidifying the style's name as *usukuchi* soy sauce.

4. Chaotic Post-war Period

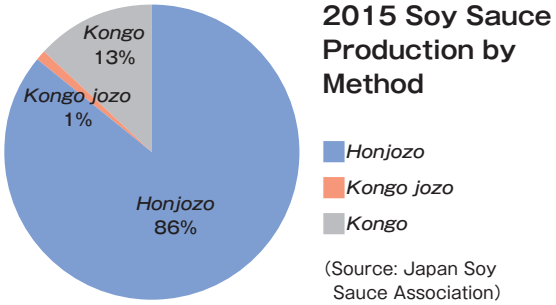
In the post-World War II period when Japan suffered from a lack of raw materials, a new type of soy sauce saved the industry. Ms. Appleton of the Allied Powers General Headquarters (GHQ) had said the "inefficient use of raw materials and one-year fermentation period in the regular fermenting method necessitate a shift to amino acid liquids for more efficient application of resources and faster production." It was then that Noda Shoyu Co., Ltd. (current Kikkoman Corporation) overcame the shortcomings of the traditional way with a method known as *shinshiki-ni-go*. The company released the patent in 1948 for the benefit of the industry, which agreed to streamline production according to



Usukuchi Soy Sauce Manufacturing Process,
(*The Science and Technology of Soy Sauce*, p.396)



Shinshiki-ni-go Soy Sauce Manufacturing Process,
(*The Science and Technology of Soy Sauce*, p.396)



(Source: Japan Soy Sauce Association)

this method. Specifically, defatted soybeans are hydrolyzed, breaking them down to create a neutralized, partially decomposed amino acid liquid to which wheat koji is added, resulting in soy sauce. The method achieved its initial goals of efficiency and allowed brewers to further increase the umami levels in their soy sauce. It also convinced GHQ to change its policy and turned out to be a savior for the soy sauce industry.
Wartime sanctions on the supply of whole soybeans, wheat, rice for sweet sake, and salt led to lower shipment volumes of Tatsuno *usukuchi* soy sauce year after year until production eventually stopped in 1944. Production did not resume until five years after the war ended, in 1950.
Although the *Shinshiki-ni-go* method saved the soy sauce industry in the post-war period, major manufacturers returned to the *honjozo* regular fermenting method around 1970 after the supply of raw materials had stabilized. This has not been possible for most small and medium-sized manufacturers around the country, however, who continue today under the *shinshiki* method, now known as either the *kongo jozo* mixed fermenting method or *kongo* mixture method.

5. Tatsuno Kyodo Shoyu Co., Ltd.

Collaboration within the soy sauce industry advanced after enactment of the 1963 Small and Medium Enterprise Modernization Promotion Law. The Fukushima Prefecture Soy Sauce Brewery Cooperative was the first of many cooperative factories built around Japan. Aided by low-interest loans from the government, soy sauce manufacturers collaborated on the construction of modern soy sauce factories, ensuring stable quality in low-cost, mass-produced *kiage* raw soy sauce. The government made it a condition of the loans that each manufacturer discard their own production equipment, and as a result, even though there are about 1,200 soy sauce manufacturers nationwide today, it is thought that less than 200 of the factories can handle the whole process from raw material processing to the final product.
In 1971, the Tatsuno Kyodo Shoyu Co., Ltd. was established with 16 soy sauce makers as shareholders, who together built a cooperative factory. Expansion and equipment renewal in six phases have meant the large-scale factory can now produce 30,000 kiloliters per year.


Tatsuno Kyodo Shoyu Co., Ltd. (from *Tatsuno Shoyu Cooperative Association Handbook*)

A general decrease in soy sauce consumption has caused many companies to discontinue manufacturing, and many cooperative factories around Japan have already shut down in Iwate, Miyagi, Toyama, Mie, and Kyoto Prefectures, among others. Financial difficulty is said to also have contributed to Tatsuno Kyodo Shoyu becoming an affiliate of a major manufacturer.

6. Other Soy Sauce Makers in Hyogo Prefecture

Of the two soy sauce associations in Hyogo Prefecture, the one in Tatsuno has ten member companies and another, called Hyogo Prefecture Soy Sauce Industrial Cooperative Association, has 17 member companies, far lower membership than in the past. The Awajishima region is said to have had 40 soy sauce makers in 1955, but today there is only one.


Soy sauce storehouse with rows of brand-new wooden barrels (Photo provided by Adachi Brewery Co., Ltd.)

Last year, I visited three Hyogo Prefecture soy sauce manufacturers not located in Tatsuno. All had integrated facilities handling everything from raw material processing to pressing and pasteurizing in-house. At two of the three companies, mixed soy sauce production accounts for 30% to 40% of total production volumes, and I heard the locals use only mixed soy sauce.
I was surprised that even in the same prefecture, the taste preferences are so different to in Tatsuno, where the focus is on brewing *honjozo* soy sauce. The proximity of these three companies to Tatsuno – the birthplace of *usukuchi* – makes it not surprising that they all produce a kind of *usukuchi* soy sauce. However, in contrast to Tatsuno, they all employ the *kongo* mixture method, in which *usukuchi* amino acid liquid is added to *koikuchi* soy sauce to obtain the lighter color. However, all three do employ the *honjozo* method for *koikuchi* soy sauces, and they are keen to differentiate their products, with two of them using whole soybeans grown locally in Hyogo Prefecture, and the third using only Japanese-grown whole soybeans. These soy sauces are not consumed locally but shipped to Osaka and other areas.

7. Kyoto Soy Sauce Manufacturers

Today, Kyoto Prefecture has just 23 soy sauce manufacturers compared to 60 in 1973. As a cooperative industry, individual makers had to discard their own equipment used to process raw materials into *kiage* raw soy sauce, so I believe there is not a single integrated soy sauce production facility left in Kyoto. With poor business forcing even the cooperative factories to close, soy sauce manufacturers in Kyoto Prefecture now source their *kiage* from a cooperative factory in Shiga Prefecture.
I was surprised to learn that 85-95% of Kyoto's production volume of soy sauce is *kongo* (mixture method) soy sauce, and hardly any *honjozo* soy sauce is made today. All three soy sauce makers I visited in Kyoto Prefecture told me they made their own amino acid liquids for mixing *kongo* soy sauce until around 1955.
In the post-war period when soy sauce was in short supply, it is said that an inferior product of brine colored with caramel labeled as soy sauce sold like wildfire, propping up the

business of soy sauce retailers, who were all listed among the top taxpayers at the time. I heard a similar story in Hyogo of even poor quality soy sauce selling well, yielding manufacturers such high profits that they could open a shop in Osaka. As things settled down and the economy stabilized, such inferior products disappeared, and proper quality soy sauce made its way back onto the market again.

8. Osaka Soy Sauce Manufacturers

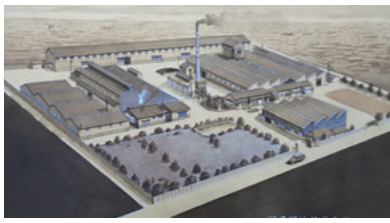
Daisho Co., Ltd. in Sakai City is the last remaining soy sauce maker in Osaka today. It formed the Central Shoyu Industry Cooperative Association with five soy sauce makers in Tokyo and Kanagawa, where just like Osaka, very few soy sauce manufacturers remain. The association secretariat is now located alongside the Soy Sauce Information Center in the Shoyu Kaikan in Nihonbashi, Tokyo. A 1927 list from the Osaka Prefecture Shoyu Brewing Cooperative Association shows 89 companies, with as many as 19 of those based within the former Sakai City limits.

As part of the structural improvement project under the above-mentioned Small and Medium Enterprise Modernization Promotion Law, Daisho Co., Ltd. was established in 1970 by a merger between Kawamata Shoyu Co., Ltd. (Sakai City) and soy sauce maker Izumiichi Co., Ltd. (Kaizuka City). The merger was dissolved just ten years later when Kawamata Co., Ltd. (renamed from Kawamata Shoyu Co., Ltd. in 1971) bought all of Izumiichi's shares, therefore bringing Daisho Co., Ltd. into its own company group.

Kawamata's long history as a soy sauce maker began in 1800 when Kawachiya Matabei commenced brewing in Sakai. Kawachiya Rihei, the owner of cotton wholesaler Kawari, where Matabei trained, gave him his start by allowing him to take the Kawachiya name and take charge of the Kawachiya soy sauce business based in Senba-Osaka. Matabei was responsible for this third arm of the family business alongside Rihei in the cotton business and Kawachiya Jinbei, a shipping agent who owned 18 *kitamae-bune* cargo ships. Jinbei's ships transported cotton to the north and returned with stocks of kombu and other marine products. During the Edo Period, non-samurai people were not allowed to have an official surname, which is why the three were previously referred to by the family business name. But in 1875, when the new Meiji Government required all individuals to register surnames, the three families got together and settled on Kawamori, a flipped version of Morikawa – the original family head's name – but still containing the first character for "Kawa" from the Kawachiya business name.

The origins of soy sauce as a seasoning are found in the Muromachi Period in the liquid that accumulated at the base of the barrel during miso soybean paste production. Because the word for accumulation is *tamari*, it came to be known as tamari soy sauce, and at the time was made from soybeans alone. Later, in the Edo Period, equal amounts of soybeans and wheat were used and *koikuchi* soy sauce was born. The soy sauce made in Sakai in the early Edo Period was sent to Edo where it was prized as a luxury item given its connection to the economically and culturally advanced cities of Kyoto and Osaka. During my visit to Daisho Co., Ltd., I heard there was once a soy sauce called Sakai Tamari. Despite having "tamari" in its name, the soy sauce apparently contained both wheat and soybeans and seems to

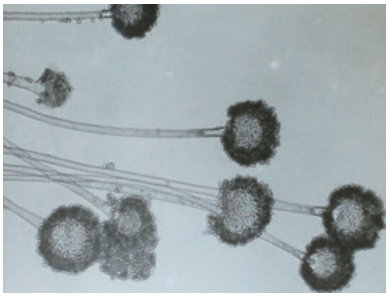
Daisho Co., Ltd.
(Photo provided by Daisho Co., Ltd.)


Kawamata Shoyu Co., Ltd.
(Photo provided by Daisho Co., Ltd.)

have been an intermediate type between tamari and *koikuchi* soy sauces. A detailed study of this product may reveal the process behind the birth and evolution of *koikuchi* soy sauce.

Kawamata was a highly advanced company in the early 20th century, mechanizing the manufacturing process and obtaining seven patents and ten utility models. Furthermore, Kawamata's technician, Seiji Konno, established new koji-making technology by revising the *tomo-koji* method (for taking koji from a previous batch; difficult to maintain good *tomo-koji*) through pure culturing of *Aspergillus oryzae* koji mold. Whilst staying on as a technician at Kawamata Shoyu, Konno launched Konno Shoten selling superior koji mold spores nationwide. Akita Konno Shoten Co., Ltd., a famous koji mold spores maker today, was built by Seiji Konno's family on the family's land.

The first use of koji mold spores in the soy sauce industry was in 1907 – relatively recent compared to the sake-brewing industry. It began when the Noda Shoyu Brewery Association Brewing Laboratory (the predecessor to Kikkoman Corporation's Research and Development Headquarters) distributed koji mold spores to its members. It was just two years earlier in 1905 that Seiji Konno had isolated superior pure culture fungus from koji.


Koji mold spores


Seiji Konno
(Photo provided by Daisho Co., Ltd.)

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