

# Rice flour bread

The increasing popularity of rice flour as an alternative to wheat flour in Japan

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**A**s a result of shortages in wheat supply due to weather conditions and other constraints from major wheat producing countries, the use of rice flour as an alternative to wheat flour is gaining popularity in Japan.

These issues have caused price hikes of wheat and wheat-derived products. For example, in Japan where about 90 percent of wheat consumed is imported, the price of wheat has risen by 17.3 percent as of April 2022 and has similarly increased the price of bread and other baked foods made from wheat.

Consequently, rice flour emerges as an economical alternative to wheat flour. However, the current size of the rice flour market is still relatively small. The production of rice for direct consumption was over 7million tonnes in 2021, while the production for rice flour was only about 40 thousand tonnes. Accordingly, most Japanese rice flour manufacturers catering to this market are either small or medium sized.

On the other hand, advancements in rice milling technology that do not compromise the flavor of rice have led to increased production and utilisation of rice flour. The demand for rice flour has steadily increased up to 41 thousand tonnes in 2021, and is expected to reach 43 thousand tonnes in 2022.

In addition, the Ministry of Agriculture, Forestry and Fisheries has targeted to increase rice production for rice flour to 130 thousand tonnes by 2030, triple that of 2021.

## Products made from rice flour

In Japan, a wide range of traditional snacks and sweets are made from rice. With its unique fluffy and chunky texture, rice flour products have come to be accepted by a wide range of consumers from young to old.

Also, rice flour is widely used in food products, such as batter for Japanese style fried chicken. This is due to its characteristics of less oil absorption, which makes the deep-fried food crunchier than wheat flour.

Most recent and increasing usage is as a substitute for the wheat flour due to health problems associated with allergies. Being gluten free, rice flour has gained popularity in school lunches and baby foods.

## Development of rice bread

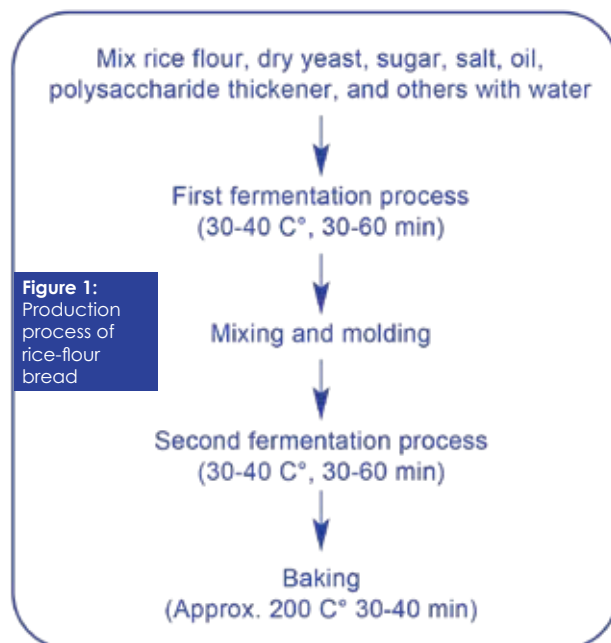
As mentioned, rice flour is becoming more popular as the main ingredient in bread that can completely substitute wheat flour. However, bread made solely from rice flour has lower dough viscosity than wheat flour bread, resulting in less puffiness, and often wheat-derived gluten has to be added to the dough to make it puff up sufficiently.

To address the issue, Satake has developed a new rice flour bread production method. This food product development research resulted in identifying a thickening agent (polysaccharide thickener) that could replace gluten to obtain higher dough viscosity in a rice flour bread.

The research also established a manufacturing method that blends the right type and amount of thickening agent into rice flour to produce bread with the same degree of puffiness as wheat-flour bread. A patent for this novel manufacturing method has been applied for and is pending.

A step-by-step production process for rice-flour bread is illustrated in Figure 1. First, water is added to the ingredients including rice flour and mixed, this is followed by primary fermentation at a constant temperature for 30 to 60 minutes, and then the mixture is mixed again.

The dough is then placed in a mould and subjected to secondary



**Figure 1:**  
Production process of rice-flour bread

fermentation at a constant temperature for 30 to 60 minutes, the fermentation is stopped when the dough has expanded to a certain extent, roughly doubling in size (as shown in Figure 2).

The exterior and interior of rice-flour bread after the baking process is shown in Figure 3. In general, gluten-free rice-flour bread does not form gluten as compared to regular wheat bread, resulting in weaker puffiness and inferior quality, including texture.

However, the newly developed rice-flour bread, despite being gluten-free, puffs up well and is not inferior in its sensory quality when compared to wheat bread.

### Rice bread is free of food allergens

The foremost benefit of a rice-flour bread is its absence of food allergens. In making the rice bread, rice flour, sugar, salt, fat (canola oil), yeast, thickener (polysaccharide thickener), and water were the only ingredients used.

There is no wheat-derived gluten, butter, eggs, or any of the other 28 allergenic ingredients, making the newly developed rice bread a safe, healthy and enjoyable option for those with food allergies.

### Halving baking time

Rice-flour bread dough is softer than wheat-flour bread dough and expands in a shorter fermentation time, resulting in a bread-making time of 120 minutes, about half the time required for wheat-flour bread. During baking, the dough expands to the same degree as wheat-flour bread when baked, resulting in a fluffy, light, and delicious bread texture.

This makes it possible to offer rice-flour bread to general households, the food industry, and hospitality industry without food allergy concerns.

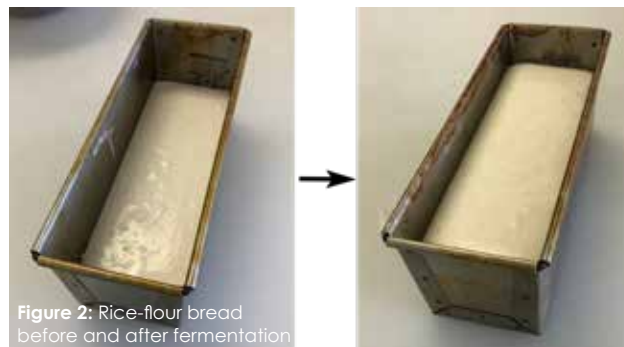


Figure 2: Rice-flour bread before and after fermentation



Figure 3: Appearance and interior of gluten-free rice-flour bread

### Expanding the possibilities

The development of rice bread has expanded the possibilities for the utilisation of rice flour and has provided a healthier option for individuals allergic to several allergens present in traditional wheat bread. Moreover, it has opened up a new market for the food industry.

Recently in Japan, the license to use this rice-flour bread manufacturing method which Satake had developed was opened to and can be granted to food manufacturers. In time, production of rice-flour for bread making is expected to increase in popularity and extend to international markets.