

Koji Guide

Explore the possibilities of Umami.

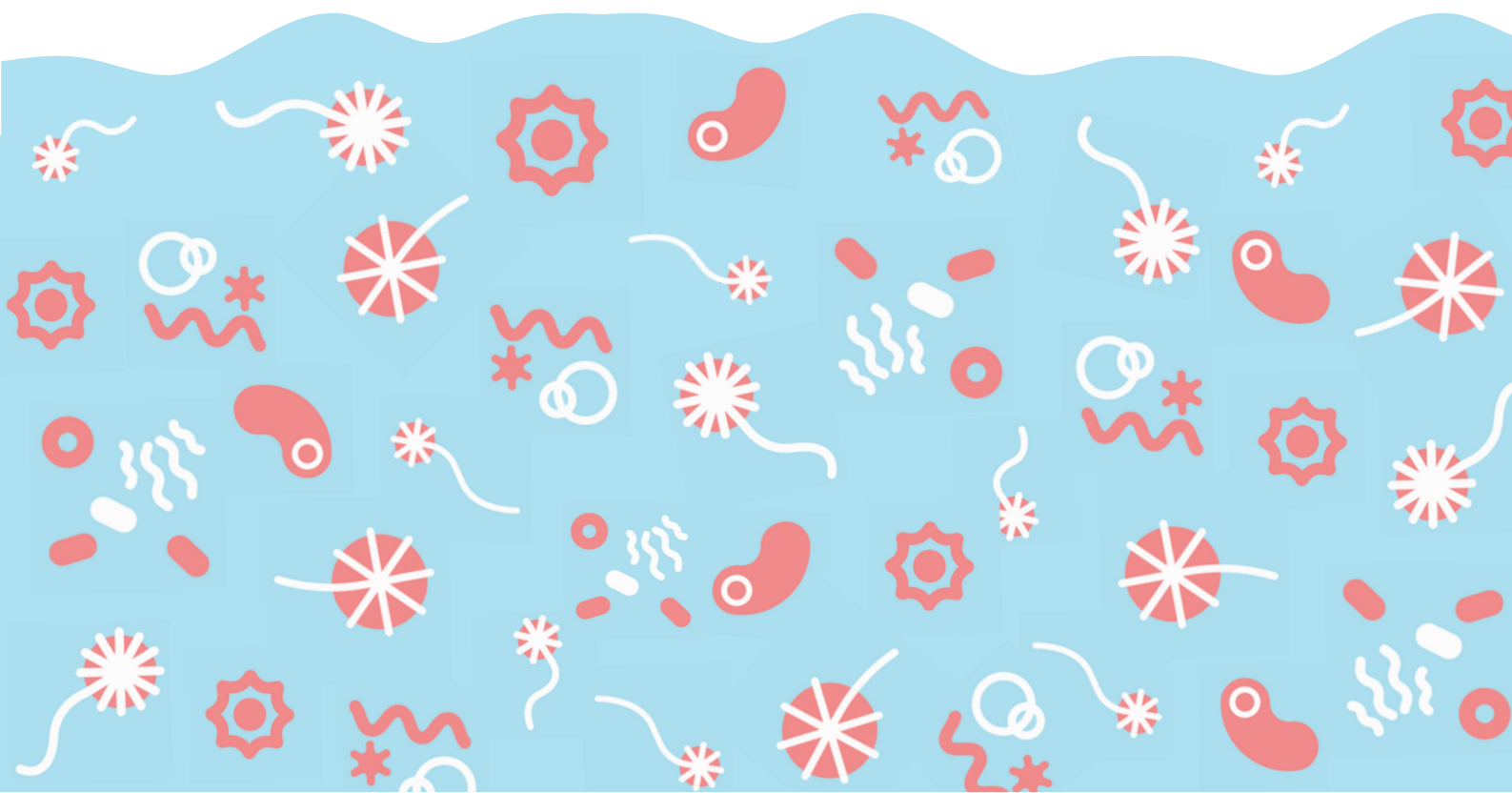


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Before You Begin

Acknowledgments

For thousands of years, cultures in China, Korea and Japan have harnessed and mastered koji. In fact, it has become so ingrained in Japanese cuisine that you'd be hard-pressed to talk about it without the mention of koji-kin. Escarpment Laboratories would like to express our deepest appreciation for the history and culture behind Koji, and for the wealth of knowledge that we inherently benefit from. We are extremely grateful for the opportunity to learn about and make amazing Koji ferments.

What is the goal?

In this guide, you will be learning about Koji, a multi-faceted (and very cool!) mold, in addition to Escarpment Lab's Koji Rice, a versatile product that can be used in making many different fermented foods. We will also provide you with a simple, delicious recipe that will let you fall in love with Koji and understand some of it's basic uses.

How hard is it?

Difficulties can range based on what you plan to use the koji for. In this guide, we provide a recipe for shio koji which is as simple as it is delicious!

How far ahead do I have to plan?

This depends on the ferment that you are attempting! Ferments like Shio Koji can take only one day, but longer ferments like Shoyu can take multiple years!



Figure 1. Escarpment Lab's Koji Rice, surround by freeze dried koji

Koji 101

What is Koji?

Koji is a fascinating mold that was discovered in China in 7000 BCE, where it is called “Qu”, and has cemented its importance in Japanese culture as its official national mold!

This mold grows especially well on high starch substrates (such as rice), in hot and humid climates. As it grows, the Koji secretes enzymes that help it break down complex starches and proteins which it uses as food.

Making healthy and enzyme rich koji is the preliminary step in many fermentation processes including miso, saké and soy sauce. It is a key ingredient because all the enzymes secreted by the mould contribute to massive flavour in the final product. It is these enzymes that are the key to getting a delicious umami flavour.

Umami is the meaty, savoury flavour we perceive in foods like parmesan cheese, tomatoes, meats and broths. What we are actually tasting with this flavour are the amino acids after the enzymes break down proteins. Therefore, by using koji we are leveraging enzymes that break down protein in order to create umami in our food.



Figure 2. Koji mycelia matting on jasmine rice after 48 hour propagation

Koji 101

What is Escarpment Lab's Koji Rice?

After years of research, we've optimized a protocol for growing reliable and enzyme rich Koji. Grown in our Flex Lab, our Koji grows in an ideal environment created by a perfect balance of heat and humidity. Once we see the perfect visible matting of the mycelia (a network of fungal threads or hyphae) on the rice, we harvest and freeze dry the koji. Finally, we package our Koji in sealed pouches, ready for use in any of your planned fermentation recipes.

Why freeze-dried instead of fresh?

In order to keep our Koji shelf stable for your convenience, we made the decision to freeze dry our Koji Rice. Freeze drying as does not disrupt the enzyme activity of koji and it drastically increases the overall shelf life of the product. The main difference between fresh and dried koji is the additional water weight that is in fresh koji, as that is lost during the drying process. In fact, we've calculated that 35-40% of the weight of fresh koji is lost as it is dried.

While our recipes will specify how to use your freeze dried koji in a specific recipe, sometimes other recipes will call specifically for fresh koji. We suggest for every 100g of freeze dried koji you used, add 35-40g of water to make fresh koji. Make sure that the weight of your freeze dried koji, plus the additional water is equal the amount of fresh koji used in the recipe.

You can also use your judgement to determine if your koji is hydrated enough. You can achieve this by adding water in increments, stirring well until rice is plump and no longer brittle. Rice should be a uniform consistency, with no water pooling at the bottom of the bowl. When rehydrating our Koji Rice, always start with less water as you can always add more water later in the process.

Please Note: Once you rehydrate our Koji Rice it is no longer shelf stable and should be used immediately.



Figure 3. Our Ready To Use packaging for Koji Rice

Koji 101

Koji Applications

Koji applications are very broad. Often koji is the first step in long multistage ferments. In this guide we cover some of our favourite fermentations using koji. Although koji is used in many cultures, it is most popular in Japan. Therefore we primarily use the traditional Japanese names to avoid confusion.

Shio Koji

Shio koji is a great all-purpose seasoning and marinade. It is a slightly acidic, slightly salty paste with the perfect amount of umami. Additionally, it is incredibly easy to make and use too! We love shio koji for marinating all sorts of meat and adding a kick of flavour on sauteed veggies.

Amazake

Amazake is an example of a sweet koji fermentation. What makes this particular application unique is that it is not seasoned with salt; however, it is still incredibly rich in flavour and enzymes. The flavour is very similar to a sweetened milk alternative.

To make Amazake:

Ferment koji with fresh partially cooked rice at 60°C for up to 6-12 hours. Amylase enzymes in the koji break down the starch in the fresh rice into sugar molecules, making a very sweet product that can be blended into a liquid. We recommend adding Amazake to your smoothies as a dairy replacement!



Figure 4. Homemade Amazake (similar to sweetened milk alternative)

Koji 101

Miso

Miso is a semi-solid paste rich in amino acids and it requires only three ingredients to make! In addition to koji, miso needs salt and a protein base (traditionally soybeans). The ingredients are mixed and fermented over several months.

The colour and flavour of the final miso product is highly dependent on fermentation conditions. We've had a lot of fun experimenting with different non-traditional miso including ricotta and nut miso! Generally the longer term ferments are considered "dark" miso and require more salt and less koji, while the shorter ferments are "light" miso and require less salt and more koji.



Figure 5. Back L-R: Cashew Miso, Pecan Miso, Sesame Miso. Front L-R: Chickpea Miso, Cacao Miso

Saké

Saké is a traditional alcoholic beverage from Japan. It is rich in 18 different amino acids, oligosaccharides, short peptides and polyphenols; all of which contribute to a pure flavour. The most basic fermentation takes 2 to 3 months and requires many steps, but if you can achieve the elegance of sake it's all worth it! Saké can also be distilled to make a higher alcohol drink called Shochu.



Figure 6. Homemade sake

Koji 101

Shoyu

Shoyu, or as it's more commonly known as soy sauce, is something we are all familiar with; but, did you know it's traditionally fermented? It is made through a two step fermentation process using koji, which contributes to the intense umami taste. Traditionally it can take anywhere from 6 months to over a year to make a rich shoyu with a balance of flavours and aromas.



Figure 7. Spent Grain Shoyu

Recipe: Shio Koji Marinade

We love shio koji! Not only is it easy to make, but elevates any dish. Shio koji is a slightly acidic, salty brine which brings in so much flavour and moisture to meat! In this recipe, we will show you how to turn your Escarpment Labs Koji Rice into a versatile shio koji and use it as a marinade for roast chicken and marinated tofu.

Ingredients

283 g	Escarpment Labs Koji Rice Pouch
480-500 mL	Water
75-80g	Kosher Salt
1	Whole Chicken or Firm Tofu



Figure 7. Ingredients for Shio Koji

Steps

Making Shio Koji

1. Add your freeze dried shio koji to a 1-2L mason jar or tupperware
2. Add 480-500mL of water to the jar. Make sure the koji is submerged under water. Dried koji will soak up some of the water so add more water if needed.
3. Add 75-80g of Kosher salt to the jar and mix well (10% of weight of koji and water)
4. Store in refrigerator up to 6 months
5. OPTIONAL: You can also blend the shio koji to turn it into a paste, this makes it easier to spread. However it does spoil faster when blended

Recipe: Shio Koji Marinade

Marinating the Chicken

1. Rub $\frac{1}{4}$ of shio koji marinade over chicken. Remaining marinade can be stored in an airtight container for up to 6 months in the refrigerator.
2. Rub shio koji over chicken 24 hours before cooking
3. Place chicken in a large zip lock bag and marinate in the fridge for 24-48 hours

NOTE: The longer the chicken marinates the more the texture can change. We prefer the 24 hour “sweet spot”

4. After the chicken is done marinating, be sure to scrap as much of the koji off. Any koji that is left on the skin has a high likelihood of burning. This will still taste good but won't be as pretty
5. Cook chicken as normal. Some of our favourite ways of cooking the chicken include:
 - a. The Jamie Oliver “Perfect Roast Chicken” recipe found at <https://www.jamieoliver.com/recipes/chicken-recipes/perfect-roast-chicken/>
 - b. Beer can chicken on the BBQ
 - c. Spatchcocking the chicken and cooking in oven or BBQ



Figure 8. Shio koji chicken cooked with Jamie Oliver's recipe

Recipe: Shio Koji Marinade

Marinating the Tofu

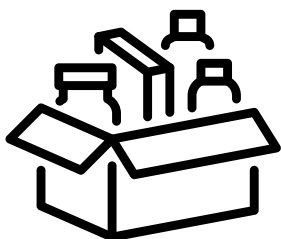
1. Press extra moisture from a firm brick of tofu
2. Line a container or tupperware with plastic wrap and apply a layer of shio koji to the bottom and place the tofu blocks on top
3. Use remaining shio koji to spread over the top and sides of the tofu brick
4. Fold over the sides of the plastic wrap and seal container
5. After 3-5 days the tofu is ready
6. You can choose to fry the tofu or slice it and eat it as is!

Frequently Asked Questions



Will there be more recipes coming?

Yes! Our Food Ferments staff are always looking for an excuse to experiment with recipe development. You can find more recipes on our website, including: Spicy Shio Koji Fish, Koji Baguette and Pizza Dough! Find these and more at <https://escarpmentlabs.com/blogs/koji-recipes>.



How do I store the product?

We freeze dry our koji, making a shelf stable product. The koji will not grow unwanted mould or make you sick if you keep it around for too long. However, it may lose some of its enzymatic ability to break down starches and proteins in your ferments.



Where can I get more information?

1. Koji Alchemy by Rich Shih and Jeremy Umansky
2. Noma Guide to Fermentation by David Zilber and René Redzepi
3. Miso, Tempeh, Natto by Kristen Shockey
4. Follow #kojibuildscommunity on Instagram

Have any other questions? Contact us at ferment@escarpmentlabs.com!