

## rhizocali Tempeh FAQ

### What is *vegan*? Is rhizocali tempeh vegan?

Vegan describes a diet or food with no animal ingredients. rhizocali Tempeh is completely vegan and vegetarian.

### Is rhizocali tempeh gluten-free?

Our tempeh contains no ingredients with gluten. We share a kitchen with some businesses that do use gluten ingredients, so we can't discount the possibility of a tiny amount of gluten getting into our product. Please use your level of sensitivity or allergy to gluten and your experience with products made in shared kitchens as your guide in choosing whether to eat rhizocali Tempeh.

### Is tempeh appropriate for a raw food diet?

No. While there is a live culture from the fungal kingdom *rhizopus oligosporus* in our tempeh before you cook it, the soybeans or other base for the tempeh are thoroughly cooked before they are cultured. Also, tempeh was never meant to be eaten raw. It is always traditionally cooked in Indonesia, where it has a long history. Because of its high protein and moisture content, for safety raw tempeh should be handled separately from ready to eat foods and cooked thoroughly to 165 F.

### Wait, is tempeh really a fermented food?

Good question! It depends on whether you're using the term "fermentation" in a science jargon way or an everyday lay usage way. In biology and chemistry, fermentation is specifically a process that takes place with NO oxygen (anaerobic). In lay usage, "fermentation" is broadly when microorganisms process food. Tempeh is processed by microorganisms in a limited-oxygen environment. Something interesting that's related is the black spots that you might have seen on tempeh and that our label says are not a sign that the tempeh has gone bad: these black spots are where the tempeh microorganism has gone into the part of its life cycle where it produces spores, like under a mushroom's cap. Lots of oxygen pushes the tempeh towards sporulation, so black spots you see are usually parts of the tempeh that have been exposed more to oxygen.

### How about *cultured* then, we've seen you call your tempeh a "cultured" food.

Of the foods that are fermented, or processed by microorganisms, some are typically made by creating an environment that selects for certain ones of the microorganisms that are already present on the food or in the air to flourish. This is sometimes called "wild fermentation," and natto, dill pickles, Belgian beer, and tea are traditionally produced this way. Tempeh is part of the other category of fermented foods, those that are *cultured*. These foods need to have specific microorganisms *added in* to the food to create it. Yogurt, kombucha, and yeasted breads are other examples. There are a lot of wild fermented foods that *can* be made instead with culture added or with *backslopping*, where a bit of the previous batch is added to the new one.

### Is your tempeh probiotic?

This is a fascinating and complicated topic that's being discussed by science and the media *a lot* right now. While certain fermented foods have been traditionally associated with good health since the beginning of humanity, the science and contemporary public understanding is having a big moment right now. We're tipping over into a more complete understanding how microorganisms affect humans, and while the specifics are not in our knowledge yet, it's clear that the effect is massive. We've known how microorganisms can cause disease for 150 years, and in the last couple of decades we've become more aware that lactic acid bacteria are intrinsically wrapped up in how the human body functions. Probiotic is a term from this era, in most people's minds associated with yogurt and live lactic acid bacteria helping digestion. Much of the research has been focused in this area too, though recently it is branching out.

Tempeh's defining culture, *rhizopus oligosporus*, is not bacterial but fungal. Like the mycellium of brie, components of the scoby of kombucha, the koji of miso, shoyu, and sake, and the beer, bread, and wine made with yeasts, tempeh's *rhizopus oligosporus* is classified in the kingdom *fungae*. Tempeh has been the subject of a surprisingly enormous body of scientific research, and studies have shown tempeh to be helpful in, for example, preventing and treating diarrhea. rhizocali Tempeh is made with a wild preferment of lactic acid bacteria naturally occurring on the beans prior to cooking the beans and adding *rhizopus oligosporus* starter culture. Prefermentation is a step that is always present in traditional production in Indonesia but far less common among US producers.

Because tempeh is cooked prior to eating and because its defining culture is fungal, eating tempeh is not analogous to eating live-culture bacterially fermented foods. Rather than introducing live bacteria to the human gut to affect us by living in our bodies, it appears that fungally cultured foods give humans benefits by enzymatically changing the composition of the base food. In the case of tempeh, this has been shown to make soybeans much more digestible to humans and its vitamins more available. Studies of miso have shown its fungal fermentation creates antioxidants and help heart health, and we may see more research into the health effects of tempeh in the future. It is more difficult within a traditional scientific method study to isolate the effects of foods like tempeh and miso as they are rarely eaten alone; for instance, in a study of people eating miso soup every day, any effects could be mixed in with the effects of other things in the soup, like seaweed, tofu, etc.

### What are the nutrients/health benefits to tempeh?

Legumes are unique among high protein foods for having a high fiber content. But legumes can be difficult for humans to digest. Soybeans, especially, cannot be easily digested by most people when they have only been cooked.

Like many staple foods that have traveled alongside humans through a long period of history, soybeans have always been processed in special ways for people to eat. Most of these traditional processing methods involve fermentation. Indeed, many foods that we might not think of as being fermented are, traditionally. From soy sauce, coffee, and tea to chocolate, bread, cheese, and cured meats, microbes were present in and essential to the development of most of our everyday foods throughout the planet. Until very recently, the path of human food production had not attempted the impossible task of sterilizing our food stream. Rather, without thinking of it in the germ theory concept we do today, our ancestors chose, through trial and error, processes that selected for certain beneficial or benign microbes to flourish. In today's terms, they found that the best deterrent to a given microbe is another microbe competing for environmental space.

Through a long history with our neighboring (and internal) microbes, we have also adapted to certain microorganisms and become accustomed to, even reliant on, their presence in our lives and in our food.





### **I've heard negative things about eating soy. What about tempeh?**

Soybeans aren't that digestible for humans after just cooking. As a result, almost all soy that we eat has been thoroughly processed. In commercial soy-based meat substitutes, bars, and shakes, this typically involves intensive chemical and mechanical processing, essentially denaturing the soybean and adding bits back in. (Google "soy protein isolate + manufacturing"). The traditional process of making soymilk and tofu involves cooking, grinding, and filtering, so while there aren't usually many additives, some of the content of the bean, including fiber, is removed.

In tempeh, after being split and cooked, the beans are cultured and fermented. This has been shown to increase the absorbable vitamin content of the beans, make them very digestible through the action of enzymes, while retaining the whole food.

Another concern with soy is genetic modification and pesticides. We use USA-grown, non-GMO organic soybeans in our tempeh.

Some people are encouraged to increase or avoid soy in their diet because of specific medical conditions and soy's impact on some hormones. Unfortunately, there is not conclusive research on whether or not tempeh has these same hormonal effects yet; perhaps more will be known in the future.

### **Tempeh is something I've never eaten or heard of. Is it new?**

Tempeh has been produced in Indonesia for at least 200 and possibly thousands of years. The first tempeh shop in the US was in the Bay Area: Otten's Indonesian Foods opened in Albany in 1961. In the early 1980s, two of the US's earliest large tempeh companies, Pacific Tempeh of Emeryville and Soyfoods Unlimited of San Leandro, grew in our area, before being sold to national producers or closed. Then there was a long period without a local tempeh shop in the Bay Area. Now our nearest neighbors are Budiman in San Jose and Alive&Healing in Sonoma. In other parts of the country, local, smaller shops have continued for decades; after living in one such place we were familiar with how much more flavor tempeh from a local shop can have than national brands and how versatile and well loved a protein it can be, and we knew our area needed a local shop. The SoyInfo Center in Lafayette, run by Bill Shurtleff and Akiko Aoyagi, the *world's most complete collection of soy information*, has an amazing amount of information about tempeh and its history; check them out online!

### **Can I make tempeh at home?**

Definitely! Tempeh is easy to cook at home. Look for rhizocali Tempeh in your favorite local supermarket, or request us. Check us out on the web for recipes and cooking tutorials. Wait...were you asking if you could make tempeh from scratch? Sure! It's harder than kombucha, sauerkraut, or sourdough but easier than beer or aged cheese. The hardest part is having a way to keep the developing tempeh around 88 F while it ferments. We have links to sites that describe the process, and there is even a chef who gives classes on tempeh-making and -cooking here in the Bay Area (Google "In the Mood for Food + Oakland").

### **What is your organic certification?**

We are registered by the State as organic producers. As we're just starting out, we do not yet require certification and the process is expensive. Our soy tempeh has only three ingredients: organic, non-GMO US-grown soybeans, and vinegar and starter culture.

### **How do you pronounce rhizocali tempeh?**

We pronounce rhizocali with the 'rhi' of rhinoceros and the 'cali' of California. Tempeh rhymes with away. In Indonesia the transliteration of tempeh is "tempe" and sometimes this spelling is used here too. "rhizo" is the Latin root of 'root' and refers to part of the tempeh microorganism.

### **Why does your tempeh taste better than other tempeh I've had?**

Our frozen distribution has a surprisingly big impact on maintaining the flavor and texture of tempeh over the pasteurization, vacuum packing, and refrigerated distribution common to national brands.

Also, we use a prefermentation process to develop lactic acid bacteria naturally occurring on soybeans; this adds depth of flavor and helps the culture grow healthy. Tempeh can be defrosted or steamed before cooking to allow you to cut it how you like, but may also be cooked directly from frozen.

### **So, black spots don't mean that tempeh has gone bad. How can I tell if tempeh is good to eat?**

Good raw tempeh should be well covered in and filled with mostly white, thick mycelium; small amounts of black sporulation are possible and normal. Very black tempeh has fermented too long or been exposed to the elements; get a fresh cake! Fresh tempeh, when defrosted, will have a mild mushroomy, sweet, yeasty smell that most people like and nutty flavor, with savory taste. In Indonesia, some tempeh is eaten overripe, where the fermentation has gone on longer and the tempeh becomes a seasoning agent with strong flavors that some people love. Overripe tempeh may have a tan or light gray color, a mildly ammonia smell, and a taste compared to Camembert. We do not currently make overripe tempeh. Discard any tempeh that has pink, yellow or other odd color, strong ammonia or otherwise unpleasant smell, is mushy or slimy or has been kept outside of refrigeration.

Our tempeh is distributed frozen and if kept well frozen will last for months. In the refrigerator, tempeh may keep three or four days but the fresher the better!

As a mnemonic device for safe handling, we sometimes suggest people file raw tempeh in their brain in the "meat/seafood/egg-type" category. Even those who never cook meat have a sense that these foods require unique handling, are perishable and should be kept cold and cooked thoroughly, and this is an easy way to remember to handle tempeh this way. This in no way changes the fact that tempeh contains no animal products and is 100% vegan and vegetarian.

**If you have any additional questions about our tempeh or are curious to learn more, please follow us on Facebook, where we link to lots of tempeh information and research. Or email us at [rhizocali@gmail.com](mailto:rhizocali@gmail.com). We hope you enjoy our tempeh!**