MISO – TEMPEH - NATTO

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See also:

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Books:

***The Book of Miso (Savory Soy Seasoning)*, by William Shurtleff**
***The Body Ecology Diet*, by Donna Gates**

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Integral Nutrition: **South River Miso – Particularly Bean Varieties**
Natto for Everyone – Particularly VEGANS for VITAMIN K2

Conventional: **Pasteurized GMO Soy Miso at best**

Terms:

WHAT IS MISO?

Source: Christian Elwell, Co-Founder of South River Miso Co.
http://www.southrivermiso.com/store/pg/97-About-Miso-What-is-Miso-Full-Text.html

Miso (pronounced mee-so) is one of the outstanding treasures of Japanese culture which has now spread from its native home to benefit all of humanity. Miso as we know it today is the result of over 2000 years of care and craft, developed within a world view which intuitively knew that food is our best medicine.

The deeper motive and spiritual impulse behind the continued development and production of miso in the modern west is bound up with the urgent question: How can our food become full of the healing forces necessary to support, and carry forth the true purpose of the human spirit? All quality food, all medicinal food, including fine quality miso, is prepared in loving, thoughtful response to this question.

According to Japanese mythology, miso itself is a gift to mankind from the gods to assure lasting health, longevity, and happiness.[1] Miso has no equivalent among Western foods. In the form of a wet paste with the consistency of a firm cottage cheese, miso is made through a unique double fermentation process developed through centuries of Japanese food craft. Cooked beans (usually soybeans) are mixed together with salt and with cultured or fermented grain, called koji (usually made from rice or barley). This mixture is then fermented in great wooden vats, in some cases for a few weeks and for as long as three years. Natural miso is always unpasteurized and, traditionally, has a distinct chunky texture.[2]

As a food, miso can be thought of as an all-purpose and delicious seasoning for flavoring soups and vegetable dishes, or for making salad dressings, sauces, and spreads. It is used in many of the same ways that we in the West would use salt. It is a condiment in the sense that only a few spoonfuls are

used per person on a daily basis due to its salt content, which ranges from 4 to 12% by weight. At the same time, miso is such a concentrated source of high-quality protein and other nutrients that only a small amount is necessary to complement and enhance the nutrition of other foods, such as a whole grain or bean dish, for example.

There are many different types and varieties of miso, which come in a wide range of colors. The more traditional natural varieties come in warm, earthy colors ranging from tans and russets, through deep ambers and rusty reds, to rich chocolate browns and loamy blacks. Miso darkens with age, and some of the darker miso is aged in wooden vats for three years or even longer. Lighter miso, made with less salt, and aged for less time, comes in sunlight colors of yellow and creamy beige.

Each variety of miso has its own distinctive flavor and aroma. For darker miso, the flavor is savory, almost meat-like, and rich in protein. The lighter types are relatively sweet, more lively and refreshing to taste. To sensitive palates, no two varieties of miso taste the same; the range of colors, textures, and aromas is as varied as the ingredients used. In Japan different regions are known for their distinct varieties of miso, and there are shops, which sell as many different kinds of miso as you might find numerous varieties of cheese in a good food market here in the West.

Miso is prized by cooks for its almost unlimited versatility. In The Book of Miso, the most complete reference on the subject, there are over 400 recipes using miso in 15 different categories of traditional use. Miso can be used like bouillon or a rich meat stock in soups and stews; like ketchup, Worcestershire or soy sauce in sauces, dressings, and dips; like cheese in casseroles and spreads; like chutney or relish as a topping for grain dishes; as a gravy base with sautéed or steamed vegetables; as a marinade for fish, poultry, and red meats; as a starter for unyeasted bread making; as a pickling medium for vegetables.

In addition to all this, the greatest value of **unpasteurized miso** is due to the unique double, and lengthy fermentation process by which it is made. Fine quality, unpasteurized miso is a living fermented food containing a vast store of natural digestive enzymes, Lactobacillus, and other probiotic microorganisms, which aid in the digestion and assimilation of all foods. When you think of miso, you may think of it as a catalyst for the dynamic digestion of whatever foods we eat. Beside its delicious flavor, miso strengthens the dynamic power of digestion, which is at the root of our well being.

1. *Michio Kushi, How to Cook with Miso (Tokyo: Japan Pub.,1978), pg. 27.*
2. *William Shurtleff, The Book of Miso, (Berkeley: Ten Speed Press, 1983), pg. 33.*

MISO

Source: *http://www.whfoods.com/genpage.php?tname=foodspice&dbid=114*

What's New and Beneficial About Miso

- Miso is typically considered to be a high-sodium food, since one teaspoon of miso often contains 200-300 milligrams of sodium. However, recent research has shown that in spite of its

high-sodium content, miso does not appear to affect our cardiovascular system in the way that other high-sodium foods sometimes can. In recent animal studies, for example, identical concentrations of salt (sodium chloride) obtained from miso versus table salt were discovered to have very different impacts on blood pressure. High-salt diets that derived their high salt level from table salt raised blood pressure in these animal studies, but high-salt diets that derived their high salt from miso did not. Recent human studies on miso intake among Japanese adults have also shown that miso-containing diets tend to lower risk of cardiovascular problems, despite the high-salt content of miso. Reasons for this unique relationship between miso and our cardiovascular system are not yet clear. However, some researchers have speculated that the unique soy protein composition of miso (including peptide building-blocks of protein that get formed from soy proteins when the beans are fermented) is one of the key reasons for the cardiovascular support provided by miso. Since miso is seldom eaten alone, other cardio-supportive foods in miso soups and miso stir-fries might also play an important role in these research findings.

- Some of the health benefits provided by soy foods depend on the ability of bacteria or other micro-organisms to break down two of the soy's isoflavones - daidzein and genistein - into related compounds (for example, equol). Interestingly, recent research has shown that many different strains of the fungus *Aspergillus oryzae* - by far the most widely-used fungus in the fermentation of miso - are capable of breaking down both daidzein and genistein. This finding is great news for anyone who already enjoys miso, or is considering adding miso to their diet. If micro-organisms used in miso fermentation don't break down some of the daidzein and genistein into other compounds like equol, it's up to the micro-organisms in our digestive tract to do so. While it is fantastic when we have the right balance of micro-organisms in our digestive tract to help us get optimal nourishment and health benefits from our food, those conditions don't always hold true. So it can be very helpful when a miso-fermenting fungus like *Aspergillus oryzae* helps breaks down the daidzein and genistein before the miso ever reaches our digestive tract!

- The list of research-documented antioxidants in miso is growing! In addition to conventional antioxidants like the minerals zinc and manganese, miso is now known to contain phytonutrient antioxidants including phenolic acids like ferulic, coumaric, syringic, vanillic, and kojic acid. Particularly interesting are new additions to the list of miso antioxidants that are related to its fermentation. In several recent studies, the amount of some specific antioxidants in miso appears to increase when fermentation is carried out for a longer period of time. DDPH (2,2,-diphenyl-1-picrylhydrazyl) antioxidants appear to be one category of miso antioxidants that increases with prolonged fermentation. These particular free radical scavengers may be more plentiful in miso that has been fermented for many months - or even several years - in comparison to miso that has only been fermented for one to three months. While the jury is still out on the overall antioxidant benefits of miso pastes with varying lengths of fermentation time, the jury is not out on the impressive antioxidant benefits that are provided by this widely enjoyed food.

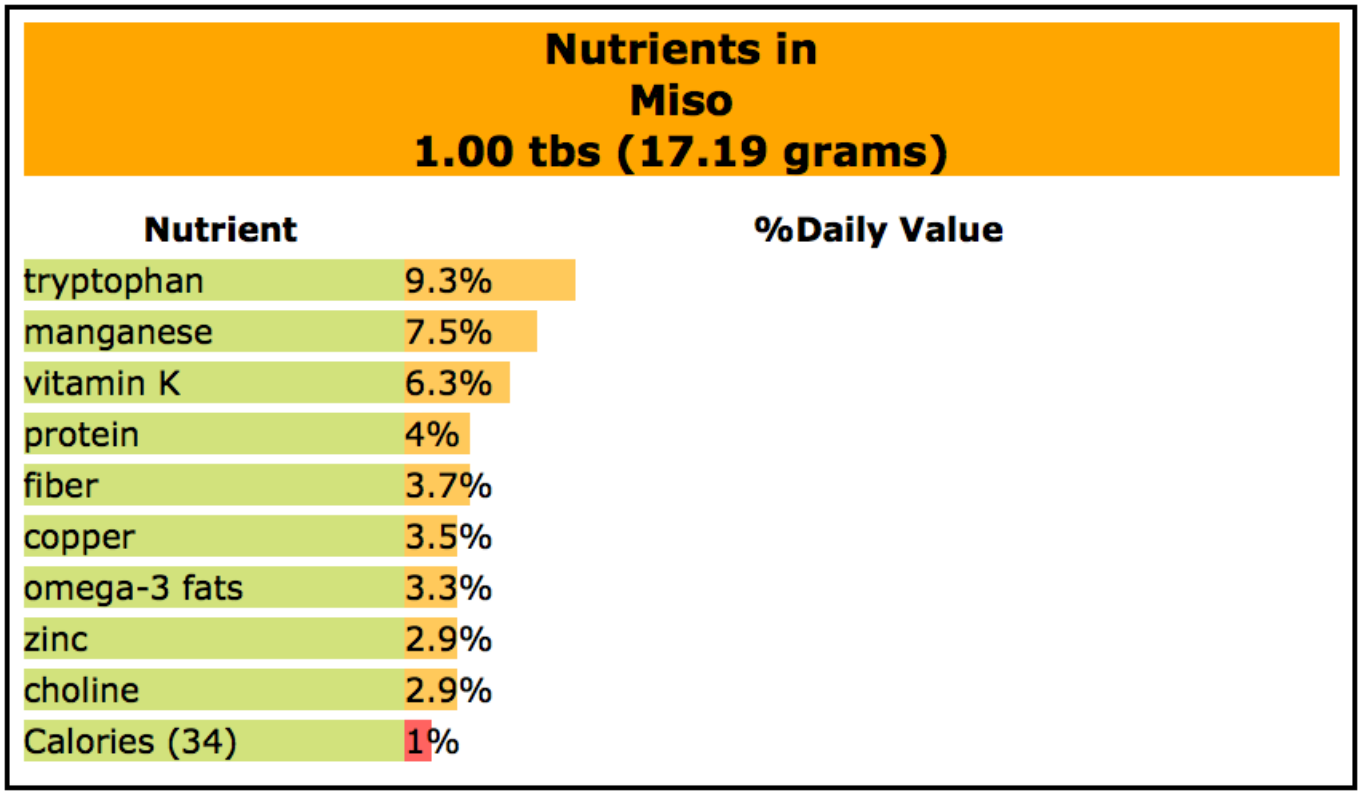
WHFoods Recommendation

We encourage you to think about miso made from soybeans as part of your legume intake. Like other legume-based foods, soy miso is a good source of fiber and protein and a great way to increase your overall nourishment.

Many public health organizations - including the American Diabetes Association, the American Heart Association, and the American Cancer Society - recommend legumes (the category in which soybeans are classified) as a key food group for preventing disease and optimizing health. The 2005 Dietary Guidelines for Americans developed by the U.S. Department of Health and Human Services (USDHHS) and the U.S. Department of Agriculture (USDA) recommends 3 cups of legumes per week (based on a daily intake of approximately 2,000 calories). Because 1 serving of legumes was defined as 1/2 cup cooked, the Dietary Guidelines for Americans come very close to this as they recommend of 1/2 cup of cooked legumes on a daily basis. Based on our own research review, we believe that 3 cups of legumes per week is a very reasonable goal for support of good health. However, we also believe that optimal health benefits from legumes may require consumption of legumes in greater amounts. This recommendation for greater amounts is based upon studies in which legumes have been consumed at least 4 days per week and in amounts falling into a 1-2 cup range per day. These studies suggest a higher optimal health benefit level than the 2005 Dietary Guidelines: instead of 3 cups of weekly legumes, 4-8 cups would become the goal range. Remember that any amount of legumes is going to make a helpful addition to your diet.

When adding soy miso to a soup or stir-fry, you can treat two tablespoons of soy miso as the equivalent of approximately one-quarter cup of a legume. But rather than trying to replace your intake of other legumes (like whole soybeans or black beans or lentils) with soy miso, we recommend that you think about soy miso as a highly nutritious addition to your diet that is helping to maximize your health benefits from the legume family of foods.

We recommend selection of certified organic soy miso. For miso produced within the U.S., one of the major reasons we like certified organic soy miso is the widespread use of genetic modification in non-organic soybeans. Genetically modified (GM) soybeans have reached 90% market penetration in the U.S. For miso produced in other countries like Japan or Korea, even though the likelihood of genetic modification might be less, we still like certified organic soy miso due to the lower risk of unwanted contaminants like pesticides. In the case of non-U.S. soy miso, you may not find the USDA organic seal, but you should still look for the words "certified organic" or "organic certified" on the label.



This chart graphically details the %DV that a serving of Miso provides for each of the nutrients of which it is a good, very good, or excellent source according to our Food Rating System. Additional information about the amount of these nutrients provided by Miso can be found in the Food Rating System Chart. A link that takes you to the In-Depth Nutritional Profile for Miso, featuring information over 80 nutrients, can be found under the Food Rating System Chart.

Health Benefits

In comparison to research on soybeans and their overall health benefits, research specific to miso is much less common. In addition, research on miso is complicated by the fact that human intake of miso can be difficult to measure in isolation since miso is usually consumed as part of a soup, stir-fry, or other dish. (For example, when participants in a study provide information about their intake of miso soup and scientists analyze the nutritional and health benefits provided by miso, the outcome can be confusing since other foods contained in the miso soup like tofu or sea vegetables might also have been responsible for the nutritional and health benefits.) Still, as an overall observation, we believe

that intake of soy miso shows a preponderance of health benefits and perhaps even stronger health benefits than soyfoods in general. We also suspect that these potentially stronger health benefits may be related to fermentation of soy miso by micro-organisms like the fungus *Aspergillus*.

Overall Nutrient Benefits

Soy miso is a very good source of manganese and a good source of zinc (both important mineral antioxidants). It is also a very good source of the minerals phosphorus and copper as well as a good source of protein and dietary fiber. In addition to these conventional nutrients, soy miso is also an important source of phytonutrient antioxidants including phenolic acids like ferulic, coumaric, syringic, vanillic, and kojic acid.

An especially interesting group of antioxidants in soy miso is the group of antioxidants related to miso fermentation. In several recent studies, the amount of some specific antioxidants in soy miso appears to increase when fermentation is carried out for a longer period of time. DDPH (2,2,-diphenyl-1-picrylhydrazyl) antioxidants appear to be one category of miso antioxidants that increase with prolonged fermentation. These particular free radical scavengers may be more plentiful in miso that has been fermented for many months - or even several years - in comparison to miso that has only been fermented for one to three months. food.

Like other soy-based foods, miso can provide us with a wide variety of phytonutrients. Many of these phytonutrients can function as antioxidants and anti-inflammatory substances. Due to differences in starting ingredients, micro-organisms used for fermentation, and total fermentation time, not all of the phytonutrients listed below are contained in all varieties of soy miso. But the list below provides a good overview of substances found in all forms of soy miso combined:

- **Flavonoids and Isoflavonoids**
  - daidzein
  - genistein
  - malonylgenistin
  - malonyldaidzin
- **Phenolic Acids**
  - Caffeic acid
  - Coumaric acid
  - Ferulic acid
  - Gallic acid
  - Sinapic acid
- **Phytoalexins**
  - glyceollin I
  - glyceollin II
  - glyceollin III
- **Phytosterols**
  - beta-sitosterol
  - beta-stigmasterol
  - campestrol
- **Proteins and Peptides**
  - defensins
  - glycinin

    - conglycinin
    - lunacin
- **Saponins**
    - soyasaponins (group A and group B)
    - soyasapogenols

Cardiovascular Benefits

Most of the heart-related research that we have seen on miso has involved population groups in Japan, and so it is difficult to say if these research findings also hold true for other population groups. In one large study involving 40,462 Japanese participants and lasting for more than 10 years, intake of miso was found to associated with decreased risk of one major type of stroke (cerebral infarct, or CI). This health benefit from miso held true despite miso also emerging as a major source of dietary salt in the study. These findings are fascinating, because ordinarily, a certain percentage of the Japanese population would be expected to be salt-sensitive and to have blood pressure undesirably increased by high intake of salt. Increase in blood pressure, in turn, would be expected to be a possible risk factor for CI. Yet miso was been found to *lower* risk of CI - a result that is unusual for a high-sodium food.

Animal studies have repeatedly shown this same result for miso versus table salt intake. Animals consuming a 2.3% table salt (sodium chloride) diet and animals consuming a 2.3% salt-from-miso diet have *not* experienced the same results. Salt-from-miso diets have *not* been found to raise blood pressure, even when they provide an equal amount of salt as high table salt diets. Researchers speculate that the difference may be related to a combination of factors, including soy proteins, peptides, isoflavones, and diverse antioxidants found in soy miso. In addition, researchers point to the potentially key role of fermentation in transforming soybean content and rendering it more capable of cardiovascular support. Further research is needed to clarify all of these issues.

Anti-Cancer Benefits

This area of soy miso research remains controversial. On the one hand, we know that soy miso contains the isoflavone genistein, and we know that dietary intake of genistein is associated with decreased risk of certain cancers, including prostate cancer. Yet at the same time, we also have studies on soy miso intake that show no association between prostate cancer risk and level of soy miso consumed.

Or, to take another controversial example: if individuals who consume daidzein (an isoflavone found in soyfoods and other types of food) have the right type of intestinal bacteria inside of their digestive tract, we know that they will end up having some of this dietary daidzein transformed by their intestinal bacteria into a related compound called equol. We also know that micro-organisms used to ferment soy miso (including many different strains of the fungus *Aspergillus oryzae*) are capable of turning daidzein into equol during miso fermentation. In this way, soy miso can end up containing equol even before we eat it!

This conversion of daidzein into equol by *Aspergillus* during miso fermentation was originally thought to have some reliable cancer-preventive benefits, but studies in this area have not reflected such a result. For example, in a study measuring risk of breast cancer among Japanese women, intake of miso

soup was not found to reduce risk. Other studies have show a similar lack of risk reduction for colorectal cancer and prostate cancer based on intake of miso soup.

We have not seen any research studies specific to miso showing *increased* risk of cancer in any form. However, we are also unable to describe any clear anti-cancer benefits for soy miso based on the studies that we have seen. It's difficult for us to imagine negative consequences when taking a whole food like whole soybeans and allowing them undergo natural fermentation under safe conditions. We would expect a naturally fermented whole food to provide outstanding health benefits, including anti-cancer benefits.

However, soy miso is definitely a challenging food to research. As mentioned earlier in this section, consumption of miso can be difficult to measure in isolation since miso is usually consumed as part of a soup, stir-fry, or other dish. In addition, miso is often consumed in relatively small amounts in comparison with other foods. We hope that researchers will continue to investigate possible anti-cancer benefits from miso intake, and devote more attention to this uniquely fermented form of soy.

Digestive Benefits

In some ways, it's accurate to think about soy miso as a food that has been "pre-digested." That's because *Aspergillus* and other micro-organisms used in fermentation of soy miso can help metabolize proteins, carbohydrates, and fats found in soybeans and transform them into smaller molecules that may be more easily digested. In addition, depending on processing and fermentation methods, some soy miso can contain "friendly" bacteria like lactic acid bacteria (including various species of *Lactobacillus*) that might be helpful in supporting intestinal microflora. We have not seen large-scale, human research studies showing benefits of soy miso consumption for the digestive tract, but we would expect such studies to show digestive benefits based on the above factors. Hopefully, more attention will be given in future research studies to soy miso and its potential digestive benefits.

Fermented Soy Foods and Vitamin K

As described throughout this Health Benefits section, much of the nutrient support we get from fermented soy miso depends on the micro-organisms used in fermentation. While *Aspergillus oryzae* is often a premier micro-organism used in miso fermentation, other micro-organisms - including bacteria - can be highly important. *Bacillus subtilis* is one of these bacteria, and it is more commonly used in fermentation of Chinese miso than in Japanese, Korean, or Indonesian versions of this fermented soy food.

From a health standpoint, one of the reasons that *Bacillus* bacteria are so interesting is their ability to create a form of vitamin K called menaquinone-7 (MK-7). Vitamin K (in all forms) is an important nutrient for bone health. Sufficient intake of vitamin K is associated with decreased risk of osteoporosis, since this vitamin is involved with maintenance of bone mineral density and also with shaping of bone structure (through gamma-carboxylation). In the case of MK-7 (the form of vitamin K produced by *Bacillus* bacteria, and a member of the vitamin K2 menaquinone family), we know that higher levels of MK-7 in the blood correspond to lower risk of hip fracture in older Japanese women, and that higher MK-7 levels correspond to increased intake of soy foods that have been fermented with *Bacillus* bacteria. One fascinating aspect of *Bacillus*-fermented soy foods is the potential ability of these bacteria to stay alive in our lower intestine after these foods are consumed. We've seen one study in which 1.6-20 million *Bacillus* bacteria (per gram of feces) were found to remain alive up to 6

days following consumption of natto. If *Bacillus* bacteria from fermented soy foods can remain alive in our digestive tract, they may keep providing us with vitamin K benefits many days after their consumption.

It's important to remember that *Bacillus* bacteria are not used in production of all miso, and it can be difficult to determine which miso products have been fermented with the help of these bacteria. (Sometimes a call to the manufacturer may still not result in a clear answer here.) Our recommendation here is that you consider selection of Chinese miso products if you want to enjoy miso in your meal plan and you are paying special attention to your vitamin K intake, since Chinese miso is more likely to have been fermented with *Bacillus* bacteria.

Description

Miso is a Japanese word that means "fermented beans." Miso is usually found in the form of a thick paste, and the beans used during fermentation are almost always soybeans. During the soybean fermentation process, grains like barley, rice, or buckwheat might be added to achieve a certain flavor or other desired attribute, but in most situations, soybeans serve as the basis for miso fermentation. (This basic role of soybeans in preparation of miso can sometimes be overlooked because many varieties of miso may take on the name of their added ingredients, like "barley miso" or "rice miso." Yet virtually all of these miso varieties will contain soybeans as a basic ingredient.)

It's worth noting that under some circumstances, you might hear the word "miso" being used to refer to fermentation of a food other than soybeans. A good example is "fish miso." In this case, the term "miso" is being used to refer to the process of fermentation rather than the food being fermented. "Fish miso" is a term used to describe fish that has been fermented using the same basic fermentation process that can be used to produce soy miso, barley miso, or rice miso.

This use of the word "miso" in relationship to fish is important, because it tells us something very special about the miso fermentation process. For many miso eaters, the magic of miso lies in the micro-organism used for its fermentation: *Aspergillus oryzae*. This micro-organism is a particular type of fungus (a filamentous fungus, also called a "mold") that plays a special role in Japanese and other Asian cuisines. Long before scientists had developed ways of identifying and naming fungi like *Aspergillus*, cultures in China and Japan had developed special methods of fermenting soybeans (and other foods) that were practical and could be reproduced (assuring that the same mold was used, even though this mold was not yet scientifically identified). "Koji" was the term used to describe the end result when foods were fermented in this special way.

When scientists eventually discovered that the *Aspergillus* fungus was the key micro-organism involved with koji fermentation, the word "koji" took on a second meaning. While remaining the name for the end-stage product, it also became the name for the *Aspergillus* fungus itself. Therefore, you can now hear the word "koji" being used to refer to end-products of *Aspergillus* fermentation like miso or sake or soy sauce, as well as to the *Aspergillus* mold itself. You can also hear the word "koji" being used to refer to a grain-based starter that is used in the production of the above foods (including soy miso). When "koji" is used to refer to this starter, *Aspergillus* mold has usually been added to rice that has been pre-soaked and pre-cooked. The result is of this *Aspergillus*-fermented rice is called "koji." For a second stage fermentation into miso, "koji" starter is then added to soybeans that have also been soaked and cooked, and the entire mixture is allowed to age and ferment into miso. As you can see,

the word "koji" can take on a variety of meanings. But these different meanings tell us something important about miso, namely, the special role played by the *Aspergillus* fungus in its fermentation.

Despite this primary focus on *Aspergillus* mold in fermentation miso, other micro-organisms are sometimes used in addition to *Aspergillus* during miso fermentation. The fungus *Zygosaccharomyces rouxii* is one of these micro-organisms. Other fungi include *Pichia guilliermondii*, *Clavispora lusitaniae*, *Absidia corymbifera*, and *Candida etchellsii*. Bacteria may also be used in the fermentation process. In the case of Japanese fermented soy pastes, *Tetragenococcus halophilus* and *Staphylococcus gallinarum* are bacteria sometimes used in fermentation. In the case of Chinese fermented soy pastes, species of *Bacillus* bacteria are more commonly used.

The texture of miso is usually paste-like and relatively thick, along the lines of peanut butter. But the color and taste can vary widely, depending on many fermentation-related factors. In terms of color, the lightest color miso is usually white or beige. This lighter color is often due to inclusion of a large amount of white rice during the fermentation process. When the word "koji" is used to refer to a miso starter made from rice and *Aspergillus*, white miso is also sometimes described as containing a large amount of koji. (If the koji has been made from *Aspergillus* fermentation of roasted rice flour, it may become light brown in color, but is often still included in the category of white miso.)

Another factor contributing to lighter color of white miso is shorter fermentation time. White miso is usually fermented for a much shorter period of time than darker-colored miso. (In some cases, a white miso may be fermented for a time period as short as several weeks, while a dark miso might be fermented for many months or even several years.) In terms of taste, white miso is usually the sweetest variety of miso. Some people also consider it to be the most versatile for cooking since it lacks the stronger flavors found in darker varieties of miso. In Japanese, the name for white miso is "shiromiso." When a miso like white miso is made with a large amount of rice, you may also hear it being referred to as "kome miso," since "kome" is the word for rice in Japanese.

When soybeans are fermented together with barley, the result is usually a miso that is yellow (or very light brown) in color. Since the Japanese word "mugi" can be used to refer to the general category of cereal grains (including barley and wheat), you will sometimes hear yellow miso being referred to as "mugi miso." Sometimes a small amount of white rice is also included during fermentation of yellow miso. One very popular yellow miso is Saikyo miso, traditionally made in the south-central region of Japan (the Kansai region).

In terms of color, the next major category of miso is red miso, sometimes called "akamimso" since "aka" means "red" in Japanese. Red miso may actually be a very dark brown or reddish brown in color, and it's usually (but not always) more salty than white or yellow miso. If a red miso is actually a very dark reddish brown in color, the brownish color may be the result of soybeans having been steamed prior to fermentation. While barley, rice and other grains may be used in the production of red miso, it is usually characterized by a very high percentage of soybeans, and for this reason is sometimes referred to as "mame miso" (since "mame" means "bean" in Japanese).

Dark brown and red miso usually get their strong flavors from longer periods of fermentation. In some cases, fermentation or dark soy miso may involve three years or longer. For example, Hatcho miso made by the Hatcho Miso Company in Okazaki, Japan (Aichi prefecture) is fermented in 200-year-old vats over a period of three winters.

Remember that regardless of the many names you may hear for different varieties of miso, virtually all include soybeans as a basic ingredient.

Other names you might hear for different varieties of miso include:

- genmai miso (brown rice-containing miso)
- soba miso or sobamugi miso (buckwheat-containing miso)
- taima miso (hemp seed-containing miso)
- natto miso (chutney-type miso that usually containing barley and ginger)

In China, miso is usually referred to as "taucheo," "dajiang," "doujiang" or just "jiang." In Korea, miso may be referred to as "jang" or "dwenjang." In Indonesia it is called "tautjo" or "tauco."

Given this rich history of miso varieties and names across Asia, the Codex Coordinating Committee for Asia (CCASIA, part of the Food and Agriculture Organization/World Health Organization of the United Nations) has actually set food quality standards for fermented soy paste that include fermentation by naturally-occurring or cultivated micro-organisms and other production factors. While the United States is a member of the Codex Commission that works to help develop international food standards, we're not aware of any commercially available miso products in the U.S. that show compliance with CCASIA standards on their labeling. Still, we are glad to see attention being paid by an international organization to the quality of this unique and much-loved fermented food.

History

The style of fermentation used with miso is most likely to have originated in China several thousand years ago. Following its development in China, this style of fermentation is believed to have made its way into Japan as early as the 10th century B.C. It's difficult to overestimate miso's rich history. From rulers and priests and Buddhist monks to military personnel and everyday citizens, miso found its way into the heart of many Asian cuisines very early in the development of the cuisines. It is especially popular in the form of miso soup (often containing tofu and sea vegetables as well).

One key event in miso's history was the development of a process that could keep the spores from the *Aspergillus* mold alive, uncontaminated, and practical to transfer from place to place. Ash from the burned leaves of certain hardwood trees turned out to be a helpful material for storing the mold spores (sometimes called conidiospores) and transporting them to miso fermentation facilities.

Today miso is produced worldwide, and not just in Asia. Much of the miso produced in Asia countries is actually consumed in Asian countries. In Japan, for example, approximately 1,600 facilities manufacture miso, and total production reaches about 600,000 tons per year. From this total amount, however, less than 1% is usually exported outside of the country. Many soy miso pastes available for sale in the U.S. have actually been made in the U.S., although it is also common to find soy miso imported from Japan and Korea.

How to Select and Store

Miso is generally sold in tightly sealed plastic or glass containers. Some stores also sell it in bulk containers. To check for freshness, look for a sell-by date listed on the container. In addition, check the label to make sure there are no additives such as MSG.

The type of miso that you purchase should depend both on personal preference as well as intended use. Since darker color miso is stronger and more pungent in flavor, it is generally better suited for heavier foods. Lighter colored miso is more delicate and oftentimes more appropriate for soup, dressings, and light sauces.

Miso should be stored in the refrigerator in a tightly sealed container where it can keep for up to one year.

You can expect to find certified organic miso at most large supermarkets and natural food groceries. However, in practice, few organic miso pastes appear to display the USDA organic logo, mostly likely because the miso has been certified as organic by an independent third party. In the case of miso imported from Japan, organic certification often involves the Japanese Agricultural Standards (JAS) system. As is our recommendation for all WHFoods, we encourage you to purchase certified organic miso to lessen your risk of exposure to unwanted contaminants in your miso.

How to Enjoy

A Few Quick Serving Ideas

- Miso soup is quick and easy to prepare. Heat miso paste and water over low-medium heat. Eat as is or add in some traditional fixings including shiitake mushrooms, tofu, scallions, burdock, carrots, and daikon radish.
- Miso-tahini sandwiches are one of our favorites. To make your own, just spread miso on a piece of bread and then top with tahini. Enjoy as is or add sliced avocado.
- Use miso as an ingredient in marinades for meat, fish, poultry or game.
- Carry dried miso soup packets with you and enjoy them as a pick-me-up coffee substitute.
- Combine a little miso with olive oil, flax seed oil, ginger and garlic to make an Asian-inspired dressing that can be used on salads or cold grain dishes.

WHFoods Recipes That Feature Miso

- 5-Minute Miso Soup with Dulse (sea vegetable)
- Miso Stir-Fry
- Yummy Healthy Miso Soup

Individual Concerns

Allergic Reactions to Miso

Although allergic reactions can occur to virtually any food, research studies on food allergy consistently report more problems with some foods than with others. For example, according to a recent report by the U.S. Centers for Disease Control, 90% of food allergies are associated with 8 food types: soy foods (such as miso), peanuts, fish, crustacean shellfish, wheat, cow's milk, hen's eggs, and tree nuts. (Crustacean shellfish include shrimp, prawns, lobster, and crab. Tree nuts include almonds, cashews, walnuts, pecans, pistachios, Brazil nuts, hazelnuts, and chestnuts.)

These foods do not need to be eaten in their pure, isolated form in order to trigger an adverse reaction. For example, yogurt made from cow's milk is also a common allergenic food, even though

the cow's milk has been processed and fermented in order to make the yogurt. Ice cream made from cow's milk would be an equally good example.

Food allergy symptoms may sometimes be immediate and specific, and can include skin rash, hives, itching, and eczema; swelling of the lips, tongue, or throat; tingling in the mouth; wheezing or nasal congestion; trouble breathing; and dizziness or lightheadedness. But food allergy symptoms may also be much more general and delayed, and can include fatigue, depression, chronic headache, chronic bowel problems (such as diarrhea or constipation), and insomnia. Because most food allergy symptoms can be caused by a variety of other health problems, it is good practice to seek the help of a healthcare provider when evaluating the role of food allergies in your health.

In addition to the general allergy-related issues described above for soybean-containing foods, there is some research information specific to miso that is important to consider. First is the issue of protein P34. In some studies, this protein has been found to be one of the primary allergenic proteins in soy. However, at least one study on consumption of Korean miso has shown an undetectable level of protein P34 (with a detection level of 0.45 nanograms) in the miso, making fermented soybean paste a potentially less antigenic (allergy-causing) food than other forms of soy. This potentially reduced allergy risk from miso versus other soy foods makes sense to us. The fermentation process - especially over a period of time involving months or years - is likely to result in substantial modification of the proteins in soy, including potentially allergy-causing proteins like P34.

Some of the anti-cancer benefits of soy miso might be related to its potential strengthening of the immune system. (Weakened immune system function is a risk factor for many types of cancer.) Research studies show that during the soy miso fermentation process, there is significant potential for the creation of immuno-supportive substances. For example, we've seen a study in which soybeans fermented with the help of the bacterium *Tetragenococcus halophilus* showed the ability to increase T helper type immunity. Since immune system function often depends on a unique set of peptides (protein building blocks), transformation of soy proteins during fermentation is likely to provide the immune system with some helpful peptidesand eventually lowering our risk of cancer through added immune system support.

Miso and Thyroid Health

Along with the increasing presence of soy foods (such as miso) in grocery stores and on restaurant menus has come increasing controversy over soybeans and thyroid health. We're not surprised to find strong conflicting opinions in this area because scientific research on thyroid and soy is both complicated and inconclusive. We have written an extensive review of what we know - and what we don't know - about this important issue at this point. You find the article Soy Food and Thyroid Health here.

Miso and Acrylamide

When certain foods are cooked, their amino acids (protein building blocks) can interact with their simple sugars to form acrylamide. Acrylamide is a potentially toxic and potentially cancer-causing substance that can be naturally present in uncooked, raw foods in very small amounts, but can be formed in much large quantities in certain cooked foods. Grain-based coffee substitutes and fried potato chips are examples of foods that can contain high amounts of acrylamide. Even though you may find some websites listing miso as a high acrylamide food, we have not found any indexed journal

research studies to support this finding. In fact, we have seen several studies on a related soy food - soy sauce - showing no detectable levels of acrylamide. The absence of high acrylamide levels in soy miso makes sense to us, because traditionally prepared soy miso does not undergo any high-heat processing, and also because the sugar content of miso is relatively low when soybeans make up the bulk of the miso ingredients. (Cooked soybeans contain only 2-3 grams of per half cup of total sugars.) In addition, traditionally fermented miso should definitely not be classified as a processed food that is comparable to potato chips or a grain-based coffee substitute. It is a natural food based on whole soybeans and natural processing of these who soybeans by micro-organisms. (For more detailed information on acrylamide and food, please see our article, What is acrylamide and how is it involved with food and health?)

Infants and Miso

One study from Japan has shown that breast-fed infants already diagnosed with atopic dermatitis (an inflammatory skin condition) experienced a worsening of dermatitis symptoms when their mothers consumed miso soup and soy sauce. We aren't sure how this research finding applies to healthy Japanese breastfeeding infants, or of course, to infants who are breastfeeding in the U.S. However, the result here does remind us of the importance of considering food sensitivity in the feeding of infants, and the potential difference between individual concerns for infants versus adults involving soy foods, including miso.

Nutritional Profile

Miso is now known to contain phytonutrient antioxidants including phenolic acids like ferulic, coumaric, syringic, vanillic, and kojic acid. Particularly interesting are new additions to the list of miso antioxidants that are related to its fermentation. In several recent studies, the amount of certain antioxidants in miso appears to increase when fermentation is carried out for a longer period of time. For example, several DDPH (2,2,-diphenyl-1-picrylhydrazyl) antioxidants that can help scavenge free radicals in the body have been shown to increase in number as the length of soy miso fermentation time increases.

Miso is a very good source of manganese and a good source of vitamin K, protein, dietary fiber, copper, omega-3 fatty acids, zinc, and choline.

In-Depth Nutritional Profile

In addition to the nutrients highlighted in our ratings chart, an in-depth nutritional profile for Miso is also available. This profile includes information on a full array of nutrients, including carbohydrates, sugar, soluble and insoluble fiber, sodium, vitamins, minerals, fatty acids, amino acids and more.
Introduction to Food Rating System Chart

In order to better help you identify foods that feature a high concentration of nutrients for the calories they contain, we created a Food Rating System. This system allows us to highlight the foods that are especially rich in particular nutrients. The following chart shows the nutrients for which this food is either an excellent, very good, or good source (below the chart you will find a table that explains these qualifications). If a nutrient is not listed in the chart, it does not necessarily mean that the food doesn't contain it. It simply means that the nutrient is not provided in a sufficient amount or concentration to

meet our rating criteria. (To view this food's in-depth nutritional profile that includes values for dozens of nutrients - not just the ones rated as excellent, very good, or good - please use the link below the chart.) To read this chart accurately, you'll need to glance up in the top left corner where you will find the name of the food and the serving size we used to calculate the food's nutrient composition. This serving size will tell you how much of the food you need to eat to obtain the amount of nutrients found in the chart. Now, returning to the chart itself, you can look next to the nutrient name in order to find the nutrient amount it offers, the percent Daily Value (DV%) that this amount represents, the nutrient density that we calculated for this food and nutrient, and the rating we established in our rating system. For most of our nutrient ratings, we adopted the government standards for food labeling that are found in the U.S. Food and Drug Administration's "Reference Values for Nutrition Labeling." Read more background information and details of our rating system.

Miso
1.00 tbs
17.19 grams
34.20 calories

Nutrient	Amount	DV (%)	Nutrient Density	World's Healthiest Foods Rating
tryptophan	0.03 g	9.4	4.9	very good
manganese	0.15 mg	7.5	3.9	very good
vitamin K	5.04 mcg	6.3	3.3	good
protein	2.01 g	4.0	2.1	good
fiber	0.93 g	3.7	2.0	good
copper	0.07 mg	3.5	1.8	good
omega-3 fats	0.08 g	3.3	1.8	good
zinc	0.44 mg	2.9	1.5	good
choline	12.41 mg	2.9	1.5	good

World's Healthiest Foods Rating	Rule
excellent	DV>=75% OR Density>=7.6 AND DV>=10%
very good	DV>=50% OR Density>=3.4 AND DV>=5%
good	DV>=25% OR Density>=1.5 AND DV>=2.5%

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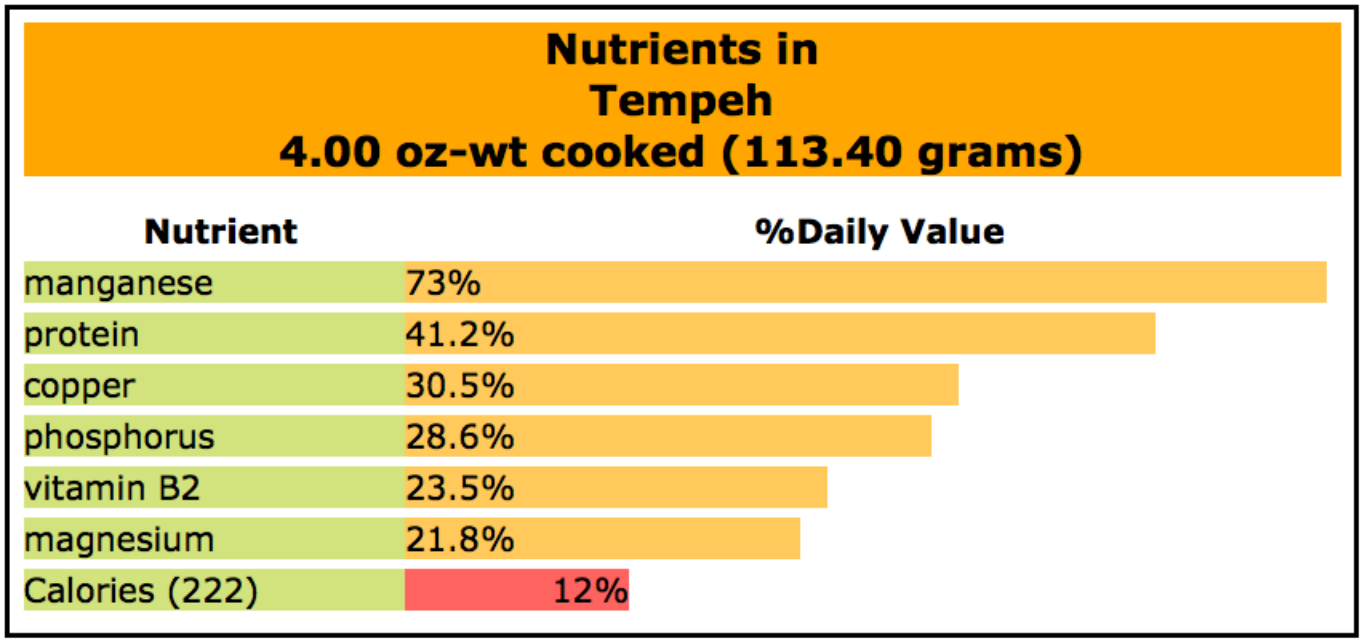
TEMPEH

Source: ***http://www.whfoods.com/genpage.php?tname=foodspice&dbid=126***

Although not a common item in most households in the United States, tempeh, with its distinctively nutty taste and nougat-like texture, is increasing in popularity. It easily absorbs the flavors of the other foods with which it is cooked making it adaptable to many types of dishes. Tempeh can be found in health food stores and specialty markets throughout the year.

Tempeh has been a staple in Indonesia for over 2000 years. It is a highly nutritious fermented food traditionally made from soybeans and its high protein content makes it a wonderful substitute for meat. It is typically made by cooking and dehulling soybeans, inoculating them with a culturing agent (like Rhizopus oligosporus), and then incubating the innoculated product overnight until it forms a solid cake.



This chart graphically details the %DV that a serving of Tempeh provides for each of the nutrients of which it is a good, very good, or excellent source according to our Food Rating System. Additional information about the amount of these nutrients provided by Tempeh can be found in the Food Rating System Chart. A link that takes you to the In-Depth Nutritional Profile for Tempeh, featuring information over 80 nutrients, can be found under the Food Rating System Chart.

Health Benefits

A food made from fermented soybeans, tempeh provides not only the protein found in soybeans but their many other health benefits as well. The soybean is the most widely grown and utilized legume in the world, with the U.S. being responsible for more than 50% of the world's production of this important food. Soy is one the most widely researched, health-promoting foods around. Soy's key benefits are related to its excellent protein content, its high levels of essential fatty acids, numerous vitamins and minerals, its isoflavones, and its fiber. While a complete review of all the benefits soy foods offer could easily fill a large book, recently there has been controversy as to the extent to which soybeans are a health-promoting food; we address this issue in our Q+A Are there special concerns related to soy foods?

A Health-Promoting Meat Replacer

Soybeans are regarded as equal in protein quality to animal foods. Just 4 ounces of tempeh provides 41% of the Daily Value (DV) for protein for less than 225 calories and only 3.9 grams of saturated fat. Plus, the soy protein in tempeh tends to lower cholesterol levels, while consuming protein from animal sources tends to raise them, since they also include saturated fat and cholesterol. In addition to healthy protein, some of tempeh's nutritional high points include:

Riboflavin: 4 ounces of tempeh provides 24% of the DV for this B-vitamin. A nutrient essential for the transfer reactions that occur to produce energy in the mitochondria, riboflavin is also a cofactor in the regeneration of one of the liver's most important detoxification enzymes, glutathione.

Magnesium: Tempeh also provides 22% of the DV for Nature's blood vessel relaxant, magnesium, in just 4 ounces. In addition to its beneficial role in the cardiovascular system, magnesium plays an essential role in more than 300 enzymatic reactions, including those that control protein synthesis and energy production.

Manganese and Copper: That same 4 ounces of tempeh will give you 73% of the DV for manganese and 31% of the DV for copper. These two trace minerals serve numerous physiological functions including being cofactors for the antioxidant enzyme superoxide dismutase.

Beneficial Effects on Cholesterol Levels

Soy protein has been found in recent years to be excellent for a number of different conditions, one of the most important ones being heart disease. Soy protein has been shown in some studies to be able to lower total cholesterol levels by 30% and to lower LDL, or "bad" cholesterol, levels by as much as 35-40%. This is important because high levels of cholesterol, especially LDL cholesterol, tend to become deposited into the walls of blood vessels, forming hard plaques. If these plaques grow too large or break, they can cause a heart attack or stroke.

Some studies have even shown that soy protein may be able to raise HDL cholesterol levels. HDL cholesterol travels through the body collecting the cholesterol that has been deposited in the arteries, so it can be taken away and removed by the liver. One of the main goals of atherosclerosis treatment and prevention, therefore, is to lower LDL cholesterol levels while raising HDL levels. And soy is one food that may be able to do both at once.

In addition, soy foods like tempeh are rich in dietary fiber. When eaten, the fiber in tempeh binds to fats and cholesterol in food, so less is absorbed. In addition, tempeh's fiber binds to bile salts and removes them from the body. Since the liver gets rid of cholesterol by transforming it into bile salts, their removal by fiber forces the liver to use more cholesterol to form more bile salts, leading to lower cholesterol levels overall.

Stabilize Blood Sugar at Healthy Levels

Another condition for which tempeh can be very beneficial is diabetes, particularly type 2 diabetes. The protein in tempeh is excellent for diabetic patients, who tend to have problems with animal sources of protein. The protein and fiber in tempeh can also prevent high blood sugar levels and help in keeping blood sugar levels under control. Some diabetics even find that the effects of soy foods, such as tempeh, and other legumes on blood sugar are so profound that they need to monitor their new blood sugar levels and adjust their medications accordingly. Of course, all of this should only be

done under the supervision of a doctor. Diabetes patients are especially susceptible to atherosclerosis and heart disease, which is the number one killer of persons with diabetes. Keeping cholesterol levels low with soy foods may be useful for preventing these heart problems. In addition, soy foods have been shown to lower high triglyceride levels. Triglyceride levels tend to be high in diabetic patients, and high triglyceride levels are another factor of diabetics' increased risk for heart disease.

Promotes Gastrointestinal Health

The fiber in tempeh also provides preventative therapy for several other conditions. Fiber is able to bind to cancer-causing toxins and remove them from the body, so they can't damage colon cells. Tempeh, which is made from high-fiber soybeans, may therefore be able to help reduce the risk of colon cancer. As a matter of fact, in areas of the world where soy foods are eaten regularly, rates of colon cancer, as well as some other cancers, including breast cancer, tend to be low.

A Healthy Transition through Menopause

One of the more popular uses of soy foods lately has been in the treatment of menopausal symptoms. Soybeans contain active compounds called *isoflavones* that act like very weak estrogens in the body. These phytoestrogens bind to estrogen receptors and may provide enough stimulation to help eliminate some of the uncomfortable symptoms that occur when natural estrogen levels decline. Studies have shown that women who consume soy foods report a significant reduction in the amount of hot flashes that they experience. There is also some evidence that soy foods may even be able to help reduce the bone loss that typically occurs after menopause. And as women's risk for heart disease significantly increases at menopause, soy foods' numerous beneficial cardiovascular effects make tempeh a particularly excellent choice for frequent consumption as menopause approaches.

Promotes Men's Health

In epidemiological studies, *genistein*, a naturally occuring isoflavone found chiefly in soy foods, has been consistently linked to lower incidence of prostate cancer. A recent study of human prostate cancer cells demonstrated some of the mechanisms behind genistein's anti-prostate cancer effects. Genistein not only induced chemicals that block cell cycling, thus preventing the proliferation of cancerous cells in the prostate, but at high concentrations actually induced *apoptosis*, the self-destruct sequence the body uses to eliminate worn out or abnormal cells.

Another study looked at the antioxidant effects of these isoflavones in soy, and found that genistein protected cells in healthy men from an increase in free radical production by inhibiting the activation of an important inflammatory agent called NF-kappaB and by decreasing levels of DNA adducts (a marker of DNA damage).

Description

Tempeh is a wonderful, high protein, southeastern Asian treat. Not only does this collaged cake of fermented soybeans have a distinctive nutty taste but its nougatlike texture readily absorbs the different flavorings with which it is cooked. Tempeh is typically made by cooking and dehulling soybeans, inoculating them with a culturing agent (like *Rhizopus oligosporus*), and then incubating the innoculated product overnight until it forms a solid cake.

History

Tempeh originated in Indonesia where it has been a staple of the traditional cuisine for over 2000 years. Shortly after colonizing Indonesia, the Dutch introduced tempeh and other native foodstuffs into Europe. It was not until the 20th century that this Southeast Asian delight was introduced into the United States. Tempeh is now gaining increased popularity in this country as people look for ways to increase their intake of soybeans, and they discover tempeh's versatility and delicious taste.

How to Select and Store

For many years it was only possible to find tempeh in natural foods and Asian stores. Yet, with the growing demand for soy foods, tempeh is now becoming more and more available in supermarkets throughout the country. Depending upon the store, tempeh may either be kept in the refrigerated or freezer section. In addition to plain soy tempeh, oftentimes varieties that include grains or vegetables are available.

Look for tempeh that is covered with a thin whitish bloom. While it may have a few black or grayish spots, it should have no evidence of pink, yellow or blue coloration as this indicates that it has become overly fermented.

Refrigerated tempeh can keep in the refrigerator for up to ten days. If you do not consume the whole package of tempeh at one time, wrap it well and place it back in the refrigerator. Tempeh will keep fresh for several months in the freezer.

How to Enjoy

A Few Quick Serving Ideas:

For a twist on the traditional reuben sandwich, place broiled tempeh on a slice of whole grain bread, layer with sauerkraut, top with cheese or meltable soy cheese, then broil in oven for a few minutes until the sandwich is hot and toasty. Top with Russian dressing made by combining ketchup and soy mayonnaise, and enjoy.

A vegetarian option to spaghetti and meat sauce is spaghetti and tempeh sauce. Just substitute tempeh for ground beef in your favorite recipe.

Add extra flavor, texture and nutrition to chili by adding some tempeh.

Individual Concerns

Allergic Reactions to Tempeh

Although allergic reactions can occur to virtually any food, research studies on food allergy consistently report more problems with some foods than with others. It's important to realize that the frequency of problems varies from country to country and can change significantly along with changes in the food supply or with other manufacturing practices. For example, in several part of the

world, including Canada, Japan, and Israel, sesame seed allergy has risen to a level of major concern over the past 10 years.

In the United States, beginning in 2004 with the passage of the Food Allergen Labeling and Consumer Protection Act (FALCPA), food labels have been required to identify the presence of any major food allergens. Since 90% of food allergies in the U.S. have been associated with 8 food types as reported by the U.S. Centers for Disease Control, it is these 8 food types that are considered to be major food allergens in the U.S. and require identification on food labels. The 8 food types classified as major allergens are as follows: (1) wheat, (2) cow's milk, (3) hen's eggs, (4) fish, (5) crustacean shellfish (including shrimp, prawns, lobster and crab); (6) tree nuts (including cashews, almonds, walnuts, pecans, pistachios, Brazil nuts, hazelnuts and chestnuts); (7) peanuts; and (8) soy foods.

These foods do not need to be eaten in their pure, isolated form in order to trigger an adverse reaction. For example, yogurt made from cow's milk is also a common allergenic food, even though the cow's milk has been processed and fermented in order to make the yogurt. Ice cream made from cow's milk would be an equally good example.

Food allergy symptoms may sometimes be immediate and specific, and can include skin rash, hives, itching, and eczema; swelling of the lips, tongue, or throat; tingling in the mouth; wheezing or nasal congestion; trouble breathing; and dizziness or lightheadedness. But food allergy symptoms may also be much more general and delayed, and can include fatigue, depression, chronic headache, chronic bowel problems (such as diarrhea or constipation), and insomnia. Because most food allergy symptoms can be caused by a variety of other health problems, it is good practice to seek the help of a healthcare provider when evaluating the role of food allergies in your health.

Tempeh and Oxalates

Soybeans, and foods made from them like tempeh, are among a small number of foods that contain measurable amounts of oxalates, naturally-occurring substances found in plants, animals, and human beings. When oxalates become too concentrated in body fluids, they can crystallize and cause health problems. For this reason, individuals with already existing and untreated kidney or gallbladder problems may want to avoid eating soybean-based products like tempeh. Laboratory studies have shown that oxalates may also interfere with absorption of calcium from the body. Yet, in every peer-reviewed research study we've seen, the ability of oxalates to lower calcium absorption is relatively small and definitely does not outweigh the ability of oxalate-containing foods to contribute calcium to the meal plan. If your digestive tract is healthy, and you do a good job of chewing and relaxing while you enjoy your meals, you will get significant benefitsâ□"including absorption of calciumâ□"from calcium-rich foods plant foods that also contain oxalic acid. Ordinarily, a healthcare practitioner would not discourage a person focused on ensuring that they are meeting their calcium requirements from eating these nutrient-rich foods because of their oxalate content. For more on this subject, please see "Can you tell me what oxalates are and in which foods they can be found?"

Soybean-based Foods and Genetically Modified Organisms (GMOs)

A large percentage of the conventionally grown soybeans in the United States come from genetically modified (GM) seeds. If you are looking your exposure to GM foods, choose organically grown soybeans (and foods such as tofu, tempeh and miso made from it), since the current USDA organic

regulations prohibit the use of GM seeds for growing foods to be labeled as organically grown. A wide assortment of processed food contain soy-based ingredients (such as soy protein and hydrolyzed vegetable protein); look for the organic version of these items in your foods and/or look for foods that note that they do not contain any genetically modified ingredients (sometimes this is noted on the packaged as "GMO-free"). For more on this subject, see this Q+A.

Nutritional Profile

Tempeh is a very good source of manganese and a good source of protein, copper, phosphorus, vitamin B2 and magnesium. In addition, tempeh is a good source of monounsaturated fats.

In-Depth Nutritional Profile

In addition to the nutrients highlighted in our ratings chart, an in-depth nutritional profile for Tempeh is also available. This profile includes information on a full array of nutrients, including carbohydrates, sugar, soluble and insoluble fiber, sodium, vitamins, minerals, fatty acids, amino acids and more.

Introduction to Food Rating System Chart

In order to better help you identify foods that feature a high concentration of nutrients for the calories they contain, we created a Food Rating System. This system allows us to highlight the foods that are especially rich in particular nutrients. The following chart shows the nutrients for which this food is either an excellent, very good, or good source (below the chart you will find a table that explains these qualifications). If a nutrient is not listed in the chart, it does not necessarily mean that the food doesn't contain it. It simply means that the nutrient is not provided in a sufficient amount or concentration to meet our rating criteria. (To view this food's in-depth nutritional profile that includes values for dozens of nutrients - not just the ones rated as excellent, very good, or good - please use the link below the chart.) To read this chart accurately, you'll need to glance up in the top left corner where you will find the name of the food and the serving size we used to calculate the food's nutrient composition. This serving size will tell you how much of the food you need to eat to obtain the amount of nutrients found in the chart. Now, returning to the chart itself, you can look next to the nutrient name in order to find the nutrient amount it offers, the percent Daily Value (DV%) that this amount represents, the nutrient density that we calculated for this food and nutrient, and the rating we established in our rating system. For most of our nutrient ratings, we adopted the government standards for food labeling that are found in the U.S. Food and Drug Administration's "Reference Values for Nutrition Labeling." Read more background information and details of our rating system.

Tempeh 4.00 oz-wt cooked 113.40 grams 222.26 calories				
Nutrient	**Amount**	**DV (%)**	**Nutrient Density**	**World's Healthiest Foods Rating**
manganese	1.46 mg	73.0	5.9	very good
protein	20.63 g	41.3	3.3	good
copper	0.61 mg	30.5	2.5	good
phosphorus	286.90 mg	28.7	2.3	good
vitamin B2	0.40 mg	23.5	1.9	good
magnesium	87.32 mg	21.8	1.8	good

World's Healthiest Foods Rating	Rule
excellent	DV>=75% OR Density>=7.6 AND DV>=10%
very good	DV>=50% OR Density>=3.4 AND DV>=5%
good	DV>=25% OR Density>=1.5 AND DV>=2.5%

In-Depth Nutritional Profile for Tempeh

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MISO SOUP:
A DELICIOUS BOWL OF HEALTH AND ANTI-AGING POWER

Source: ***http://bodyecology.com/articles/miso_health_and_anti-aging.php#.UCFv00RrcTk***

There's a great debate about soy in the health food world today.

Once thought to be the cure-all for many ills and the lifesaver for vegetarian and gluten-free diets, more and more studies are showing what we at Body Ecology have known for some time: **soy is NOT the health food you may think it is...*unless* it's fermented and non-GMO (not genetically modified).**

Unfermented soy has been linked to digestive distress, immune system breakdown, PMS, endometriosis, reproductive problems for men and women, allergies, ADD, higher risk of heart disease and cancer, malnutrition and loss of libido.[1]

Who's At Risk?

While sales of soy are slowing as people learn about the risks, there are still people using soy. According to Kaayla T. Daniel, PhD, who wrote The Whole Soy Story, **the most at risk populations, are:** infants who are taking soy baby formula, vegetarians (especially vegans) eating a high soy diet and mid-life women eating a lot of soyfoods thinking it will help with the symptoms of menopause.

So how can you get the benefits of soy, without the risks?

Fermentation to the Rescue

Fermented foods and drinks are a cornerstone of the Body Ecology program because they help build your inner ecosystem. When your inner ecosystem is healthy, it is full of friendly microflora (beneficial bacteria in your intestines), that help you digest and assimilate nutrients and boost your immunity.

In fact, healthy *microflora actually* go to work for you, creating the vitamins and minerals your body needs to stay strong and energized.

When you follow the Body Ecology program, you begin to create energy so that your body can correct digestion, conquer infections and cleanse. **Once your systemic fungal infection is under control we recommend adding fermented soy foods like miso soup, natto and tempeh. Soyfoods are high in copper and we have found that high copper foods often are not tolerated when a person has candidiasis.**

Amazing Miso

Miso has been eaten in Japan and China for many centuries and has been attracting the attention of many of us because of its health and anti-aging benefits. It's also quite delicious. When you aren't feeling well a bowl of miso soup can be especially soothing.

While it was once thought that soy was the reason for the low rates of heart disease, breast and prostate cancer in Asia, more evidence is now showing us that it is the consumption of traditional ***fermented*** soy products (usually eaten every day) that are providing the real benefits.

Traced from ancient China, where it was known as hisio, a seasoning prized by aristocrats, miso was perfected in Japan from the 7th century to today.

Making miso is an art form in Japan. It is made of soybeans and koji, a culture starter made from beneficial molds, yeast and lactic acid bacteria. **As long as you choose *unpasteruized* miso, you will be getting the benefits of live friendly microflora for the health of your inner ecosystem.**

There are many types of miso, some made with just soy beans and soy koji (called Hatcho miso, a favorite in Japan) and others made with barley and rice.

No matter which type you choose, this fermented superfood has many health benefits.

Miso Benefits

Many studies have been done on miso, some on humans and some on animals. These studies are showing the following benefits of miso[2]:

- Reduces risks of cancer including breast cancer, prostate cancer, lung cancer and colon cancer.
- Protection from radiation
- Immune strengthening
- Antiviral -- miso is very alkalizing and strengthening to the immune system helping to combat a viral infection.
- Prevents aging - high in antioxidants, miso protects from free radicals that cause signs of aging.
- Helps maintain nutritional balance - full of nutrients, beneficial bacteria and enzymes, miso provides: protein, vitamin B12, vitamin B2, vitamin E, vitamin K, tryptophan, choline, dietary fiber, linoleic acid and lecithin.
- Helps preserve beautiful skin - miso contains linoleic acid, an essential fatty acid that helps your skin stay soft and free of pigments.

- Helps reduce menopausal complaints - the isoflavones in miso have been shown to reduce hot flashes.

Length of Fermentation Matters

Soy protein is hard to digest and takes a long, slow process of fermentation to break it down. Bacteria that can digest soy are much more hardy than the more fragile bacteria used to ferment vegetables, young coconut water and milk products (so while you may love our line of Starters, they won't help you make homemade miso - but they WILL help you make a variety of other probiotic-rich fermented foods and drinks.

With miso, length of fermentation matters. Hiro Watanabe, PhD, an expert in developmental biology and cancer prevention in Japan, conducted several animal and human studies using freeze dried rice miso to better understand how miso protects against cancer, radiation and other diseases.

Dr. Watanabe's studies showed that **when it comes to healing illnesses like breast and prostate cancer, the ideal length of fermentation was between 180 days (6 months) and 2 years.**

Dr Watanabe also found that miso fermented for 180 days is typically a rich color and has plenty of healthy microflora. After 2 years of fermentation, the amount of friendly bacteria has begun to disappear. And while the miso would still a fermented food and is not "spoiled" there is a risk that other pathogens can grow in the miso.

Sipping Miso Soup for Your Health

According to Dr. Watanabe's studies, the sodium in miso did not show adverse affects for people with salt sensitivity and hypertension. Here are the amounts of miso soup he recommended for different health conditions:

- Cancer - 3 or more cups per day
- High blood pressure - 2 cups per day
- Menopause - 1 - 3 cups per day
- Special Note: Here at Body Ecology we recommend eating less miso in the summer months because our body needs much less salt in the hot months. Donna often recommends adding it to salads, cultured veggies or salad dressings during the summertime. However, right now it is winter and much of the country is having extremely cold weather. Miso is a great food to eat every day.

For health maintenance, follow your intuition when it comes to how much miso soup you enjoy. This delicious, healing food is a great way to nourish yourself to great health!

Make Your Own Miso Soup

When you are ready to introduce the benefits of miso into ***your*** diet, you have more options than soup. For example, you can blend **this certified organic miso** (made with healthy **sea salt**) (Miso Master is another recommended brand; check with your local health food store) in with your cultured vegetables or add it to salad dressings for a delicious dose of protein, minerals and anti-aging power!

Or, sip your miso in a warming cup of soup as the Japanese have been doing to stay healthy for centuries. If you are really in a hurry simply dissolve a heaping spoonful of your favorite miso paste into a cup of hot water that you've poured into a favorite coffee mug. Spoon some cultured veggies into another bowl, add some roasted pumpkin seed oil and some sea salt to these and enjoy a perfectly balanced meal. This is fast food at its finest!

To make a more traditional miso soup, follow this easy recipe:

EZ Traditional Miso Soup Recipe

5-inch strip wakame (sea vegetable)
1 large onion (about 1 cup)
4 Cups filtered water
2 Tablespoons **miso** (ideally, fermented for 6 months - 2 years)
Garnish - chopped parsley, green onions, ginger or watercress

Instructions

- Soak the wakame in water for 10 minutes and slice in into 1.5 inch pieces.
- Thinly slice onions
- Put water, onions and wakame in a saucepan and bring to a boil.
- Reduce the heat to simmer for 10 - 20 minutes, until tender.
- Remove 1.5 cups of broth from the saucepan, place in a bowl.
- Allow water in the bowl to cool a bit and add the miso, mixing it into the water (the water should not be boiling, because it can kill the live beneficial microflora and enzymes in miso. In general, the microflora in koji, the starter used to make miso, die at 105° F).
- Turn off heat, allow the water to cool a bit.
- Add the miso broth to the soup in the saucepan and add chopped parsley, green onions, ginger or watercress for garnish.

RECIPE NOTE: The above recipe is a vegetarian version. You can also add bonito flakes (dried fish) - **check out these bonito flakes at Amazon** or check with your local Asian market. Simmer one tablespoon of bonito flakes in the water for 10 minutes and strain. Then continue as above. When made with the dried fish as a quick stock your miso soup will be even more strengthening.

P.S. Donna and Scott Eibel, President of Body Ecology, just returned from a trip to Japan. They enjoyed several bowls of miso soup each day...even at breakfast. They felt great.

SOY BAD, SOY GOOD: THE PLUSES OF FERMENTED SOY

Source: ***http://articles.mercola.com/sites/articles/archive/2004/08/04/fermented-soy.aspx***

Soy is a hotly debated product among those who promote and sell its nutritional value as well as consumers who eat it. The debate stems largely from the health value of nonfermented soy found in a great many processed foods in relation to those that use the much healthier alternative fermented soy.

Why? Nonfermented soy products contain phytic acid, which contains anti-nutritive properties. Phytic acid binds with certain nutrients, including iron, to inhibit their absorption. This is a direct, physical effect that takes place in the digestive system. Their ability to bind is limited by the milligrams of phytic acid present.

Products using nonfermented soy include:

- Fresh green soybeans
- Whole dry soybeans
- Nuts
- Sprouts
- Flour
- Soy milk
- Tofu

What makes unfermented soy particularly unsafe: It's hard to avoid soy in processed foods such as baby formula, meat substitutes, drinks and snacks. One can find it in a great many domestically-produced food products at the grocery store. Additionally, soy is sanctioned by groups like the Soy Protein Council and USDA that cite the presence of isoflavones scientists say reduces one's risk of cancer.

On the other hand, fermented soy stops the effect of phytic acid and increases the availability of isoflavones. The fermentation also creates the probiotics--the "good" bacteria the body is absolutely dependent on, such as lactobacilli--that increase the quantity, availability, digestibility and assimilation of nutrients in the body.

Products using fermented soy include:

- Natto
- Miso
- Tempeh

- Soy sauces
- Fermented tofu and soymilk

Many studies have shown traditionally fermented soy--which is the form that is very popular in many Asian cultures--aids in preventing and reducing a variety of diseases including certain forms of heart disease and cancers.

Good Foods

One such study of the culturing method involved in the production of the Japanese traditional food miso concluded the culturing process itself led to a lower number and growth rate of cancers. Researchers also found it was not the presence of any specific nutrient that was cultured along with the soyabean paste but the cultured soy medium itself that was responsible for the health benefits associated with eating miso.

Miso, a fermented or probiotic form of soyabean, is particularly rich in the isoflavone aglycones, genistein and daidzein, which are believed to be cancer chemopreventatives.

The health benefits are found to be as good with natto, according to research conducted by a Japanese scientist who found natto had the highest fibrinolytic activity among 200 foods produced worldwide. About 15 years ago, that same scientist discovered an enzyme produced in the fermentation process, nattokinase, a powerful agent contained in the sticky part of natto that dissolves blood clots that lead to heart attacks, strokes and senility.

Natto also contains vitamin K2 and isophrabon, which help to prevent diseases such as osteoporosis and breast cancer and slow down the aging process.

How Do Fermented Foods Work?

Scientists have considered three different theories:

1. Primary active ingredients in complex fermented soy "foods" act synergistically with secondary compounds
2. Secondary compounds mitigate the undesirable side effects caused by the predominant active ingredients
3. Multiple ingredients act through multiple discrete pathways to therapeutically affect the host. That allows lower concentrations of each of the botanicals or soy phytochemicals to be more efficacious when used together than when used individually

Four years ago, the World Health Organization reported the Japanese, who consume large amounts of fermented soy foods like natto and miso along with green tea, ginger and ocean herbs, have the longest lifespan of any people in the world.

Unfortunately, Americans didn't make the top 20 for lengthy lifespans, which has much to do with a Western diet that emphasizes foods that are processed and genetically altered. That could have a domino effect worldwide on the health of other cultures. Experts fear consumers in other cultures may abandon their traditional fermented foods for a more Western diet, losing healthy sources of probiotic whole food nutrition.

Well Being Journal Vol. 11, No.6

Contra Costa Times July 14, 2004

Dr. Mecola's Comments

Although many seem to feel better after they start to include soy in their diet, I don't believe this is an endorsement in any way. My guess is that this is likely more related to what people have excluded from their diet to make room for the soy. Understand that I am in no way opposed to soy consumption, only improper soy consumption.

Fermented soy, which includes natto, miso and tempeh, is a healthy food and should be consumed by the masses. However, soy formula is an abomination that has caused much damage to the children of this country and should be immediately banned for sale in every country.

And, as I've written before, the enzyme nattokinase--derived from natto--is a safer more powerful option than aspirin that can dissolve blood clots and has been used safely for more than 20 years.

Rivaling pharmaceutical agents, nattokinase seems to have longer lasting beneficial action without the potential for abnormal bleeding. Look for more news about nattokinase soon, as we will offer this very potent all natural enzyme on the site this fall.

HOW TO MAKE TEMPEH

Source: *http://www.tempeh.info/maketempeh/how-to-make-tempeh.php*

Making tempeh is very easy. Here we explain how to make tempeh from 100% soy. This is the traditional tempeh as it is consumed in the country of origin: Indonesia. To make 1kg tempeh you need the following ingredients:

- 600 g whole dry soybeans
- 6 tablespoons vinegar
- 1 teaspoon (about 5g) tempeh starter

Step 1: Cracking the soybeans

The easiest way is to crack the soybeans with a loosely set grain mill. Ideally each soybean is cracked in half. On the left you can see a picture of a Family Grain Mill. This grain mill can be bought on the internet for les than $100. With the Family Grain Mill you can split the 600 g soybeans in a few minutes. Daniel informed us that the Porkert Universal Grain Mill can also split the soybeans. It is a Czech made grain mill that is all hot dipped steel, easy to take apart and lasts a long time. Another grain mill that seems to do the job is the Country Living Grain Mill.
When buying a grain mill consider that you can also use the dehulled soybeans to make soymilk. If you don't have a grain mill or dehulled soybeans continue with using whole soybeans, you will have to remove the hulls later by hand. If you are lucky, you can find a store that sells dehulled soybeans. Industrial tempeh producers normally buy dehulled soybeans. Maybe they will sell you some soybeans!

Step 2: Soaking and dehulling soybeans

Soak the soybeans in 2 liter water for 6 - 18 hours. If you use whole soybeans you should split them by squeezing them with a kneading motion. Stir gently causing the hulls to rise to the surface, then pour off water and hulls into a strainer. Add fresh water and repeat until most hulls are removed. Don't worry if a few hulls remain attached.

Step 3: Cooking the soybeans

Put the beans in a cooking pot and add enough water to cover them. Add the vinegar and cook for 30 min. Drain off the water and dry the soybeans by continue heating them in the pot on medium heat for a few minutes and until the beans are dry. Allow the soybeans to cool down to below 35°C.

Step 4: Inoculating the soybeans with tempeh starter

Sprinkle the soybeans with 1 teaspoon of tempeh starter. Mix with a clean spoon for about 1 minute to distribute the tempeh starter evenly. It's very important to mix the tempeh starter very well: it reduces the risk for spoilage and the fermentation will be faster. To promote the home production of tempeh we will send you a free sample of tempeh starter.

Step 5: Incubating the beans

Take 2 plastic bags 18 x 28 cm and perforate them with holes at a distance of about 1 cm by a thick but sharp needle. A normal needle is too thin, you need a fat needle or small nail (about 0.6 mm in diameter). This will allow the mould to breathe. Divide the soybeans in the two bags and seal them. Press them flat, making sure that the total thickness of the beans is max 3 cm. Place the packed beans in an incubator at 30°C or at a warm place for about 36- 48 hours during which the tempeh fermentation takes place. Then the container should be filled completely with white mycelium and the entire contents can be lifted out as a whole piece. Now you know how to make tempeh. We hope that you will enjoy the home making of tempeh and ... the eating of it! If you have questions about how to make tempeh, please Email us!

NATTO - THE LITTLE KNOWN FOOD WITH BIG BENEFITS FOR YOUR HEART AND SKIN

Source: ***http://products.mercola.com/vitamin-k/***

If you want beautiful skin, a healthy heart and strong bones, **it's time you try vitamin-rich natto.**

Natto is a traditional Japanese dish made from soybeans fermented with Bacillus subtilis[1] . Keep in mind that we do not recommend eating soybeans unless they are fermented.

The key element in natto is the **fermentation** of the soybeans, which make them easier to digest while increasing your body's ability to absorb nutrients.

Fermented foods and drinks, such as natto, are the cornerstone of the Body Ecology Diet because they are a great source of probiotics.

Natto has a long history as a super food. It has a stringy consistency, strong smell and an acquired taste.

Primarily eaten as a breakfast staple in Japan for over 1,000 years, natto is a great source of protein and is low in calories. But it goes even further to enhance your inner and outer health.

Natto and Vitamins K1 and K2

Unlike many foods that are only rich in Vitamin K1, *natto is rich in both types of Vitamin K*.

Vitamin K1 is found in green leafy vegetables and makes up about 90 per cent of the vitamin K in a typical Western diet. **Vitamin K2** isn't produced in plants, but by various types of bacteria. It makes up only about 10 per cent of Western vitamin K consumption[2].

Natto increases the health and strength of your skin, heart and bones.

Here are some of the many health benefits of natto:

- Natto is especially *rich in vitamin K2,* which could **reduce bone loss** in post-menopausal women by as much as 80 per cent[3]
- Fermented soybeans such as natto contain **Vitamin PQQ, which is very important for the skin.**PQQ in human tissues is derived mainly from diet.[4]
- Vitamin K is repeatedly shown to **reduce blood clots by slowing arterial calcification, enhance liver function and encourage the flow of urine.**
- Vitamin K2 has a *better bioavailability that K1*. Studies show that this molecule remains in the body for a longer period and is **more effective at lower doses,** hence is much more bio-effective.[5]
    - Additionally, natto suppresses immune reactions.[6]

Ready to add probiotic-rich fermented foods and drinks to your diet?Sipping just 2 oz. of Innergy-Biotic helps boost your energy, strengthen your immunity and provides a good source of vitamin K2. Learn more about Innergy-Biotic and get yours today!

Tips for Enjoying Natto

Eating natto as a food is far better than taking the supplement version, which is less potent and less effective. You can find it at Asian markets and some health food stores.

While fermented foods and drinks all have an acquired taste, natto may take more time to get used to than cultured vegetables or probiotic liquids. But the taste is definitely worth acquiring!

When you take the natto out of its package, pour it into a bowl and, using a fork, whip it about 50 times until it gets kind of foamy. In Japan, natto is commonly served over rice but instead, we recommend you add: plenty of cultured vegetables, mustard (made with apple cider vinegar), wheat free tamari, scallions and if you like, a little wasabi.

Even if you've experienced soy allergies, natto may not bother you. The fermentation process breaks down the difficult-to-digest proteins that many are sensitive to, rendering them unrecognizable as a problem food to your immune system!

Now that you know the vitality secret the Japanese have know for a thousand years, make fermented foods and drinks, like natto, part of YOUR diet today.

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BEST SOURCE OF VITAMIN-K IS NATTO

Source: *http://products.mercola.com/vitamin-k/*

Considered unimportant and forgotten for decades, scientists worldwide are now recognizing its extraordinary benefits to your bones and heart health.* This is one vital nutrient you do NOT want to be deficient in...

It's been over 10 years, since I began educating and helping people understand the importance of vitamin D… specifically, vitamin D3.

Of course, I wasn't alone in this effort. Many others contributed to helping overcome some of the myths about sunlight and how critical vitamin D3 is to your overall health.

And now I believe another nutrient, appropriately labeled the 'forgotten vitamin,' is about to explode in popularity as researchers are uncovering more of its spectacular health benefits every day.

Why has it been forgotten and somewhat ignored for over 80 years?

I'm not sure anyone can really answer why this vitamin's health-enhancing benefits have been so overlooked. But certainly there's a clue to its importance here because in some areas of the world (like India), government health agencies regulate this vitamin.

If this nutrient did not have any beneficial health advantages, why would it be regulated by government health agencies?

Plus, your potential benefits from this extraordinary nutrient are pretty much off the chart.

For example, this vitamin…

- **Helps you build strong bones and keep them healthy***
- **Helps boost your vascular (arteries and veins) system***
- **Promotes your healthy heart***
- **Helps you fight against premature aging***

- **Enhances your memory function***

And this is just a start…

Before I get into more details on this vital nutrient, I must warn you up front… there are synthetic forms of this nutrient that may put your health at risk.

So, it's very important to make sure you fully understand what to look for.

After all, the whole purpose here is to give more exposure to the 'forgotten vitamin' so you can reap the benefits… not to spike any health risk.

And that's exactly what I'm planning to do. Just please pay close attention to the details on the different types of this nutrient to avoid potentially risky synthetics.

Next, let's discover…

Why You Could be Deficient in this Vital Nutrient

It's hard to understand why this vitamin has been so overlooked over the years. And estimates range as high as 99% of the population could be deficient in this nutrient.

There are many conditions where you could be putting yourself at risk for a higher likelihood of deficiency.

First of all, this vitamin is fat-soluble.

What does that mean? Well, fat-soluble simply means that dietary fat is necessary for efficient absorption. So, if your diet does not contain adequate amounts of dietary fat, your absorption of this nutrient could be impacted.

There are additional conditions that could increase your risk of deficiency in this essential vitamin…

- Eating a poor or restricted diet
- Having certain conditions like Crohn's, ulcerative colitis, celiac, and others that interfere with nutrient absorption
- Dealing with a liver condition that interferes with vitamin storage
- Taking certain medications such as broad-spectrum antibiotics, cholesterol drugs, and potentially aspirin that may impact or block vitamin absorption
- Eating foods containing the wrong type of this vitamin with poor bioavailability

I'm ready to dive into your best natural source of this 'forgotten vitamin'… but first, right up front, I want to further raise your awareness of…

Synthetic Pretenders – What to Look For and Avoid

If you haven't figured out what the 'forgotten vitamin' is by now let me tell you that this new wonder kid on the block is vitamin K. You can rest assured that in the next few years you will hear the media rave about its benefits.

But fortunately, since you are reading Mercola.com you can learn about this long before the rest of population discovers its benefits.

Danish scientist, Dr. Henrik Dam, discovered vitamin K in 1929. The 'K' is for 'koagulation' – essential for blood clotting.* But it only starts there.

Vitamin K is unique because it has multiple effects in your body, but doesn't demonstrate any known toxicity. With research focused on potential effects on your skeletal system, brain, liver, and pancreas, vitamin K is one of the most promising nutrients of our time.*

But you should know about the different types. And in particular, know which synthetic type to be on the look out for.

There are three main forms of vitamin K…

- **K1**-phylloquinone, aka phytonadione
- **K2**-menaquinone
- **K3**-menadione synthetic variant

Vitamin K3 is a synthetic variant of the vitamin which I don't recommended for human consumption… this is the one you and your family need to avoid at all costs.

Green leafy vegetables – including lettuce, broccoli, and spinach contain vitamin K1. And it makes up about 90 percent of the vitamin K in the Western-style diet.

The vitamin K which I recommend is vitamin K2 natural, non-toxic, and made in your body as well.

Vitamin K2 includes several menaquinones (MK-n, with the 'n' determined by the number of prenyl side chains), such as MK-4 found in meats, MK-7, MK-8, and MK-9 found in fermented food products like cheese and natto.

What is Your Best Source of the 'Forgotten Vitamin'?

One of the best natural sources of vitamin K2 comes from an ancient Japanese food called natto.

So, what is natto?

Natto…

- Is a fermented soybean food
- Comes loaded with a healthy bacteria called bacillus subtilus that may also serve as a probiotic*

Fermented foods, like natto, typically have the highest concentration of vitamin K in the human diet. Levels of vitamin K found in natto (K2) have been shown to far exceed those amounts found in dark green vegetables (K1).

In fact, vitamin K2 concentration after the consumption of natto has been shown to be about 10 times higher than that of vitamin K1 after eating spinach.

Unfortunately, most people do not eat or enjoy many fermented foods.

And the absorption of vitamin K1 through eating green leafy vegetable is not very efficient… some research shows only about 10-15% gets absorbed even when consumed with dietary fat.

The problem with natto is that most people do not enjoy eating it because they find it very distasteful. It has a slippery texture with a strong flavor and pungent aroma.

Some people do acquire a taste for natto over time. But many never do.

Any wonder why most people may be deficient in vitamin K?... They simply may not be eating the right food to provide what's needed.

So, what can be done to solve this issue? That's where I can offer some recommendations to help out.

Before we dive into that, I first want to address the natto issue and the fact that it comes from soy. If you've been a visitor to my site, you're probably already aware that I'm not a big fan of soy. But if you look closely, there is one exception and that's…

Why This Type of Soy Could be Healthful for You

Like I said, I'm not an advocate of eating unfermented soy.

Why?

Many people still believe unfermented and processed soy products like soy milk, soy cheese, soy burgers, and soy ice cream are actually *healthful* when nothing could be further from the truth.

Today's high-tech processing methods leave toxic and carcinogenic residues created by high temperatures, high pressure, alkali and acid baths, and petroleum solvents in unfermented soy.

Natto does not come from unfermented soy… it's derived from healthful fermented **soy and provides an extraordinary rich source of vitamin K2.**

Fermented Dairy – Another Excellent Source of Vitamin K2

While natto is the most potent natural source of vitamin K2, the nutrient is also readily available in fermented dairy products, especially cheeses.

Most cheeses are rich in vitamin K2… particularly, curd cheese. And even though it's not as high in vitamin K2 as natto, curd cheese may be more palatable on a day-to-day basis for many people. Raw curd cheese made from grass fed cows would be best.

Like I mentioned earlier, most people have a difficult time acquiring a taste for natto… especially on the regular basis needed for healthy K2 absorption.

Curd cheese is also a good vitamin K2 source because it's lower in fat (animal fat) than regular cheese.

When compared to natto in equal portions… Japanese food natto contains over 27 times more vitamin K2 than curd cheese.

No Good Vitamin K2 Test

One of the reasons vitamin D became so popular is that a relatively inexpensive test became commercially available in the 1990s. That allowed researchers and clinicians to gain a better understanding of vitamin D. Unfortunately there really isn't a great commercial assay for vitamin K2 yet.

Sure there is a blood test.

But, this classic measure of vitamin K deficiency uses clotting time and what's called 'prothrombin'… which provides almost no value for determining vitamin K deficiency in your bones or arteries.

In fact in some cases, blood levels of vitamin K may appear normal while a real deficiency exists in your bones.

So, more work needs to be done in the area of vitamin K deficiency testing.

As this 'forgotten vitamin' gets more and more of the attention it deserves, I'm confident modern medical science will determine a more accurate test… just like the comprehensive test eventually created for vitamin D.

With potential health advantages (in addition to the ones already mentioned above) in which vitamin K has been shown to…

- **Promote** your heart health*
- **Protect** and support your skin*
- **Provide** the calcium path 'key' from your bloodstream to your bones*
- **Boost** your overall immune system*
- **Help regulate** calcification of your tissues*
- **Provide** you powerful antioxidant benefits*
- **Protect** your cells against oxidative damage*
- **Aid in supporting** your already normal blood sugar levels*

…it's only a matter of time before a more comprehensive test evolves.

In the meantime, it's important you take vitamin K deficiency seriously and take action to provide yourself and your loved ones with enough vitamin K.

And if you do not like the taste of natto, or prefer not to eat curd cheese, I have a phenomenal solution for you coming up.

But next, let's take a closer look at…

How This Vitamin Goes to Work for YOU

While other nutrients are important for maintaining and promoting your bone health (like vitamin D3, calcium, and magnesium), evidence continues to grow indicating a vital role vitamin K plays in bone metabolism and healthy bone growth.*

In fact it may be the modern day "missing link" to increasing your bone density.

Vitamin K has been linked to osteoblasts, the cells that generate or 'lay down' bone and produce a specific protein known as osteocalcin.*

You can think of osteocalcin like the studs in the wall of your house. Basically, osteocalcin acts as the structural framework holding calcium in place in your bones.*

And vitamin K is critical for producing osteocalcin protein.*

Why is this so important? Because osteocalcin cannot perform its job until vitamin K converts it to an active bone-building form.

The bottom line – vitamin K is the 'key' that unlocks the door from your bloodstream to let calcium flow into your bones and bone marrow.*

Without this vitamin K key action, you simply wouldn't have the strong bones you do.* Plus, there's another area vitamin K plays an important role, particularly vitamin K2.

I mentioned earlier how osteoblasts are important cells responsible for bone formation.

Well, while these osteoblast cells are busy building bone, other cells called osteoclasts are trying to break down bone and remove bone tissue.

Vitamin K2 is so important because, not only has it been shown to stimulate and enhance osteocalcin production, it has also been shown to inhibit osteoclasts and help maintain your bones.*

Some Compelling Research

There are many research studies supporting how vitamin K2 works to help maintain healthy bone mass and growth through its effects on osteocalcin, osteoblasts, and osteoclasts.*

Here are few examples for reference purposes…

- *Journal of Bone and Mineral Research,* 1997, Y. Koshihara and K Hoshi **Journal reference**: "The results proved that vitamin K2 increased Gla-containing **osteocalcin**, which accumulated **osteocalcin** in the extracellular matrix, and facilitated mineralization in vitro."

- *Molecular and Cellular Biochemistry,* 2001, ZJ Ma and M Yamaguchi **Journal reference**: "These results suggested that MK-7 (K2-7) has a suppressive effect on **osteoclasts**."

- *Molecular and Cellular Biochemistry,* 2001, M Yamaguchi et al1 **Journal reference**: "This study demonstrates that MK-7 (K2-7) has an anabolic effect on bone tissue and **osteoblastic** (MC3T3-E1) cells in vitro, suggesting that the compound can stimulate **osteoblastic** bone formation."

In a human study, Japanese scientists examined the effect of vitamin K2 from fermented soybeans on normal individuals.

The scientists reached the following conclusion – "This illustrates that intake of K2-7 can stimulate carboxylation (gamma-carboxylated **osteocalcin**), which plays an important role in bone formation in normal individuals."

So, the evidence is quite compelling when it comes to the vital role vitamin K2 potentially plays in promoting your healthy bones.*

What is the Best Way for You to Get Vitamin K2?

Since I promised you an alternative natto solution for vitamin K2, let's get right to it.

The bottom line here… your best bet for a natural source of K2 is from natto. And maybe you can find a reliable natural source and come to acquire a taste for it.

But I can tell you… I tried it myself on a regular basis but never really got used to the taste and smell. So, I decided to do **the next best thing and look for a high quality inexpensive natural K2 supplement made from natto.**

And let me tell you, finding a natural source of vitamin K2 turned out to be a real challenge.

Why? Well, not only did my team and I have to be on the lookout for risky synthetic imposters out there, we had to scrutinize the manufacturing processes very closely as well.

See, as I dug deeper and deeper into this, it became quite apparent how important a role the manufacturer must play in creating a natural high-quality K2 product.

Here are the key issues my team and I looked for when searching for a top manufacturer to deliver the highest quality vitamin K2 formula…

- **Must be non-GMO –** Formulas including genetically modified organisms or processes are absolutely unacceptable.
- **Must be allergen-free –** Other than fermented soy content from the soybeans, the formula has to be free from known allergens such as peanuts, tree nuts, milk, eggs, fin fish, shellfish, and wheat.
- **Must have a stable fermentation process –** Natto fermentation process that involves other derivatives can be very unstable. Need a consistent reliable process that ensures product quality in the formula.
- **Must use vitamin K2-7 in the formula –** Just like there are many varieties of vitamin K (K1, K2, K3), there are many varieties of K2. K2-7 produced from natto has proven to be one of the most bioavailable, stable, and beneficial varieties.*
- **Must be pure –** Formula must be of the purest fashion with both internal and external lab validations following GMP standards and high-quality best practices.
- **Must be affordable –** With all these rigorous requirements for this K2 formula, cost could be a real challenge. But affordability is one of my top priorities and cannot be overlooked.

The good news with all this is I was able to find, what I believe to be, the highest quality vitamin K2 manufacturer in the world that could deliver the formula you need.

Plus, this manufacturer not only met all of the stringent selection criteria, they *exceeded* many of them as well.

I'll have more on that coming right up. But first I want to take a closer look at another reason why the vitamin K2 type requirement is so important.

Powerful Synergy with Vitamin D3

The surprising thing about what I'm going to review next is that some of the research has been available for over 10 years.

I guess this goes along with the whole 'forgotten vitamin' story.

If you've been a regular visitor to this site, you undoubtedly know how I feel about the vital role vitamin D3 plays in your optimal health.

Well, the amazing thing is research has shown vitamin K2 and vitamin D

3 may provide you another level of benefits when taken together.*

Several studies have shown the following potential synergistic benefits when vitamin K2 and D3 are combined…

- **Increased** bone formation*

- **Enhanced** osteocalcin accumulation in cells*
- **Amplified** bone mineral density*

So, vitamin K2 and D3 worked together in certain situations to help improve your bone health even more.*

Because vitamin D3 encourages calcium uptake to promote your strong and healthy bones, it's not only a natural complement to vitamin K2, the two nutrients work together to boost your bone health to a higher level.*

What a phenomenal combination. Wouldn't you agree?

You Can Get More Info on Dr. Mercola's Incredibly High Quality K2 Supplement Here:
http://products.mercola.com/vitamin-k/

SOUTH RIVER MISO CO. FAQ'S

Source: ***http://www.southrivermiso.com/store/pg/62-About-Miso-FAQ-s.html***

How long does miso keep? I've had a jar in my refrigerator for six months. Is it still OK to use? And, does South River Miso have a shelf life? I don't see an expiration date.

South River Miso is technically not a perishable food, and we are not required to put an expiration date on our product. Whether opened or unopened, South River Miso will keep almost indefinitely – even for years. Indeed, we have kept some miso for as long as 20 years without spoilage, even without refrigeration. As with all foods, let your nose be the final judge.

Miso darkens with age, eventually turning black in color and less sweet to taste. Miso that has been

aged for many years develops a bouquet of such depth that it touches the soul in a very nourishing way. Traditionally, such aged miso was prized for its medicinal qualities.

How much miso should I use?

Less is more. For greatest benefit, miso should be used in small amounts on a regular basis. A few teaspoons per day would be average use, which will vary from person to person depending on age, body type, size, and activity. When seasoning soup, begin by adding a small amount of miso -one to two teaspoons per cup of liquid- adding more as needed to achieve individually desired taste. The miso should mingle with the flavor of the soup and enhance, but not overpower it. When using the three year aged dark miso, less will be needed; more miso will be needed when using the light and lower salt varieties to achieve the desired seasoning. Dark and light varieties of miso can also be mixed together for a seasoning blend of both.

Which varieties have no gluten?

We make ten varieties of miso. Eight varieties are made with non-gluten ingredients: Hearty Brown Rice, Dandelion Leek, Sweet Tasting Brown Rice, Azuki Bean Miso, Chickpea Miso, Golden Millet, Sweet White, Garlic Red Pepper Miso.

Two varieties are made with barley, which contains gluten: Three Year Barley Miso and Chick Pea Barley Miso.

All ten varieties of miso are made in the same building, using the same equipment, but in separate batches. Miso containing barley is not made at the same time as the gluten-free varieties. The equipment is washed thoroughly between batches.

Are any of your varieties soy free?

Four varieties are made without soybeans: Chick Pea Barley Miso, Azuki Bean Miso, Chickpea Miso, and Garlic Red Pepper Miso.

Why does South River Miso have a chunky texture?

Chunky textured South River Miso is the natural result of intentionally following traditional methods of miso making which were universal until World War II and the advent of modern food processing equipment.

William Shurtleff writes in *The Book of Miso*:

> *"Natural miso, universally regarded as having the finest flavor, is prepared in the traditional way and has three basic characteristics: it is fermented slowly and leisurely (usually for six months to three years) at the natural temperature of its environment; it is made from only natural ingredients… and it is never pasteurized. Most natural misos have a distinctive texture imparted by clearly visible chunks of whole soybeans and koji…. Chunky miso (tsubu miso) is any variety in which the shape of the soybeans (and usually of the koji grains) is still visible. It is the oldest form of miso and comprised virtually all that was made before 1945. During the*

mixing and mashing of ingredients before the fermentation of natural miso, almost all of the koji and at least half the soybeans were left in their natural form. [This was due to the fact that the miso was mixed and mashed under foot rather than puréed into a smooth texture by machine. ed.] The koji gradually dissolved as the miso aged, but the beans generally retained their individual form, even after three years of fermentation, thereby lending the finished miso a distinctive, flavor-enhancing flavor."