


# The Health Effects of Soy:

*A Reference Guide for Health Professionals*





There is a soyfood for nearly every diet and lifestyle, and there are benefits to consuming soyfoods at all ages and stages of life. This publication is designed to provide an overview of the health effects of soyfoods and soybean components. At the end of this booklet, you will find intake recommendations and a soyfoods glossary.

To view the peer-reviewed publication from which this information is sourced, scan the QR code at the bottom of this page.

Full Paper:



**Read *The Health Effects of Soy: A Reference Guide for Health Professionals***

<https://www.frontiersin.org/articles/10.3389/fnut.2022.970364/full>

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# SOYFOODS OVERVIEW

## TRADITIONAL ASIAN SOYFOODS



There are two general categories of Asian soyfoods: fermented and unfermented. Fermented soyfoods include natto, tempeh, and miso whereas unfermented foods include soymilk and tofu. Globally, most soy is consumed in the unfermented form, excluding soy sauce, which is a condiment, not a food.

See the Soyfoods Glossary on page 12 for more information on soyfoods and soy products.

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## SOY PROTEIN INGREDIENTS

A wide array of foods are made using concentrated sources of soy protein, often referred to as “soy protein ingredients”. The primary ingredients are soy protein isolate (SPI), soy protein concentrate (SPC), and soy flour. Most often, these ingredients are

Ingredient	% Protein
Soy protein isolate (SPI)	≥90%
Soy protein concentrate (SPC)	65-90%
Soy flour	50-65%

found in packaged foods, such as cereals, energy bars, and infant formulas. Soy protein ingredients are widely used by the food industry for their functional attributes related to solubility, gelation, hydrating capacity, emulsification, adhesion/cohesion, and foaming.

## SOY PROTEIN QUALITY

There is a large body of research that has investigated the quality of soy protein, although until recently much of that research focused on concentrated sources of soy protein such as SPI and SPC.

Both SPI and SPC have protein digestibility corrected amino acid scores (PDCAAS) of ~1.0, which is higher than beef (0.92), pea protein concentrate (0.73), kidney beans (0.68), pinto beans (0.63), rice (0.53), and wheat gluten (0.25). Soy is also highly ranked when assessed through the digestible indispensable amino acid score (DIAAS): tofu (97%), soymilk (117%), soy-based burger (107%) when using the IAA reference pattern for the older child, adolescent, and adult. In comparison, the DIAAS for 80/20 lean ground beef and a popular pea protein-based burger are 110% and 83%, respectively.

## SOY PROTEIN & MUSCLE MASS



The combination of exercise and dietary protein is a powerful stimulus promoting gains in lean body mass, and research has shown that soy protein promotes gains in muscle mass and strength similarly to animal protein, including whey. Acute studies assessing the effects of protein on muscle protein synthesis over a 4 hour period do not accurately reflect the results of longer term studies measuring changes in lean body mass and strength. In part, this may be because muscle protein synthesis following resistance exercise may last for at least 24 hours.

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## SOY PROTEIN & WEIGHT MANAGEMENT



Several studies have examined the impact of soy protein on body composition in adults as dietary protein is increasingly viewed as an important factor in weight loss and weight maintenance strategies. Some evidence suggests dietary protein may be the most effective macronutrient for satiety, and a 2008 review found that soy promotes weight loss similar to other protein sources. A double-blind randomized cross-over study that involved 17 healthy adults concluded that consuming soy protein exerts comparable effects to whey protein on appetite, energy metabolism, and subsequent energy intake. The findings from this study align with other research, indicating there is little evidence suggesting one source of protein is more effective than another as an aid for weight management.

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# ISOFLAVONES

The health effects of soy have been rigorously investigated for more than 30 years, in large part because the soybean is a uniquely rich source of isoflavones. Isoflavones are diphenolic molecules that naturally occur in plants. They bind to both estrogen receptors thereby influencing gene transcription. Isoflavones are much less potent than the hormone estrogen; however, because circulating isoflavone levels following soyfood ingestion are much higher than estrogen levels in pre- and postmenopausal women, they have the potential to exert physiological effects.

The three isoflavones found in soybeans, genistein, daidzein, and glycitein, account for about 50%, 40%, and 10%, respectively, of total isoflavone content. Isoflavone ingestion results in a biphasic appearance in human plasma and urine, with levels occurring 1-2 hours and then 4-8 hours following consumption. Many of the proposed benefits of soyfoods, such as increasing bone mineral density, hot flash alleviation, and improved cognitive function, may be due to the estrogen-like effects of isoflavones.

# FERMENTED VS. UNFERMENTED SOYFOODS



Despite popular claims, there is little evidence that fermented soyfoods are more beneficial than unfermented soyfoods. A notable exception is natto, a traditional Japanese food made from soybeans fermented with *Bacillus subtilis* var. natto. Natto is high in vitamin K. Nattokinase is an enzyme found in natto, which acts as a fibrinolytic and may benefit bone health. Additionally, fermented soyfoods may function as probiotics, but this is dependent on whether the product is pasteurized after the fermentation process has begun. The data

does not support a generalized recommendation to choose fermented soyfoods over unfermented ones. Both types of soyfoods offer nutrients beneficial to health.

## ISOFLAVONE-RELATED TOPICS

### WOMEN WITH BREAST CANCER OR AT HIGH RISK OF THIS DISEASE



Despite interest in the role of soy in breast cancer prevention, the results of studies in mice published in the late 1990s raised concern that soyfoods – because they contain isoflavones – may worsen the prognosis of women diagnosed with breast cancer. However, clinical intervention studies consistently show neither soy nor isoflavones adversely affect markers of breast cancer risk including breast tissue density and breast cell proliferation. Furthermore, observational studies indicate post-diagnosis soy consumption reduces breast

cancer recurrence and breast cancer-specific mortality. Numerous health agencies including the American Cancer Society, Canadian Cancer Society, and the European Food Safety Authority have concluded either that breast cancer patients can safely consume soyfoods or that isoflavones do not adversely affect breast tissue.

### PROSTATE CANCER



The low incidence of prostate cancer in soyfood-consuming countries helped fuel speculation that isoflavones may be protective against prostate cancer. Several clinical studies found that soy and isoflavone intake decreased prostate specific antigen (PSA) levels—a marker of prostate tumor growth—in men with prostate cancer. Though there is suggestive observational evidence mostly from case-control

studies that soyfoods reduce risk of developing prostate cancer, the data are too inconsistent to reach firm conclusions. Nevertheless, health professionals advising clients or patients concerned about developing prostate cancer can be confident recommending soy.

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## OSTEOPOROSIS



There is a complex relationship between protein intake and bone health. Overall, studies suggest dietary protein may have a modest beneficial effect, but whether this is dependent on the type of protein is unclear. Several observational studies reported that soy intake was associated with a reduced fracture risk among women. A recent meta-analysis of clinical studies reported a trend of isoflavones to increase bone formation markers such as bone alkaline phosphatase and osteocalcin. Additionally, there was a trend toward lower levels of pyridinoline and deoxypyridinoline, two bone resorption markers. Because they offer protein, isoflavones, and in some cases are fortified with calcium, soyfoods can be emphasized for those concerned about bone health.

## COGNITIVE FUNCTION

Clinical studies evaluating the impact of soy or isoflavones on cognitive function have produced inconsistent findings although a recent meta-analysis found that isoflavones from supplements and foods improved memory. Observational studies have also produced inconsistent effects. There is some evidence to recommend soyfood consumption as a means of delaying cognitive impairment due to the isoflavone content, but the evidence is too inconsistent to make broad recommendations.

## HOT FLASH ALLEVIATION

In 1992, researchers first proposed that isoflavones possess enough estrogen-like activity to mitigate hot flashes. There have been mixed reviews of the efficacy of isoflavones with some reviews reporting no benefits, some modest benefits, and a smaller number reporting more pronounced benefits. However, these reviews have failed to consider that two different types of isoflavone supplements have been used in the intervention trials. When sub-analyzing the data, results show that when supplements provide approximately 50-60 mg total isoflavones, at least 20 mg of which is genistein, the primary isoflavones in soybeans, hot flash frequency and severity is consistently reduced.

## THYROID FUNCTION



Soy's effect on the thyroid has been examined for nearly 100 years. There is extensive clinical evidence indicating that isoflavones do not affect the main two thyroid hormones, thyronine (T4) and triiodothyronine (T3) in euthyroid individuals, but there is conflicting data about its effect on thyroid stimulating hormone levels. Although less well studied, evidence suggests neither soy nor isoflavones impair thyroid function in individuals with subclinical hypothyroidism or whose iodine intake is marginal. Soy protein does inhibit the absorption of levothyroxine, but this is the case for all foods and many dietary supplements. Consequently, levothyroxine is to be taken when fasting, typically in the morning at least 1-3 hours before any food is consumed.

## MALE HORMONES AND FERTILITY



Classification of soybean isoflavones as phytoestrogens has led to concern that soy may feminize men. However, extensive clinical trial data show neither soy nor isoflavones affect testosterone or estrogen levels in men. Additionally, clinical studies show neither soy nor isoflavones have adverse effects on sperm or semen parameters or risk of developing gynecomastia (breast enlargement in men).

## FEMALE HORMONES AND MENSTRUAL CYCLE LENGTH

The classification of isoflavones as phytoestrogens has led to concerns they may cause hormonal disturbances in women. However, clinical evidence indicates that neither isoflavones nor soy impact circulating reproductive hormone concentrations. Soy may increase menstrual cycle length by ~1 day, but this increase does not prevent ovulation.

## PUBERTY ONSET



Children throughout much of the world are entering puberty at earlier ages than previous generations. Some have suggested that one factor contributing to this trend is exposure to hormonally active chemicals in the environment, which includes everything from the foods we eat to the air we breathe. For this reason, there has been interest in the impact of soy intake on puberty onset. However, puberty onset is occurring in children from soyfood-consuming countries as well as non-soyfood-consuming countries. Also, a U.S. cross-sectional study of girls 12-18 years

old from a high soy-consuming population found that neither total soy product intake nor the intake of soy-based meat alternatives, traditional soyfoods, or soy beverages were significantly related to the age of menses onset (AOM) or the likelihood of early or late AOM. A similar study in boys 12-18 years old found moderate and high isoflavone intake was associated with pubarche onset as determined by first onset of pubic hair but not facial hair growth, a secondary metric of puberty onset. Furthermore, even boys consuming higher levels of soy underwent puberty later than average for U.S. boys.

## SOY CONSUMPTION DURING PREGNANCY: MATERNAL EFFECTS



Several prospective cohort studies show that soy intake is associated with a decreased risk of gestational diabetes mellitus (GDM). Additionally, a clinical study found that pregnant women who did not eat a soy-containing diet had significantly higher fasting plasma glucose, serum insulin levels, and were more insulin resistant. More recently, studies have shown that women who consumed plant-based diets were less than half as likely to develop GDM. Although the existing research is intriguing, more study is needed to better understand the relationship between soy and GDM.

## SOY CONSUMPTION DURING PREGNANCY: FETAL EFFECTS



Limited research has evaluated the impact of maternal soy intake on the developing fetus, but evidence suggests that the in utero isoflavone concentrations are too low to affect the fetus. Nevertheless, an older observational study found that maternal soy intake was associated with an increased risk of hypospadias in the male offspring. However, more robust results from a study published in 2022 showed higher soy isoflavone intake was protective against this condition.

## EQUOL PRODUCERS VS. EQUOL NON-PRODUCERS

More than 20 years ago, it was hypothesized that individuals who host intestinal microbiota that convert the isoflavone daidzein into equol, which represents about 25-30% of the populations in Western countries, are more likely to benefit from consuming soyfoods than those who do not. This hypothesis continues to be rigorously investigated.

## SUPER SOY & ANCIENT GRAIN SALAD

*Makes 12 servings*



### Ingredients

2 tablespoons soybean oil	1 cup fresh blueberries
2 lemons, juiced and zested	1 cucumber, peeled & seeded (cut into 1/4-inch cubes)
2 teaspoons dijon mustard	1/2 cup red onion, diced
1/2 teaspoon salt	1/2 cup fresh basil, thinly sliced
1/2 teaspoon ground black pepper	1/4 cup fresh mint, finely chopped
3 cups cooked quinoa, cooled	2 ripe avocados (peeled, pitted, and sliced)
2 cups edamame, shelled & cooked according to package directions	

### Directions

Whisk soybean oil, lemon juice and zest, and mustard in small bowl until smooth; set aside. Combine quinoa, edamame, blueberries, cucumber, avocado, basil, mint and red onion in medium serving bowl. Pour soybean oil lemon mixture over salad, tossing lightly, until combined. Top with avocado slices. Serve immediately.

### Nutritional Information

Calories 160; Fat 9g; Saturated Fat 1g; Cholesterol 0mg; Sodium 130mg; Carbohydrate 16g; Fiber 5g; Protein 5g



# SOY PROTEIN-RELATED TOPICS

## SOY PROTEIN INGREDIENTS (CONCENTRATED SOURCES OF SOY PROTEIN)



While an emphasis on consuming whole foods is important, concentrated sources of soy protein, such as soy protein concentrate and soy protein isolate, provide high-quality protein. Researchers have rigorously investigated the potential benefits and safety of concentrated sources of soy protein, as these ingredients are typically the intervention products used in animal studies and clinical trials, as opposed to traditional Asian soyfoods.

## CHOLESTEROL REDUCTION

The cholesterol lowering effect of soy protein has been studied for more than 50 years. Results indicate soy protein intake leads to a modest yet clinically relevant reduction. In 1999, the U.S. Food and Drug Administration formally recognized the ability of soy protein to lower cholesterol when it approved a health claim for soyfoods and coronary heart disease (CHD). However, in 2007, the FDA began to review the strength of the evidence supporting the efficacy of soy protein. If the claim is revoked, it will likely be replaced with a strongly worded qualified health claim, such as exist for soybean oil and CHD.



### SOY PROTEIN UNQUALIFIED HEALTH CLAIM

25 grams of soy protein a day, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease.

## GOUT



Gout is caused by the deposition of monosodium urate crystals in the body and appears in relation to chronic hyperuricemia. Although gout is a worldwide health issue, incidence rates in South Asia, Southeast Asia, and East Asia are moderately lower (~10%) than in Western Europe and North America. Despite the lower rates in regions where soyfoods are consumed, among health professionals in Asia there is a belief that soy increases risk of gout. However, the results from clinical

trials show that soy protein intake does not exert meaningful effects on blood uric acid levels. Additionally, observational data show that soyfoods do not increase the risk of gout. In fact, some evidence indicates soyfoods reduce risk of gout.

## KIDNEY STONES

Those prone to developing kidney stones often follow a low-oxalate diet although the importance of doing so has been deemphasized in recent years. The concentration of compounds in different types of soyfoods potentially associated with kidney stone formation (e.g., oxalate, protein, sodium, phytate, and calcium) varies markedly. Therefore, any recommendation to incorporate soyfoods into the diet of kidney stone formers should be based on the specifics of the food in the context of the overall diet. Research suggests that as long as other high-oxalate foods are avoided, soyfoods can be included in the diet.

## ALLERGY

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In the United States, soy is one of nine foods designated as a major allergen that must be called out as an allergen on product labels when present in a food. These nine allergens are responsible for ~90% of all food-related allergic reactions in the United States, however studies show that soy allergies are less common than the other major food allergens (except sesame). Only about 3 out of every 1,000 adults are allergic to soy. Although more children are initially allergic to soy than adults, about 70% of children outgrow their soy allergy by age 10 years. Soy-allergic individuals need to avoid soyfoods but can safely consume

highly refined soybean oil. Because highly refined soybean oil contains only negligible amounts of soy protein, soybean oil does not elicit allergic reactions in individuals sensitive to soy protein, and as such, does not fall under the allergy labeling regulation. In 2022, the Food and Agriculture Organization and World Health Organization recommended removing soybeans from the global list of priority food allergens because of the generally low prevalence of soy protein allergy, the relatively low potency of soy protein for triggering an allergic response and because of the low proportions of anaphylaxis, and especially severe anaphylactic reactions.<sup>1</sup>

1. <https://www.fao.org/3/cb9070en/cb9070en.pdf>

## LEMON BERRY MUFFINS

*Makes 12 servings*



### Ingredients

½ cup soybean oil  
1 cup sugar  
1 egg  
1 tsp vanilla  
2 tbsp lemon juice  
Zest from 2 lemons  
2 cups all-purpose flour  
½ cup soy flour  
3 tsp baking powder  
1 tsp baking soda

1 tsp salt  
½ cup soymilk  
6 oz blueberries  
6 oz raspberries

### *Topping:*

½ cup unsalted butter, melted  
½ cup brown sugar  
½ cup flour  
2 tsp cinnamon

### Directions

Mix together oil, sugar, egg, vanilla, lemon juice, and lemon zest. In separate bowl, combine all purpose flour, soy flour, baking powder, baking soda, and salt. Slowly add dry ingredients to wet mixture until combined. Add milk to desired consistency. Fold in fruit.

Fill standard muffin tins  $\frac{3}{4}$  full.

Make topping mixture by combining melted butter with brown sugar, flour, and cinnamon. Add to muffin tins.

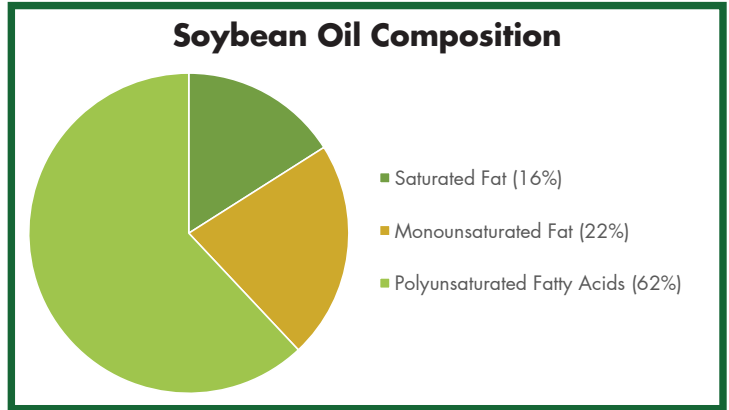
Bake at 400F for 15-20 minutes.

### Nutritional Information

Calories 466; Fat 18g; Saturated Fat 6g; Cholesterol 35mg; Sodium 441mg; Carbohydrate 71g; Fiber 2g; Protein 6g

# SOYBEAN OIL/OMEGA-6 FAT & INFLAMMATION/OXIDATION

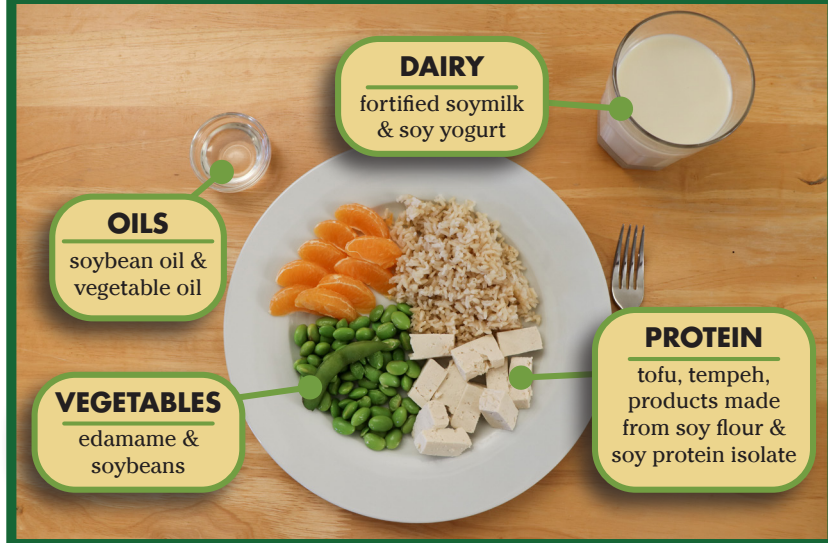
Soybean oil, often labeled as vegetable oil, is the most widely consumed oil in the U.S. and world. It accounts for 7% of U.S. caloric intake and over 40% of the intake of both essential fatty acids: the omega-6 fatty acid linoleic acid and the omega-3 fatty acid alpha-linolenic acid (ALA). Soybean oil was awarded a qualified health claim for its ability to reduce the risk of coronary heart disease based on its cholesterol-lowering effect when replacing saturated fat in the diet. Linolenic acid has also been associated with a decreased risk of diabetes, cancer, and all-cause mortality. Nevertheless, concerns have been raised that because of its high linoleic acid content soybean oil is pro-inflammatory and increases oxidative stress, but the clinical data consistently show this is not the case.



## SOYBEAN OIL QUALIFIED HEALTH CLAIM

Supportive but not conclusive scientific evidence suggests that eating about 1½ tablespoons (20.5 grams) daily of soybean oil, which contains unsaturated fat, may reduce the risk of coronary heart disease.

## Soy is prominently featured in the U.S. Dietary Guidelines



# INTAKE RECOMMENDATIONS

A soy intake recommendation consistent with the results of clinical and observational studies showing a variety of potential benefits and consistent with the dietetic principles of moderation and variety is to consume between **two and four servings of soy daily**. These amounts will provide approximately 15 to 25 g soy protein and 50 to 100 mg isoflavones. Consuming more than these amounts is not associated with adverse effects, but there is little historical precedence for doing so. Furthermore, it is not appropriate to put too much emphasis on one food, no matter how nutritious.

## SOY PROTEIN

15-25 g/d

## ISOFLAVONES

50-100 mg/d

## DIETARY PROTEIN IN POPULAR SOYFOODS



### EDAMAME

1/2 cup  
9-11 grams



### SOYMILK

1 cup  
7-8 grams



### TOFU

3 oz.  
6-13 grams



### SOYNUTS, ROASTED

1/4 cup  
9-11 grams



### TEMPEH

3 oz.  
11-17 grams



### SOYNUT BUTTER

2 Tbsp  
7 grams



### SOY YOGURT

1 cup  
9-14 grams



### SOY "BURGER"

1 patty  
9-16 grams



### SOY-BASED NUTRITION BAR

1 bar  
6-14 grams



### MEATLESS SOY CRUMBLES

1/3 cup  
10-11 grams



### SOY-BASED PROTEIN POWDER

1 scoop (24-42g)  
20-25 grams



# PRACTICAL WAYS TO ADD SOY

## Breakfast



- Opt for soymilk or soy creamer for a morning cup of coffee.
- Scramble tofu with vegetables and picante sauce in a skillet with oil for a plant-based omelette.
- Prepare your oatmeal or smoothie with soymilk
- Warm up the day with a bowl of oatmeal made with soymilk.
- Sprinkle berries and granola over soy yogurt.
- Smear soynut butter on a whole wheat bagel and top with sliced bananas.

## Lunch



- Add protein to your favorite salad by sprinkling with edamame and add crunch with soynuts.
- Stir together soybean oil, balsamic vinegar, a little honey, and herbs for a homemade salad dressing.
- Smash tofu with mustard and spices for a plant-based “egg” salad, and serve with crackers.
- Pair soynut butter with jelly for a twist on a classic sandwich.
- Build a power bowl for lunch. Start with brown rice or quinoa, and top it with tofu or grilled tempeh and raw or cooked vegetables. Sprinkle with soynuts for crunchiness.

## Dinner



- Use soybean oil in homemade marinades, salad dressings, and sauces.
- Grill marinated tofu or tempeh for an easy cookout.
- Add soft tofu to mashed potatoes for added creaminess and protein.
- Replace half of the ground meat in your chili with crumbled tempeh or soy crumbles.
- Add soy crumbles to spaghetti sauce for plant-powered pasta night.
- Crisp up tofu cubes in the air fryer and serve with dipping sauces for an easy kid-friendly dinner.

## Snacks



- Add soynuts to trail mix.
- Blend tofu into your favorite dip recipe for added protein.
- Make fresh hummus dip by blending cooked edamame, soybean oil, tahini, and spices.
- For an easy snack, cook frozen edamame in the pods and sprinkle with sea salt.
- Fill celery slices with soynut butter and top with raisins or chocolate chips for a fun after school snack.
- Create a sweet dip by blending soft tofu, honey, and cinnamon, and serve with apple slices.

## Sweets



- For baking, swap some of the all purpose flour with soy flour.
- Melt chocolate in soymilk for a warming hot cocoa recipe.
- Mix soymilk into your favorite milkshake recipe.
- Combine soy yogurt with a handful of berries, and pour into popsicle molds for a cooling protein treat.
- Blend tofu, soynut butter, brown sugar (or sugar substitute) and bananas for an easy homemade pudding. Pour into small containers, and refrigerate for at least 30 minutes.

# SOYFOODS GLOSSARY

## Green Soybeans (edamame)

These large soybeans are harvested when the beans are still green and sweet tasting and can be served as a snack or a main vegetable dish after boiling in slightly salted water for 15–20 minutes. They are a good source of protein and fiber and contain no cholesterol. Green soybeans are sold frozen either in the pod or shelled.

## Meat Alternatives

Meat alternatives are typically frozen or refrigerated products, often made with soy protein ingredients, that resemble meat or meat-like products but are vegetarian or meat-free. These products can be made to resemble any meat species, such as pork, chicken, or beef.

## Miso

Miso is a rich, salty condiment that characterizes the essence of Japanese cooking. The Japanese use miso to flavor a variety of foods including miso soup. A smooth paste, miso is made from soybeans and a grain such as rice, plus salt and a mold culture, and then aged in cedar vats for one to three years. Miso should be refrigerated. Use miso to flavor soups, sauces, dressings, marinades, and pâtés.

## Soy Protein Ingredients

Soy protein ingredients include soy flour (~50% protein), soy protein concentrate (~70% protein), and soy protein isolate (~90% protein). These versatile ingredients are available in powdered or textured form and found in a wide range of foods to boost the protein content or to deliver specific textural or functional properties. Soy protein isolates, in particular, are valued for their high protein quality and content and versatility in beverages, nutrition bars, and other nutritional products.

## Soybean Oil

Soybean oil, more commonly known as vegetable oil, has a heart-healthy fatty acid profile as it is comprised of almost 90% unsaturated fatty acids, about two-thirds of which is linoleic acid. Soybean (vegetable) oil provides essential omega-3 and omega-6 fatty acids.

## Soybeans

As soybeans mature in the pod, they ripen into a hard, dry bean. Although most soybeans are yellow, there are also brown and black varieties. Whole soybeans (an excellent source of protein and dietary fiber) can be cooked and used in sauces, stews, and soups. Whole soybeans that have been soaked can be roasted for snacks. Dry whole soybeans should be cooked before eaten.

### **Soynut Butter**

Made from roasted, whole soybeans, which are then crushed and blended with soybean (vegetable) oil and other ingredients, soybean butter has a slightly nutty taste.

### **Soymilk**

Soybeans soaked, ground fine, and strained produce a fluid called soymilk. Plain, fortified soymilk is a good source of high-quality protein and an excellent source of B12 vitamins. Soymilk is commonly found in aseptic containers (nonrefrigerated, shelf stable), but also can be found in quart and half-gallon containers in the dairy case at the supermarket. Soymilk is also sold as a powder that must be mixed with water.

### **Tempeh**

Tempeh, a traditional Indonesian food, is a chunky, tender soybean cake. Whole soybeans, sometimes mixed with another grain such as rice or millet, are fermented into a rich cake of soybeans with a smoky or nutty flavor. Tempeh can be marinated and grilled and added to soups, casseroles, or chili.

### **Tofu and Tofu Products**

Tofu, also known as soybean curd, is a soft, cheese-like food made by curdling fresh, hot soymilk with a coagulant. Tofu is a bland product that easily absorbs the flavors of other ingredients with which it is cooked. Tofu provides high-quality protein and is very low in sodium. Firm tofu is dense and solid and can be cubed and served in soups, stir fried, or grilled. Firm tofu is higher in protein, fat, and calcium than other forms of tofu. Soft tofu is good for recipes that call for blended tofu. Silken tofu is a creamy product and can be used as a replacement for sour cream in many dip recipes.

**Find more ways to serve up soy protein and oil:**



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