

# *Soyfoods* *and Your Health*



# Introduction

Soybeans were first domesticated in Northern China around the 11th century B.C.

Over the next 1500 years they were introduced throughout much of Southeast Asia but didn't arrive in Europe and North America until the 18th century. Today, more than 70 million acres of U.S. farmland are planted with soybeans.

While the vast majority of soybeans produced in the United States are used for animal feed, soyfoods are growing in popularity as more people learn about their nutritional and health attributes. Soyfoods are good sources of essential nutrients, but most of the current research has focused on the role of soy in disease prevention.

Soyfood	Calories	Protein (grams)	Fat (grams)	Carbohydrates (grams)	Fiber (grams)	Calcium (Mg)	Iron (Mg)	Folate (Mcg)	Potassium (Mg)
*Soy Burgers (1 burger)	103	10	3	8.3	3.3	-	-	-	-
*Soy Crumbles (2/3 cup)	70	9.6	.8	5.3	2	-	-	-	-
Soy Flour, Defatted (1 cup)	33	4.7	.12	3.84	1.8	24	.92	305	238
Soy Flour, Full-fat, roasted (1 cup)	375	29.6	18.5	28.6	8.2	160	4.9	193	1735
Soy Flour, Low-fat (1 cup)	327	41	5.9	33.4	9	165	5.27	361	2262
Soy Protein Isolate (1oz.)	96	22.8	1.0	2.0	1.6	50	4.1	50	23
*Soy Yogurt (8 oz.)	150	5	3.5	24	1	-	-	-	-
*Soybeans, Canned, Yellow (1/2 cup)	150	13	7	11	3	-	-	-	-
*Soybeans, Canned, Black (1/2 cup)	120	11	6	8	7	-	-	-	-
*Soybeans, Green in pod (1/2 cup)	100	8	3	8	1	-	-	-	-
*Soybeans, Green bean (2/3 cup)	105	9.5	4	10	8	-	-	-	-
*Soybeans, Roasted (1/4 cup)	136	10	6	8	5	-	-	-	-
Soymilk (1 cup)	120	9.19	5.1	11.3	3.2	10	1.4	5	345
*Soynut Butter (2 Tbs)	170	8	11.6	9.8	3	-	-	-	-
Tofu, Firm, Water-packed (1/2 cup)	97	10	5.6	3.7	.5	204	1.8	42	222
Tofu, Firm, Silken (1 slice)	52	5.8	2.3	2.0	.1	27	0.87	-	163

Source unless specified: Nutrient Database Laboratory, USDA Food Composition Data, USDA.

Web Site: [www.nal.usda.gov/fnic/cgi-bin/nut\\_search.pl](http://www.nal.usda.gov/fnic/cgi-bin/nut_search.pl)

\*Information taken from commercial product nutrition facts label on package. Saturated fats is not listed because most soy-based products have insignificant amounts of saturated fat. (-) Information not available on nutrition label or USDA database.

# Soyfoods are Good Nutrition

Most soyfoods are high in protein and those made from the whole soybean—such as soynuts and tempeh—are rich in fiber. Traditional soyfoods like tofu are good sources of healthful omega-3 fats. Table 1 shows that different soyfoods have different nutrient profiles depending on which part of the soybean they are made from and the type of processing they undergo.

The protein in soyfoods is very high quality, just like the protein in animal foods. In fact, soyfoods are a good choice for people who consume a high protein diet for sports or weight control, because they don't contain cholesterol or high levels of saturated fat like many protein-rich animal foods. Soy protein also supports muscle growth.



# Soyfoods Provide Isoflavones

Plant foods are rich in a variety of compounds called phytochemicals. Phytochemicals (plant chemicals) are different from nutrients because they are not required in the diet. But many of them have health benefits, especially in relation to chronic diseases such as cancer and heart disease.

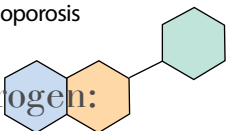
Soybeans are the only commonly-consumed food that provide a type of phytochemical called isoflavones. Traditional soyfoods contain about 3 1/2 milligrams of isoflavones for every gram of protein in the food. Therefore, a cup of soymilk, which contains 6 to 8 grams of protein, has about 20 to 25 milligrams of isoflavones. Studies show that older people in Japan, who eat a more traditional Japanese diet, consume about 30 to 50 milligrams of isoflavones per day.

Isoflavones are also referred to as phytoestrogens (plant estrogens) because they have a chemical structure that is similar to —although not exactly the same as— the female hormone estrogen. But isoflavones are different from estrogen in some important ways.

Isoflavones are referred to as SERMS which are compounds with “selective” estrogen effects. This is because they act like estrogen in some parts of the body, but have effects that are opposite those of estrogen in other parts. Some tissues that are affected by estrogen are not affected one way or the other by isoflavones.

The concept of SERMS is a common and important one in medicine. Some of the most important drugs used to treat both breast cancer and osteoporosis are SERMS.

## Isoflavones and Estrogen:



In tissues on which estrogen has an effect:

- isoflavones may have a similar effect
- isoflavones may have the opposite effect
- isoflavones may have no effect whatsoever

Isoflavones also affect some tissues in ways that are not related to estrogen at all.

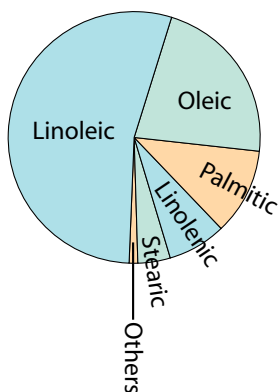
# Soy and Heart Disease: 3-Way Protection



The American Heart Association recently recognized the important role that soyfoods can play in reducing risk of coronary heart disease (CHD). Because soyfoods are rich in protein and are versatile, they can displace foods in the diet that are high in saturated fat. The fat in soybeans is about 84% unsaturated and is rich in essential fatty acids, including omega-3 fats.

In addition, soy protein, as acknowledged by the U.S. Food and Drug Administration directly lowers blood cholesterol levels. Soyfoods may also reduce heart disease risk in other ways. For example, isoflavones may improve the health of the arteries in ways that reduce heart attack risk.

## Fatty Acid Composition of Soy Oil



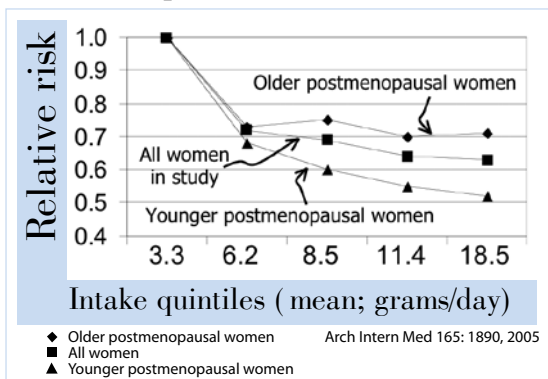
Fatty Acid	%
Linoleic (18:2)	54.0
Oleic (18:1)	22.0
Palmitic (16:0)	11.0
Linolenic (18:3)	7.5
Stearic (18:0)	4.1
Others	Trace
Omega-6: Omega-3 ratio	7.2:1

# Soy and Bone Health

Some soyfoods, especially fortified soymilk and certain types of tofu, are excellent sources of calcium. The calcium in soyfoods is absorbed very well, about as well as calcium from cow's milk.

In addition, isoflavones may have some positive effects on bone health by reducing bone loss in older women. In Asia, women who consume the most soy have stronger bones than those who consume little soy. In one very large study, Chinese women with the highest intake of soyfoods had about a one-third lower risk for having a bone fracture compared to those women who consumed the least soy.

## Relationship between Soy Protein and Fracture Risk among 24,400 Postmenopausal Chinese Women



# Soyfoods and Menopause

**H**ot flashes associated with menopause are less common in Japanese women than in western women and soy consumption may be one reason for this. The isoflavones in soyfoods may alleviate menopausal symptoms associated with declining estrogen production but without the harmful side effects of estrogen therapy.

Isoflavones may not be effective for all women, but they seem to be most helpful for women who need them the most—that is, in women who have four or more hot flashes per day. Certain soy products and supplements appear to be more effective than others, too. And women metabolize isoflavones differently, which impacts how effective they are in reducing menopausal symptoms. Relief from hot flashes usually occurs about 3 to 4 weeks after a woman begins consuming isoflavones.



# Soy and “Diabesity”

**D**iabesity is a relatively new term coined to describe a syndrome of diabetes and obesity that is on the rise in the United States. Because higher-protein diets may aid weight loss, healthful protein sources like soyfoods can play an important role in fighting diabesity. Soy protein places less stress on the kidneys, too, compared to animal protein.

Also, soy protein may improve some symptoms of metabolic syndrome—a condition affecting 50 million Americans that includes obesity, high triglycerides, low HDL-cholesterol (the good cholesterol), hypertension, and insulin resistance. One study found when soyfoods replaced red meat in a healthy diet, cholesterol and inflammation was reduced and insulin sensitivity (the ability to use insulin) increased.



# Soy and Cancer Risk



Breast cancer risk may be related more to lifestyle during the first 20 years of life than to health and dietary habits in adulthood. Research suggests that girls who consume soyfoods in adolescence may have a lower risk for breast cancer when they are older. For those who consume just one to two servings of soyfoods per day during their teen years, could reduce the risk by as much as 50%.



Soy consumption may also inhibit growth of prostate tumors. Since prostate cancer is usually diagnosed late in life and these tumors grow slowly, anything that even modestly inhibits their growth or delays their onset could significantly reduce the number of men who die of this disease.

## Adolescent (13-15 y) Soy Protein Intake and Breast Cancer Risk among Chinese Women



# Are Soyfoods for Everyone?

Soyfoods have been consumed for centuries by people in Asia at all stages of life, and for decades by Western vegetarians without any apparent ill effects. The evidence indicates that only those who are allergic to soy protein, which is rare among adults, need to avoid soy.

Research shows that the isoflavones in soyfoods do not affect hormone levels in women or men, nor do they affect thyroid function. Studies in humans also show that neither soyfoods nor isoflavones have harmful effects on breast tissue. Nevertheless, women who have breast cancer should always consult their physician before making any dietary changes.



# Soyfoods Make Sense in Healthy Diets

Soyfoods are one of the most highly researched foods. In addition to their nutritional value, soyfoods may help reduce risk of heart disease, osteoporosis, and certain cancers. Research suggests that just 2 to 3 servings of isoflavone-rich soyfoods per day could be beneficial. A serving is, for example, one cup soymilk, one-half cup tofu or edamame, or one-quarter cup soynuts.

Introducing soyfoods into your diet is easy and delicious. Try fortified soymilk on cereal for breakfast or use it to make pancakes, waffles or French toast. Edamame in the pod is a perfect snack for kids and adults alike. Shelled Edamame is an ideal addition to soups, salads, casseroles and vegetable combinations. Check the freezer section of your grocery store for soy-based veggie burgers and hotdogs—perfect for a healthy barbecue or a quick supper. Soft silken tofu pureed with herbs and lemon juice makes a good and healthful topping for baked potatoes or a spread to replace mayonnaise.





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