

# Soy Protein and Soy Isoflavones

Functional ingredients are used in manufactured foods to provide other benefits in addition to nutrition or product quality.

## Relationship of soy protein and isoflavones:

Soybeans are broken down into components for use as food ingredients. Crushing the beans separates the soy oil from the soy protein. Phyto- or plant estrogens called isoflavones remain in the soy protein. The two major soy isoflavones are genistein and daidzein. But further processing can affect the level of isoflavones. Raw soybeans, roasted soybeans, soy flour, and textured vegetable protein have a similar isoflavone content. Tofu and soy milk have lower isoflavone levels due to rinsing or the addition of water and flavorings. Soy protein isolate (SPI) is more refined than soy protein and contains lower amounts of isoflavones. SPI is used to make meat and cheese substitutes. Soybean oil contains no isoflavones and soy sauce has little or none.

## FDA approved use:

Not restricted. It is generally recognized as safe or “GRAS.” Food manufacturers are now adding isoflavones to foods to boost their appeal to consumers. Food companies have added soy protein to certain manufactured foods for years.

## Benefits:

Soy protein has been shown to lower total blood cholesterol by lowering LDL, the bad cholesterol. It does not affect the good blood cholesterol, HDL. Some clinical studies suggest that soy protein and its isoflavones protect bone density, but this has not been firmly established.

## Side effects:

Eating foods that have added soy protein and isoflavones may not provide the same effects as eating more traditional soy foods like tofu, tempeh, soy milk, and miso. Because isoflavones are weak estrogens, eating too much (more than 100 milligrams a day) could possibly increase the risk of cancer.

## Rules for use in foods:

Soy protein and SPI can be added to foods with no restrictions as they are generally recognized as safe. FDA now allows food manufacturers to make a health claim on a package if the product contains at least 6.25 grams of soy protein per serving and is also low fat, low in saturated fat, and low in cholesterol. The health claim may say,

“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. A serving of [name of food] supplies \_\_\_\_ grams of soy protein.”

One needs to eat 25 g of soy protein a day to see its blood cholesterol lowering effect. This amount of protein contains about 45 mg of isoflavones. A four-ounce serving of tofu contains 10 grams of protein, while a cup of soy milk contains 6–8 grams.

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## Points to consider:

- There is no evidence that pure isoflavones have a cholesterol-lowering effect or protect bone density. These effects require the soy protein and its isoflavones. The protein and isoflavones appear to act synergistically. This means their effect is greater together than individually.
- Recent studies have cast doubt on the ability of soy to control hot flashes in postmenopausal women. In a double-blind study, taking 150 milligrams of soy isoflavones as soy protein a day did not reduce hot flashes in women survivors of breast cancer. This is the amount of soy isoflavones in 3 glasses of soy milk.
- Scientists have some concerns about the use of soy formulas for infants because of the blood isoflavone levels that result. But infants have been consuming these formulas for years with no known ill effects. At present, FDA still considers them safe.
- The impact of soy protein and its isoflavones on cancer risk is not firmly established as most of the evidence is based on population studies. How these plant chemicals actually affect cancer risk remains unclear. Many bioactive compounds in soybeans would appear to work together to greater effect than each alone.
- The ability of soy products to reduce breast cancer risk in women appears to depend on the age at which it was eaten. Young women eating soy products appear to have a reduced risk of breast cancer later. Asian women

who ate soy before immigrating to the United States still have reduced breast cancer rates but their daughters raised on western diets do not. Postmenopausal women who eat soy products may actually increase their risk of breast cancer. Breast tissue does respond to isoflavones with increased cell division, which could increase the occurrence of cancer.

- Women on tamoxifen should not be taking isoflavone supplements or powders.
- Soy protein may have a protective effect against prostate cancer. It appears men need to eat this throughout their life span to reduce this risk.
- Isoflavones are weak estrogens. More is not better. Scientists are worried that these could have bad effects if eaten in large amounts for long periods of time. The safe range of intake is 35–55 milligrams a day. Some suggest an upper limit of 100 milligrams per day.
- Most Japanese have one serving of soy foods (like tofu) or about 25–50 mg of isoflavones a day.

## Safe amounts of soy isoflavones to eat:

- Natural soy foods like tofu or tempeh are considered safe. Even 2–3 servings of these soy foods a day are fine for healthy women. Women at high risk for breast cancer can still have such soy products once or twice a week.
- A safe upper limit for soy isoflavones is 100 mg. Be careful about combining manufactured foods containing added soy isoflavones in a day, i.e., soy milk with soy cereal for breakfast, soy nuts or soy bars for a snack, and Hamburger Helper for dinner.
- Supplements can be dangerous. Soy pills and powders can contain levels of isoflavones higher than what occur naturally in more traditional soy foods. The effects of getting this much exposure to isoflavones is unknown.

### **Average isoflavone content of various soy foods — 100 grams (3.3 ounces)**

- Boiled soybeans — 54 mg
- Tofu — 28 mg
- Soy hot dogs — 15 mg
- Soy milk — 10 mg
- Soy mozzarella — 8 mg
- Soy sausage — 4 mg
- Soy nuts — 9 mg or 79 mg per 28 ounces
- Gardenburger Lifeburger — 50 mg in 6 ounces
- Soy Sensations Nutrition Bar — 60 mg in 2 ounces
- Soy flour — 0.1–0.4 mg/g or 20 mg per half cup (50 grams)
- Soy protein concentrate — 0.01–0.2 mg/g
- Soy oil — none
- Soy sauce — none

**To learn more about soy, look at these Web sites:**

<http://www.WebMD.com>

<http://www.soyfoods.com>

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