



## Vegetarian Nutrition

a dietetic practice group of the  
**eat right.** American Dietetic Association

### RD Resources for Consumers:

# Isoflavones

**Isoflavones are among the hundreds of compounds in foods called phytochemicals.**

Phytochemicals are not essential nutrients but often have important health effects. While a number of plants have small amounts of isoflavones, soybeans and foods made from them are the only common foods that provide nutritionally relevant amounts of these compounds.

Isoflavone intake varies greatly throughout Asia, but in Japan and certain parts of China, adults consume about 25 to 50 mg of isoflavones per day.

## Isoflavones and Estrogen

Isoflavones are commonly called phytoestrogens, which means “plant estrogens”, because they can bind to the same receptors in cells that bind the hormone estrogen. They are different from estrogen in some important ways, however. In some tissues, isoflavones exert weak estrogen-like effects, but in others, they seem to have anti-estrogenic effects. And, in some, they have no effect at all.

## Possible Health Benefits

### Breast Cancer

Studies within Asia generally show that Asian women who consume higher amounts of isoflavone-rich soyfoods are less likely to have breast cancer compared to those who consume little soy. However, it is not clear that the breast cancer-protective effects of soy result from consumption during adulthood.

Rather there is evidence that consuming soyfoods early in life reduces risk for breast cancer in adulthood. Evidence suggests that as little as one serving of soy daily during childhood and/or adolescence reduces breast cancer risk later in life by 25 to 50 percent.



### Prostate Cancer

Numerous studies suggest that soyfoods reduce the risk of developing prostate cancer. Isoflavones may even have a role in treatment of this cancer since they have been shown to decrease rising levels of prostate specific antigen (PSA) in men who have prostate cancer. Reduced PSA levels are associated with increased cancer survival. Isoflavones may also help alleviate side effects in men undergoing radiation for the treatment of prostate cancer. While the data are encouraging, the relationship between prostate cancer and isoflavones has yet to be definitively determined.



### Heart Disease

Adding soy protein to the diet directly lowers total blood cholesterol levels by around 3 to 5%. This small reduction can significantly affect heart disease risk as part of an overall heart-healthy diet. And when soyfoods take the place of foods higher in saturated fat, the reduction in blood cholesterol levels is even greater.

There is also evidence suggesting that soy may exert other types of coronary benefits. In fact, in several Asian studies, soy intake was associated with a remarkable 75% reduction in risk for heart disease. This may be due to effects of soy isoflavones on the health of the arteries. There is evidence for example, that these compounds increase the elasticity of the arteries—which improves overall cardiovascular health.



## Isoflavone Content of Selected Foods

Food	Total Isoflavone Content
• Edamame (green soybeans), ½ cup, cooked	<b>28 mg</b>
• Flaxseed, 1 tbsp	<b>0 mg</b>
• Kidney beans, ½ cup, cooked	<b>&lt;1 mg</b>
• Miso, 2 tbsp	<b>14.7 mg*</b>
• Soybeans, mature, ½ cup, cooked	<b>47 mg</b>
• Soy cheese, 1 oz	<b>8.8 mg*</b>
• Soy flour, defatted, ¼ cup	<b>27.5 mg</b>
• Soy flour, full-fat, ¼ cup	<b>37.3 mg</b>
• Soy hotdog, 2 oz	<b>9.7 mg*</b>
• Soy infant formula, 4 oz	<b>6.5 mg*</b>
• Soy protein isolate, 1 oz	<b>27.3 mg</b>
• Soymilk, 8 oz	<b>3 mg*</b>
• Soy oil, 1 tbsp	<b>0 mg</b>
• Soy veggie burger, 3 oz	<b>8.4 mg*</b>
• Tempeh, ½ cup	<b>36 mg</b>
• Tofu, firm, ½ cup	<b>38.8 mg*</b>
• Tofu, regular, ½ cup	<b>29.7 mg*</b>
• Tofu, silken, ½ cup	<b>31.2 mg*</b>

*\* isoflavone content varies according to brand*

## Bone Health

Observational studies of postmenopausal women in Asia show that soy intake is generally associated with higher bone mineral density (BMD). So far, only two studies in Asia have looked at effects on bone fractures but both have shown that soy intake is associated with a one-third reduction in risk.

Approximately two-thirds of the clinical studies, where researchers give subjects a specific amount of isoflavones, have found improvements in BMD in comparison to the placebo group.



## Menopausal Symptoms

The low incidence of hot flashes in Japan has prompted speculation that isoflavones might alleviate menopausal symptoms because of their weak estrogen-like effects. However, although many studies show a reduction in the frequency and/or severity of hot flashes in response to isoflavones, a similar number show no such benefits. Evidence suggests that this is because not all isoflavone supplements are equal. Supplements that are high in a particular isoflavone called genistein, which is the primary isoflavone in soyfoods and soybeans, are consistently effective whereas those low in genistein are not. A typical response to the high-genistein supplements is a 50% reduction in the number of hot flashes per day.



## Optimal Isoflavone Intake

Average isoflavone intake in older Japanese adults ranges from about 25 to 50 mg per day. Research suggests that it may require around 50 mg of isoflavones per day to alleviate hot flashes, and as much as 90 mg per day to promote bone health.

## Are Isoflavones Safe?

Results of some types of animal studies have raised concerns about the safety of isoflavones. In contrast, human studies support the safety of both isoflavone supplements and soyfoods. Here are some of the findings:

- Neither soyfoods nor isoflavones substantially affect hormone levels in men or women.
- Neither soyfoods nor isoflavones affect the thyroid, even in individuals with compromised thyroid function.
- Although a recent small pilot epidemiologic study linked soy intake to lower sperm concentration, clinical studies show no such effects.
- While results of some animal studies suggest that isoflavones may be contraindicated for women with breast cancer or possibly even those who are at high risk of this disease, human studies generally show that neither soyfoods nor isoflavone supplements have estrogenic effects on breast tissue. The current position of the American Cancer Society is that breast cancer patients can safely consume up to three servings of soyfoods daily.