Nutrition and Health Info Sheet: Soy

For Health Professionals

What is soy?

The soybean is a legume that provides a low-cost source of plant protein. Soy has been consumed in Asian nations for many centuries. This food is a low fat source of protein, fiber, minerals, and isoflavones (a type of flavonoid, a bioactive plant metabolite), all beneficial nutrients that may contribute to a reduction in chronic disease risk. Regular intake of this food is thought to be partially responsible for the lower rates of heart disease, stroke, and cancer observed in Asian populations.

What are the isoflavones contained in soy?

The isoflavones genistein, daidzein, and glycine are the isoflavone components of soy protein. Also known as phytoestrogens, these compounds are structurally similar to the hormone estrogen, and they interact with estrogen receptors in the body. Many researchers believe that the isoflavones may be a biologically active component of soy, along with the soy proteins, that are responsible for the beneficial effects observed after soy consumption.\(^1\) Due to concerns that have been raised by the use of hormone replacement therapy, many researchers are looking to soy as a possible natural alternative to prevent some of the symptoms associated with menopause.\(^2\) While epidemiological studies have demonstrated that phytoestrogens may alleviate menopausal symptoms, toxicity is not yet determined and more research is needed before recommendations can be made regarding soy intake for this purpose.\(^2\)

What are good sources of soy?

There are many soy products on the market; however, most of these have undergone such high levels of processing that much of the nutritional benefit is lost. Below is a listing of high-quality sources.
Edamame or Soy Beans

Soy beans are the least processed form of soy protein. Available in most grocery stores, they can be purchased in fresh, frozen, or roasted forms. These beans can be eaten alone, like peas, or added to salads and stir-fries.

Tofu

Tofu, or bean curd, is made by curdling soymilk with a coagulant. Available in both soft and firm forms, tofu can be used in a variety of recipes to partially replace either meat or dairy products. Due to the common use of calcium sulfate as the curdling agent, tofu can also be a good source of calcium. A 1/2 cup serving may contain as much as 130 mg of calcium.

Soy Milk

Soy milk is another high-quality source of soy protein that is available in a variety of forms, including plain, vanilla, and chocolate. It can be used to replace milk added to coffee, tea, or cereal. A one-cup serving can have as much as 300 mg of calcium.

Why should people eat soy?

Epidemiological studies suggest that regular consumption of plant-based protein foods reduces one’s risk for chronic diseases such as cancer, and heart disease. Plant-based foods, such as soy, can provide the body with beneficial agents including vitamins, minerals, fiber, and flavonoids. Numerous clinical trials have investigated the potential of soy to protect against the risk of chronic disease. Below is a listing of some of these findings.

Soy and Heart Disease

Isoflavones have been associated with lowering total and LDL cholesterol, and increasing HDL cholesterol, reducing LDL oxidation, and improving vascular function, possibly reducing the risk of coronary artery disease. Consumption of soy has been associated with modest improvements in lipoproteins and blood pressure; however, consumption of soy protein-rich foods may indirectly reduce heart disease risk if it serves as a substitute for animal protein, which contains saturated fat and cholesterol while soy does not.

Soy and Cancer

Numerous studies have investigated the anticarcinogenic properties of soy. It has been suggested that soy isoflavones may provide antioxidant defense, DNA repair, and inhibition of cancerous cell growth. Regular consumption of soy protein by healthy adult populations has been associated with a reduction in risk of both breast and prostate cancer. As with any
significant dietary change, women with breast cancer or elevated risk for this disease should consult their physician before adding soy to their diet.

**Soy and Osteoporosis**

Due to the similarity in the structures of the isoflavones and estrogen, several studies are investigating the ability of isoflavones to reduce the rapid rate of bone loss that is associated with the onset of menopause. However, recent clinical trials are reporting minimal effect of these soy isoflavones on bone loss in postmenopausal women.\(^8,9\)

**Soy and Diabetes**

Habitual consumption of soy may help to reduce the risk of Type 2 Diabetes.\(^10\) Soy has also been shown to help manage symptoms of diabetes by decreasing postprandial hyperglycemia, improving glucose tolerance, and decreasing amounts of glycosylated hemoglobin.\(^11\)

**Soy and Obesity**

A recent observational investigation in postmenopausal women found a favorable association between regular consumption of soy protein and a lower body mass index, higher HDL cholesterol concentration, and lower fasting insulin levels.\(^11\) More research must be completed before any firm conclusions can be made.

**How much soy is recommended?**

According to the American Heart Association and the US Food and Drug Administration (FDA), soy products have beneficial nutrient profiles and daily consumption of 25 grams or more of soy protein with isoflavones can help lower cholesterol levels in individuals at high risk for heart disease.\(^12\) An average serving of soy foods provides 6.25 grams of soy protein, so an individual who is trying to lower his or her cholesterol should aim for eating about four servings of high-quality soy foods a day. If a breast cancer patient, or person who is at high risk for this disease, enjoys eating soy, occasional consumption does not appear to pose any risk; however, these individuals should consult their physicians before adding soy to their diets.\(^12\)

**Can too much soy be harmful?**

Numerous clinical studies have found that daily consumption of up to 50 grams of soy protein is not only safe, but may also be effective in improving risk factors for chronic disease such as some types of cancer, diabetes, and cardiovascular disease.\(^12\) There is little basis for concern that excessive amounts of dietary soy, even in those with or at high risk for breast cancer, will lead to adverse health effects.\(^13,14\) Even still, there are many types of low fat, high fiber legume options and eating a varied diet is recommended to harvest a variety of nutrients.
What are some ways to increase soy intake?

Below is a list of suggestions to help you achieve the American Heart Association and the FDA’s recommended four servings of soy per day.

Replace some or all of the meat in your favorite recipes with tofu or texturized vegetable protein (TVP).

- In spaghetti sauce, replace half of your ground beef with TVP.
- In stir-fry or fajitas, replace the usual chicken or beef with cubed firm tofu.
- In chili, replace half of your ground beef with TVP.
- Make tacos with TVP.
- Add some TVP to meatloaf.

Use silken tofu to replace sour cream, yogurt, or cheese in recipes.

- Make a dip for vegetables with half silken tofu and half sour cream. Add one package of dried onion soup mix, combine in a blender, and serve.
- Make a morning smoothie with silken tofu instead of the usual yogurt.
- Replace half of the ricotta cheese with puréed firm tofu in lasagna.
- Use silken tofu to replace the heavy cream in your favorite soup recipe.
- Make a mixture of half sour cream and half silken tofu to use as a low-fat topping on baked potatoes.

Try some of the new soy products available at the supermarket.

- Replace your morning breakfast sausage with soy sausage or soyrizo (soy chorizo).
- Try some of the numerous types of garden or soy burgers.
- Use soymilk instead of creamer in your morning coffee or tea or on your breakfast cereal.
- Use soy nuts as a salad topper or eat them alone as a snack.
- Try soy nut butter and jelly for your next brown bag lunch.

Should people take isoflavone supplements?

Although many researchers have attempted to isolate the active component of soy to create an effective soy supplement, there appears to be some additional benefit provided by consuming the intact protein particularly for lowering cholesterol. Furthermore, the actual isoflavone content of any supplement cannot be guaranteed. For these reasons, it is recommended that people wishing to lower their cholesterol attempt to incorporate high-quality sources of soy protein into their diet rather than resorting to supplements.
Listed below are some common foods and their soy protein content.

<table>
<thead>
<tr>
<th>Food</th>
<th>Serving</th>
<th>Soy Protein (g)</th>
<th>Isoflavone Content* (mg)</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>soy burger</td>
<td>1 patty</td>
<td>8</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>soy nuts</td>
<td>1 oz</td>
<td>12</td>
<td>38</td>
<td>150</td>
</tr>
<tr>
<td>soy milk</td>
<td>1 cup</td>
<td>8</td>
<td>24</td>
<td>100</td>
</tr>
<tr>
<td>texturized vegetable protein (TVP)</td>
<td>&lt;1/4&gt; cup</td>
<td>14</td>
<td>27</td>
<td>50</td>
</tr>
<tr>
<td>tofu</td>
<td>3 oz</td>
<td>9</td>
<td>33</td>
<td>45</td>
</tr>
<tr>
<td>soy protein bar</td>
<td>1 bar</td>
<td>6</td>
<td>10 - 15†</td>
<td>180</td>
</tr>
<tr>
<td>soy breakfast pattie</td>
<td>2 patties</td>
<td>16</td>
<td>4</td>
<td>160</td>
</tr>
<tr>
<td>soy flour</td>
<td>&lt;1/4&gt; cup</td>
<td>12</td>
<td>33</td>
<td>90</td>
</tr>
<tr>
<td>soy beans, boiled</td>
<td>&lt;1/2&gt; cup</td>
<td>7</td>
<td>47</td>
<td>190</td>
</tr>
<tr>
<td>tempeh</td>
<td>&lt;1/2&gt; cup</td>
<td>18</td>
<td>36</td>
<td>200</td>
</tr>
<tr>
<td>soy nut butter</td>
<td>2 Tbs</td>
<td>8</td>
<td>0</td>
<td>160</td>
</tr>
</tbody>
</table>

*Obtained from the USDA-Iowa State University database on the isoflavone content of food.
†Estimated from nutrition label information.

Acknowledgements:

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References:


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