Health Benefits of Soybean - Uses - Health Implications - Reference

Health Benefits of Soybean
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About

Soybean is hailed as the most protective bean. Soy contains 40 percent protein. It has the highest protein content amongst plant products. "Soy protein" refers to the protein found in soybeans. As animal protein contains all the essential amino acids, lacking in pulse protein, soy is often used to replace the animal proteins in an individual's diet. Soybeans is the only vegetable food that contains all eight essential amino acids. Soybeans are processed to various soya products namely soy flour, soy milk, cottage cheese like tofu, fermented products like tempeh and miso.

Macronutrients -

Protein

Soybeans is the richest plant source of protein. It contains 43 percent protein as compared to other legumes which contain 20 to 25 percent protein. Soy protein is also of the highest quality amongst all legumes. Under guidelines adopted by the Food and Drug Administration and the World Health Organization for evaluating protein quality for children and adults, soy protein isolates receive a rating of 1, which is the highest possible score. This means that the quality of soy protein is equal to that of meat and milk proteins.

Most plant proteins are considered "incomplete" proteins because they are low in one or more essential amino acids. Levels of one amino acid or another are insufficient for human needs. Grains are typically low in lysine; beans are typically low in the sulfur amino acids, methionine and cysteine. However, the level of sulfur amino acids in soybeans is higher than in other beans, and therefore soy protein is equivalent to animal protein in quality.

The World Health Organization (WHO) and the US Food and Drug Administration use an alternative method for evaluating protein quality called the protein digestibility corrected amino acid score (PDCAAS). The PDCAAS for soy protein isolate is 1.0, which makes soy equivalent to animal proteins in quality and higher than other plant proteins foods. Soy foods if used smartly contribute significantly toward meeting protein needs, and could be an excellent addition to a diet for a variety of reasons.

Fat

Like protein soybeans are high in fat too. Most legumes (except peanuts) contain between 2 to 14 percent fat, whereas soybean contains 19 percent fat.
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At the same time, most of the fat in soybeans is unsaturated and beneficial. Polyunsaturated, monounsaturated and saturated fats make up 63 percent, 23 percent, and 14 percent respectively of the fat in soybeans with saturated fat being the lowest. The polyunsaturated fat content of soybeans includes linoleic acid or Omega-6 fatty acid. The presence of omega-3 fats makes it special as soybeans are one of the very few plant sources of this essential fatty acid. Omega-3 fatty acids form an essential nutrient which helps to reduce risk of both heart disease and cancer.

Soybean oil can be used in cooking. Some soy foods have the fat removed. Defatted soy flour is commonly available. Reduced-fat tofu and reduced or non-fat soymilk also form some low fat alternatives.

Fiber

A serving of soybeans provides approximately eight grams of dietary fiber. However, some soy foods are processed in ways that decrease the fiber content significantly. Tofu and soymilk contain very little fiber, while soy foods that utilize the whole bean such as tempeh, soy flour and textured soy protein are high in fiber.

Micronutrients-

Calcium

Soy foods are a good source of calcium in comparison to the commonly used legumes. Processing affects the calcium content of soy foods considerably. Tofu due to its processing methods can contain between 120 and 750 mg of calcium per 1/2 cup serving. Soymilk contains around 93 mg of calcium per one cup serving. The calcium-fortified soymilk could often contain between 200 and 300 mg of calcium per serving and a good amount of vitamin D.

Although soy foods are high in both oxalates and phytates that inhibit calcium absorption, the calcium from soy foods is well absorbed and has an absorption rate equal to that of milk.

Iron

Soya is rich in iron too. However, both phytate and soy protein reduce iron absorption which leads to the iron in soy foods being poorly absorbed. Iron could be better absorbed from fermented soy foods like tempeh and miso.

Other nutrients-

Like other whole grains, soy foods are rich in B-vitamins, particularly niacin, pyridoxine and folacin. Soymilk is well fortified with vitamin B12 which makes it a prominent source of this essential nutrient.

Nutrient Content of Soyfoods

<table>
<thead>
<tr>
<th>Food</th>
<th>Calories</th>
<th>Protein grams</th>
<th>Carbohydrate grams</th>
<th>Fat grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybeans, 1/2 cup, cooked</td>
<td>149</td>
<td>14.3</td>
<td>8.5</td>
<td>7.7</td>
</tr>
<tr>
<td>Tempeh, 1/2 cup</td>
<td>165</td>
<td>15.7</td>
<td>14.1</td>
<td>6.4</td>
</tr>
<tr>
<td>Textured Soy Protein, 1/2 cup, cooked</td>
<td>59</td>
<td>11</td>
<td>7</td>
<td>0.2</td>
</tr>
<tr>
<td>Soy nuts, 1/4 cup</td>
<td>202</td>
<td>15</td>
<td>14.5</td>
<td>10.0</td>
</tr>
<tr>
<td>Tofu, 1/2 cup</td>
<td>94</td>
<td>10</td>
<td>2.3</td>
<td>5.9</td>
</tr>
<tr>
<td>Soy flour, defatted 1/4 cup</td>
<td>81.7</td>
<td>12.8</td>
<td>8.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Soymilk, plain 1 cup</td>
<td>79</td>
<td>6.6</td>
<td>4.3</td>
<td>4.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Food</th>
<th>Niacin mg</th>
<th>B6 mg</th>
<th>Folic Acid ug</th>
<th>Calcium mg</th>
<th>Iron mg</th>
<th>Magnesian mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybeans, 1/2 cup, cooked</td>
<td>1.35</td>
<td>.20</td>
<td>47</td>
<td>88</td>
<td>4.42</td>
<td>74</td>
</tr>
<tr>
<td>Tempeh, 1/2 cup</td>
<td>3.8</td>
<td>.25</td>
<td>43</td>
<td>77</td>
<td>1.9</td>
<td>58</td>
</tr>
<tr>
<td>Textured Soy Protein, 1/2 cup, cooked</td>
<td>.75</td>
<td>.12</td>
<td>---</td>
<td>85</td>
<td>2</td>
<td>86</td>
</tr>
<tr>
<td>Soy nuts, 1/4 cup</td>
<td>0.6</td>
<td>.09</td>
<td>91</td>
<td>59</td>
<td>1.65</td>
<td>63</td>
</tr>
<tr>
<td>Tofu, 1/2 cup</td>
<td>0.2</td>
<td>.06</td>
<td>19</td>
<td>130</td>
<td>---</td>
<td>127</td>
</tr>
<tr>
<td>Soy flour, defatted 1/4 cup</td>
<td>0.65</td>
<td>.14</td>
<td>76</td>
<td>60</td>
<td>2.3</td>
<td>72</td>
</tr>
<tr>
<td>Soymilk, plain 1 cup</td>
<td>1.4</td>
<td>.10</td>
<td>4</td>
<td>93</td>
<td>1.38</td>
<td>45</td>
</tr>
<tr>
<td>Miso 2 Tbsp.</td>
<td>0.3</td>
<td>---</td>
<td>10.1</td>
<td>23</td>
<td>.95</td>
<td>14.5</td>
</tr>
<tr>
<td>Adult Recommended Daily Allowance</td>
<td>15</td>
<td>1.6-2.0</td>
<td>180-200</td>
<td>800</td>
<td>10-15</td>
<td>280-350</td>
</tr>
</tbody>
</table>

Ref: USDA
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There are various anti-nutritional factors in soybean as in other pulses. However most of them are heat liable and can be eliminated by suitable heat treatments.

**Soybean in comparison to other legumes is far superior in terms of health benefits.**

- Low in fat with no cholesterol
- Contains essential heart friendly omega-3 fats
- An excellent source of fiber
- Is a good source of enriched Calcium and Vitamin B12
- Is a complete protein, containing all the amino acids essential to human nutrition
- Provides important minerals such as calcium, magnesium, iron and selenium
- Rich in probiotics in the form of fermented soy products, such as miso, tempeh, and soy yogurt
- Contains isoflavones which are beneficial in reducing risk of various cancers, heart disease and osteoporosis
- Whole soy foods such as tofu and tempeh form a nutrient rich alternative to meat

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