

# Soybean Consumption And Health Benefits

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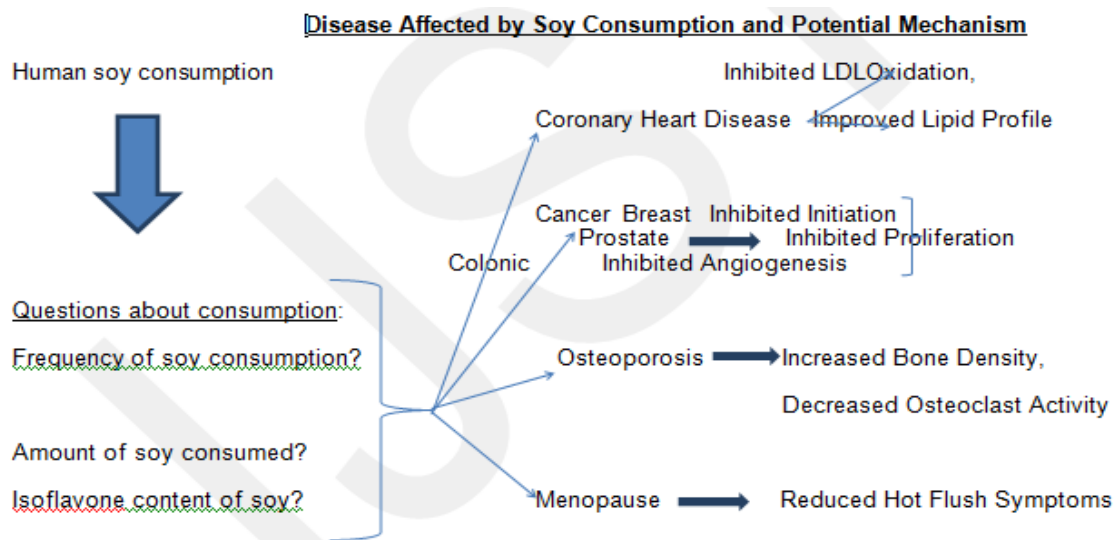
**Abstract:** soy foods are rich source of dietary protein. soy based foods are rich in a class of compounds called isoflavones. Isoflavones have chemical structure that is similar to the hormone estrogen receptors commonly called phytoestrogens. the consumption of soy isoflavones appears to result in health benefits for cancer, heart disease, menopausal symptoms and osteoporosis. so as a result soy protein have become major components of food.

**Keywords:** health benefits, uses, amount of consumption daily

## 1. Soy comes from soybeans.

Soy foods have become more familiar to consume worldwide and have become a popular choice of many health conscious valued for their Versatility, Taste, Nutritional Content, Environmental Advantages and Health Benefits. Soy available in Boiled Soybeans, Soy Flour, Soy Oil, Soy Sauce, Soy Milk, Soy Tofu, Soy Curd, Fried Soy Curd, Fortified Soy Products for Infants & Women, Fermented Soybeans and other. Soy is used for High Cholesterol, High Blood Pressure & Preventing Diseases of the Heart & Blood Vessels. It is also used for type 2

Diabetes, Asthma, Lung Function, all type of Cancers (Lung Cancer, Endometrial Cancer, Prostate Cancer & Thyroid Cancer) as well as Preventing Weak Bone (Osteoporosis) slowing the Progression Of Kidney Diseases. Other use includes treating Constipation and Diarrhea, as well as Decreasing Protein in the Urine of people with Kidney Disease, Improving Memory and Treating Muscle Soreness caused by exercise. Women use soy For Breast Pain, Preventing Breast Cancer, Preventing Hot Flashes for Breast Cancer, Menopausal Symptoms and Premenstrual Syndrome (PMS).



Soy foods are rich source of high quality protein. Soy provide the some quality protein as meat, milk and eggs. Often with less saturated fat & bad cholesterol. When chose in place of animal based proteins, soy offers other health advantages as well.

## 2. Soy Isoflavones:

Soybeans are unique because they are the only commonly eaten food that contains a group of compounds called Isoflavones. Isoflavones have chemical structure that is similar to the Hormone Estrogen, hence they are commonly called Phytoestrogen. Phytoestrogen can bind to estrogen receptors in the body, although with low affinity & have biological activities in the body that often times mimic that of estrogen. Paradoxically, phytoestrogen can also exert a weak Antiestrogenic effect as well. The three most common phytoestrogens in soy products are daidzein, genistein, glycitein. In addition to their phytoestrogenic activities,

daidzein and genistein are also known to have powerful invivo antioxidant affects that may be physiologically important. Ultimately, the content of daidzein, genistein, glycitein present in a food appear to determine the extent of health protection. Isoflavones have a phenyl-ring structure with a series of attached hydroxyl group that give them their unique biological activities. A close structural similarity exists between the structure of the isoflavones and estradiol. A potentially important isoflavone metabolite is equol. Equol is unique because it has a higher estrogenic activity than its precursor, daidzein. It is also unique because only 35% of individuals have the intestinal flora responsible for its production. The nutritional importance of equol formation and excretion remains to be more completely understood. The genistein metabolite, *p*-ethyl phenol, appears to have no activity. Metabolites of glycitein have not as yet been identified. All three soy isoflavones are glucuronidated in the intestinal cells prior to entering the bloodstream. Isoflavones in raw soy products are typically found

conjugated to a glycosidic group. The glucose can be as a 6"-o-malonylglucose with the malonyl form the predominant one in rawsoybeans. This structure property is called  $\beta$ -glycosidic linkage or more commonly a glycine structure. When consumed by humans, glycones aren't absorbed from the intestinal tract. Cleavage of the sugar moiety by the gut flora create a compound referred to as an glycine, resulting in a substantial increase in absorption from the gastrointestinal tract and improved bioavailability of consumed soy isoflavones. Eating soy protein seems to help hot flashes caused by menopause. However, it does not reduce other symptoms of menopause, such as vaginal dryness or itching. Also, soy does not seem to help hot flashes in women with breast cancer. Results from human studies are supportive of the safety and beneficial effects of isoflavones.

### 3. Heart health:

A cardiovascular disease (CVD) is the leading cause of death. Aside from smoking, many risk factors for cardiovascular disease, including elevated body weight (being overweight or obese), high cholesterol and high blood pressure, can often be mitigated or completely eliminated simply with improvements in lifestyle and dietary choices. Recommendations from the American Heart Association to decrease the risk of cardiovascular disease include:

- ✓ Reach and maintain a healthy bodyweight.
- ✓ Limit intake of saturated fat by choosing lean meats and plant proteins like soy.
- ✓ Increase fiber intake.
- ✓ Incorporate omega-3 essential fatty acids, like those from salmon and other types of fish.

### 4. Soy for heart

Raw soy and soy protein fractions both appear to exert a lipid lowering effect. However, soy products that have been stripped of their isoflavone content tend to be less effective in lowering plasma lipids. Furthermore, it has been suggested that the effect associated with soy protein are due to isoflavones that remain associated with soy-protein fractions. It has been estimated that soy protein diets must contain 1.5mg isoflavone/g soy protein to provide the cholesterol lowering effects in humans. Oxidative damage to LDL particles leads to lipid peroxidation and damage to the apolipoprotein B-100 protein of LDL. This event causes oxidized LDL to be recognized by the scavenger receptors localized within the arterial wall. LDL uptake via scavenger receptor is unregulated and is known to cause rapid accumulation of LDL cholesterol, promoting plaque formation. Animal and human studies have determined that Dietary antioxidant, such as  $\alpha$  tocopherol, can prevent plaque formation and possibly lead to plaque regression. Soy isoflavones have a hydroxylated diphenolic structure that confers an antioxidant activity relative to the prevention of LDL oxidation. Soy foods are a great alternative to meat. Unlike many sources of animal protein, soy is low in saturated fat and naturally cholesterol free. Soy protein works directly lower blood cholesterol levels. Soy isoflavone may help reduce the risk of heart disease by improving arterial health. 5grams of soy protein a day, as part of a diet low in saturated fat and cholesterol, may help to reduce the

risk of heart disease. A theory to explain the lipid lowering properties of soy was put forward by Forsythe and colleagues, who postulated that it occurs because soy consumption increases thyroxine levels. It is known that hypothyroidism is associated with a reduction in hepatic LDL receptors and hypercholesterolemia from poor removal of circulating LDL cholesterol. Clinically, the condition is reversible when thyroxine is administered. It is possible that soy isoflavones stimulate the production of thyroid stimulating hormone, resulting in increased thyroxine levels and increased hepatic LDL receptors. Because apolipoprotein B-100 (apo B-100) has a thyroxine-binding site, it is also possible that thyroxine may affect the affinity of LDL for receptor mediated uptake. Although direct thyroxine/soy interactions have not been investigated in humans, pigs maintained on a high soy diet for 14 weeks showed a marked hypcholesterolemia that was associated with significant elevations of plasma thyroxine and thyroid stimulating hormone.

### 5. Cancer:

Phytoestrogen consumption has been suggested to be the agent responsible for providing soy linked breast cancer protection. Genistein and Daidzein and possibly their metabolites have been suggested to affect breast cancer by suppressing tumor initiation and proliferation. Furthermore, recent studies indicate that genistein may also inhibit angiogenesis, thus preventing vascularization in cancerous tissues and thereby limiting tumor growth. Large scale randomized clinical trials to determine if soy consumption reduces the risk of breast cancer development have not been performed. The protective effect of soy foods is most apparent when soy is eaten in early life. Soy foods may help reduce the recurrence of breast cancer and / or the risk of death in women with breast cancer. Being overweight or obese, especially if excessive weight is gained after menopause, can increase the risk of certain cancers, including breast cancer. Studies show that who eat the most soy are about 30% less likely to develop prostate cancer than who eat little soy. One of the soy isoflavones may help improve prostate cancer outcomes by lowering the levels of enzymes that allows cancer cells to spread throughout the body.

### 6. Bone health:

According to the National Institutes of Health (NIH) Osteoporosis and related Bone Disease National Resources Center, 10 million people have osteoporosis and another 34 million people have low bone mass, placing them at risk for this disease. For women, bone loss is fastest in the first few years after menopause; bones may lose thickness and density, which can dramatically increase the risk of fractures. Osteoporosis is a disease of the elderly where bone density and calcium content is progressively decreased due to osteoclast overactivity, leading to an increase in the pelvic fracture rate especially in postmenopausal women. Epidemiological studies have observed that, when compared with western population, bone density is greater and hip fractures less frequent in Asian population consuming large amounts of soy in the form of tofu, miso and tempeh. Promotion of increased bone density can be achieved with hormone replacement

therapy, but increased risk of breast cancer has been an important factor leading investigators to pursue alternatives to estradiol. Raloxifene is a pharmacological alternative that shares significant structural similarities to soy isoflavones; it inhibits osteoclast activity and bone resorption, promoting increased bone density.

#### **Daily amount of Soya Isoflavones studied to prevent a range of diseases**

Objective	Daily dose
Lowering cholesterol	25 – 50gms of soya protein
Cancer prevention	20-40gms of soya protein
Hot flashes (menopausal symptoms)	45 gms of soya flour/ day or 80-160mg of isoflavones
Osteoporosis, post menopausal women	40gms of soya protein/day containing 90mg isoflavones for six months had a +ve effect on bone density

### **7. Soy Side Effects:**

Soy may be possibly unsafe when used during pregnancy in medicinal amounts. Higher doses during pregnancy might harm development of the baby. Not enough is known about the safety of higher doses during breast-feeding. Stay on the safe side and avoid larger doses. Very high levels of phytoestrogens can be toxic. People with kidney failure who use soy products might be at risk for blood levels of phytoestrogens becoming too high. Large amounts of a group of chemicals called oxalates causes kidney stones. Soy lecithin is generally derived from refined soybean oil by a process which is thought to remove most, if not all, of the soy protein that a person with a soy allergy would want to avoid. Some of the interactions and side effects are seen when there is a use of soybeans. For example use of Warafarin, commonly used to slow blood clotting. When there is consumption of soy it leads to risk of clotting. As well there is an interaction with the antioxidants and Tamoxifen usage.

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