HEALTH BASICS

Soy

Soy is a protein-rich legume eaten whole or used in foods and supplements.

WHAT IT IS
A protein-rich legume used in many foods

WHERE IT COMES UP
Foods, ingredient labels, infant formula, supplements, and allergy care

WHY IT MATTERS
Adds protein and can replace foods higher in saturated fat

WHAT IT IS NOT
Not a disease or a human hormone

WHO TO ASK
Primary care clinician, dietitian, allergist, or pharmacist

HOW IT IS CHECKED
Food labels; allergy testing when reactions suggest allergy

Overview

Soy comes from soybeans, a type of legume related to peas, beans, and lentils. It can be eaten as edamame or processed into tofu, tempeh, soy milk, miso, soy sauce, textured soy protein, and other foods.

Soy provides protein, unsaturated fats, vitamins, minerals, and plant compounds called isoflavones. The exact nutrition depends on how the food is made. For example, sweetened soy milk may contain added sugar, while soy sauce is usually high in sodium. Some soy milks are fortified with calcium, vitamin D, and vitamin B12.

Soy is not a disease or diagnosis. Most people can include soy foods as one part of a varied diet. Whether a particular product is useful for you depends on your food needs, allergies, medicines, and the nutrients in the rest of your diet.

Soy protein is considered a complete protein. This means it supplies all nine essential amino acids-the protein building blocks your body cannot make by itself.

How it works

Your digestive system breaks soy protein into amino acids. Your body then uses these amino acids to maintain muscles, skin, enzymes, hormones, and other tissues.

Soybeans also contain isoflavones. These compounds are sometimes called phytoestrogens, meaning plant substances that can interact with estrogen receptors in the body. They are not the same as human estrogen. Their effects are much weaker and can differ by tissue.

Processing changes soy. Tofu is made by coagulating soy milk, somewhat like making cheese. Tempeh and miso are fermented by microorganisms. Soy protein isolate is a more concentrated protein ingredient used in some meat substitutes, nutrition bars, and powders.

The overall effect of eating soy also depends on what it replaces. Substituting tofu or edamame for food high in saturated fat may improve the balance of fats in your diet. Adding a heavily sweetened soy product without changing anything else may have a different effect.

Why it matters for your health

Soy foods can be a practical source of protein for people who eat vegetarian, vegan, or mixed diets. Whole and less processed choices, such as edamame, tofu, and tempeh, may also provide fiber and unsaturated fat.

Research suggests that soy protein can produce a small reduction in low-density lipoprotein, or LDL, cholesterol. LDL is sometimes called "bad" cholesterol because high levels can contribute to fatty deposits in arteries. The benefit is likely greater when soy replaces foods that are higher in saturated fat.

Fortified soy milk can help replace some nutrients found in dairy milk. Products differ, so check the label for protein, calcium, vitamin D, vitamin B12, added sugar, and sodium. A soy beverage is not the same as soy-based infant formula and should not be used as infant formula.

Studies of soy foods have not shown that usual dietary intake causes feminizing effects in men. Evidence also does not support avoiding soy foods simply because they contain isoflavones.

Soy foods are generally considered acceptable for people with a history of breast cancer. They are not a cancer treatment. Concentrated isoflavone supplements are different from food and have less certain benefits and risks, so discuss them with your cancer care team.

What can go wrong

Soy allergy is an immune reaction to soy protein. It may cause hives, swelling, vomiting,

coughing, wheezing, or other reactions after exposure. An allergist can assess the history and may use a skin-prick test, a blood test for soy-specific antibodies, or a supervised oral food challenge. A positive skin or blood test alone does not always prove that eating soy will cause symptoms.

Call emergency services if eating soy is followed by trouble breathing, throat or tongue swelling, faintness, collapse, or a rapidly worsening reaction involving more than one part of the body. These can be signs of anaphylaxis, a severe allergic reaction.

Make a routine appointment if you repeatedly develop hives, vomiting, wheezing, or other symptoms after soy but are currently well. Do not deliberately test a suspected serious food allergy at home.

Soy can also cause gas, bloating, or loose stools in some people. These digestive effects are not automatically an allergy. A clinician or dietitian can help if symptoms keep returning or lead you to remove several foods from your diet.

Soy may reduce the absorption of levothyroxine, a medicine used to replace thyroid hormone. This does not always mean soy must be avoided. Consistent eating and medicine habits can help your clinician interpret thyroid blood tests. Ask a pharmacist or prescribing clinician how to separate your medicine from food, and mention any major change in your soy intake.

Natto, a fermented soybean food, contains substantial vitamin K. Vitamin K affects warfarin, a medicine used to reduce blood clotting. If you take warfarin, ask your anticoagulation service before adding natto or changing how often you eat it. Sudden dietary changes can alter the medicine's effect.

Soy-based infant formula is made to meet infant nutrition standards, but it is not the right choice for every feeding situation. Ordinary soy milk, homemade formula, and adult nutrition drinks are not substitutes for breast milk or regulated infant formula.

What you can do

There is no need for a general medical test before eating soy. Your practical steps depend on why soy has come up.

In the United States, packaged foods containing soy generally have to identify it as a major food allergen. Highly refined soybean oil may be treated differently because it contains very little soy protein. If you have had a severe reaction, ask your allergist how to handle soybean oil, soy lecithin, restaurant foods, and cross-contact.

If you are simply deciding whether to eat soy and have no allergy, relevant medicine interaction, or special nutrition need, nothing needs to be checked medically. Choose products

based on your preferences and their nutrition labels.

- Read ingredient and allergen labels if you have a known or suspected soy allergy
- Compare protein, added sugar, sodium, calcium, and vitamins between products
- Keep a record of the food, amount, timing, and reaction if symptoms recur
- Ask about thyroid blood testing after a major diet change if you take levothyroxine
- Check concentrated isoflavone supplements with a pharmacist or relevant clinician
- Ask a paediatric clinician before changing an infant's formula

Common questions

Is soy milk nutritionally the same as dairy milk?

No. Fortified soy milk often has a protein content closer to dairy milk than many other plant drinks, but nutrients differ by brand. Check whether it contains calcium, vitamin D, vitamin B12, and added sugar. Nutrition needs are different for infants and young children, so discuss milk substitutions with their healthcare professional.

Does soy increase estrogen?

Soy isoflavones can interact with estrogen receptors, but they are not human estrogen. Research on usual amounts of soy food has not shown clinically meaningful feminizing effects in men. Concentrated supplements may provide much larger amounts than food and should not be assumed to have the same effects.

Should someone with breast cancer avoid soy?

Evidence does not support routinely avoiding soy foods after breast cancer. Tofu, edamame, tempeh, and soy milk can be part of a balanced diet. Ask your cancer care team before using high-dose isoflavone supplements, especially during active treatment.

Is genetically modified soy less healthy?

Some soybeans are genetically engineered, often to support particular farming methods. Approved genetically engineered foods are assessed by food-safety regulators. Choosing organic or non-genetically engineered soy can be a personal preference, but the label does not by itself show that one product has better nutrition.

Is tofu highly processed?

Tofu is processed because soybeans are soaked, ground, heated, and coagulated. Processing alone does not determine whether a food is nutritious. Look at the whole product, including protein, sodium, added sugar, and other ingredients.

Sources

- National Center for Complementary and Integrative Health. "Soy."
- U.S. Food and Drug Administration. "Food Allergies."
- U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2020-2025 .
- Messina M. "Soy and Health Update: Evaluation of the Clinical and Epidemiologic Literature." Nutrients . 2016;8(12):754.
- Otun J, Sahebkar A, Östlundh L, et al. "A Systematic Review and Meta-analysis on the Effect of Soy on Thyroid Function." Scientific Reports . 2019;9:3964.
- American Cancer Society. "Soy and Cancer Risk: Our Expert's Advice."