

Sorting Out Soy Confusion

Google “soy health” and you'll get over 14 million entries. The opposite, “soy danger”, returns almost 2 million links. Some of these sources (on either side of the issue) are obviously unreliable, but many others seem legitimate. ***Who can you believe?***

To start, there are patterns in this debate. Most of the arguments about soy food, both 'pro' and 'con', are generated by groups that are driven by ideology, profit, or both.

The most vocal proponents of soy, for example the United Soybean Board [1], tend to be funded by major producers of chemically processed soybean products and by pharmaceutical companies who hold the patents for genetically engineered (GEO) soybeans. They tout the benefit of all soy whether it's good food or toxic junk food.

Other soy defenders also have an agenda, though one that is arguably more positive and ecological/health oriented: **promoting a vegetarian or vegan lifestyle.**[2] [3]

The anti-soy side, centered primarily around the Weston A. Price Foundation [4] (Fallon/Enig References) appears to be largely motivated by an anti-vegetarian, pro meat and dairy ideology. Its followers have gained strong presence on the internet where the foundation's anti-soy articles have been repeatedly recycled. Some soy detractors give approval to traditional fermented soy foods such as miso or shoyu soy sauce, but still, they inaccurately and simplistically declare that all unfermented soy is unhealthy.

If you are looking for sound information about soy, here is a good place to start:

- Health benefits of soy - Why the controversy? by Dixie Mills, M.D. [5]
- Soy Phytoestrogens: The Art of Propoganda by John Mericle, M.D. [6]
- Soybeans by the George Mateljan Foundation for the World's Healthiest Foods [7]
- Mayo Clinic, Harvard Health, and an overwhelming number of academic medical and health institutions *recommend* eating whole soy and fermented soy products. *Just Google it!*

Quality is Everything

When one gets to the center of the soy debate, a truth becomes evident: Whether a particular soy food is good for you or bad for you depends upon how it is made.

Soy is one of nature's most bio-chemically complex plant foods. Like other beans, as well as grains, soybeans contain many anti-nutrients in its dry raw form. These natural toxins are part of the plant's 'personal defense system', and also lie at the heart of many anti-soy arguments. Yet when unlocked correctly through fermentation or proper, thorough cooking, soy's undesirable properties are negated and its protein, antioxidants, and overall nutritional profile are exceptionally nourishing.

Toxic Studies

The majority of claims that all soy is unhealthy, appear to be backed up by conjecture and flawed studies. In many of the studies that are repeatedly cited by soy detractors, lab rats had been fed very high levels of genetically engineered and chemically derived soy protein isolates, concentrates, extracted isoflavones, and raw or roasted soy meal that was dry heated and defatted using hexane gas. Genetically engineered (GEO) soybeans in at least one study have been found lethal to the offspring of lab rats, and have also been found to be 29 percent lower in choline, which is needed for brain function; 27 percent higher in protease inhibitors; and contain almost double the lectin, soy's suspected allergen culprit, compared with non-GEO soybeans. [8]

Answers to Anti-Soy Claims

Claim: Soybeans contain large quantities of 'anti-nutrients' including enzyme inhibitors that block the action of trypsin and other enzymes needed for protein digestion. (Fallon/Enig 2000) [9]

Answer: It is true that raw soybeans contain a number of anti-nutrients, including trypsin inhibitors and phytates. This has been an item of academic interest for many years, as the plant kingdom is full of so-called anti-nutrient compounds. But the proper preparation and cooking of foods, including soybeans, invalidates these anti-nutrients.

Claim: Soybeans are high in phytic acid - a substance that can block the absorption of essential minerals - present in bran or hulls of all seeds. (Fallon/Enig 2000) [10]

Answer: The knowledge of proper preparation to transform beans and grain into food - including the removal of the hull - has been part of our collective humanity for over 10,000 years. As with trypsin inhibitors and other anti-nutrients, proper cooking dramatically reduces phytic acid.

Claim: Soybeans contain haemagglutin, a clot promoting substance. (Fallon/Enig, 2000) [11]

Answer: If people ate soybeans raw (which they don't of course), this might be an issue. Numerous plant foods contain a class of proteins or glycoproteins referred to as lectins (a.k.a. haemagglutinin or phytohaemagglutin). Plant foods containing a high concentration of lectins can, in some cases (raw form), be toxic to animals or cause poisoning in humans. According to the FDA's Bad Bug Book: Foodborne Pathogenic Microorganism and Natural Toxins Handbook [12], this is "usually caused by the ingestion of raw, soaked" or sprouted beans, "either alone or in salads and casseroles" or when certain high lectin beans, especially kidney beans, are cooked in "slow cookers or crock pots where the temperature has not reached a high enough internal temperature to destroy the glycoprotein lectin." As the FDA states, even in red kidney beans which contain about ten times the level of lectins found in soybeans, these lectins are rendered harmless by proper cooking. Dozens of other scientific

organizations we found concur. According to the Food and Agriculture Organization of the United Nations, "The **lectins**, formerly known as hemagglutinins, are proteins which possess the ability to agglutinate red blood cells. They are widely distributed in plants and some, such as the castor bean lectin ricin, are highly toxic. The lectin found in raw soybeans has, apparently, no observable dietary effect, good or bad. Furthermore, it too is easily inactivated by heat." [13]

Claim: Soybeans contain goitrogens - substances that depress thyroid function. (Fallon/Enig, 2000) [14]

Answer: The authors fail to mention that this is not a problem generally related to whole, natural soy foods, but rather with isolated soy protein. According to the Sparrow Health Network's physician reviewed Nutrition Services, "Intact whole soybeans are not high in goitrogens, however, when soy protein is isolated in processing these goitrogenic substances (diadzen, genestein) are concentrated and preserved. The phytochemicals from isolated soy protein are added to a number of the newer functional processed foods such as breakfast cereals, energy bars, health drinks, protein powders, and pill supplements. Under these circumstances cardiac benefits of soy have to be weighed against possible risks to thyroid function: Dose and form of soy should be taken into account." In addition to soybeans, a number of common plant foods contain goitrogens, especially cruciferous vegetables. Those who suffer from thyroid problems or have concerns about such should consult with their health practitioner.

Claim: Alkaline soaking and modern processing reduces the cystine content which is already low in the soybean. Lacking cystine, the entire protein complex of the soybean becomes useless unless the diet is fortified with cystine-rich meat, eggs, or dairy products. (Fallon/Enig, 1995)

Answer: Soybeans are the only complete protein plant, containing all eight essential amino acids including methionine, and all non-essential amino acids including cystine. When compared to some foods like meat, eggs, dairy, and seafood, soybeans are lower in methionine and cystine. However, the soybean is higher in cystine than almost all other beans. One need not consume meat, eggs and dairy to obtain cystine and methionine as suggested by the authors. Many amino acids absent or found in small quantities in some beans and legumes can be found other plant foods, thus enabling the body to produce sufficient amino acids for complete protein. Some plant sources of cystine are red peppers, lentils, split peas, broccoli, cabbage, oats, oat bran, rye, wheat, wheat bran, millet, brown rice, brussel sprouts, and onions. Some plant food sources of methionine are peanuts, sesame seeds, sunflower seeds, pumpkin seeds, lentils, garbanzo beans, garlic, and onions.

Claim: Soybeans are an unbalanced, incomplete source of protein. Only when beans, including soybeans, are supplemented with some complete and balanced protein from an animal-derived food, can the combination achieve the status of being a complete protein food, with all essential amino acids present. (Beatrice Trum Hunter, 2001)

Answer: *Soybeans are one of a few plant-derived sources of complete protein and contain all nine essential amino acids and all non-essential amino acids.* It is not necessary to consume animal-derived protein for complete protein. The American Heart Association says, "You don't need to eat foods from animals to have enough protein in your diet. Plant proteins alone can provide enough of the essential and non-essential amino acids, as long as sources of dietary protein are varied and caloric intake is high enough to meet energy needs. Whole grains, legumes, vegetables, seeds, and nuts all contain both essential and non-essential amino acids. You don't need to consciously combine these foods ("complementary proteins") within a given meal. Soy protein has been shown to be equal to proteins of animal origin. It can be your sole protein source.

Claim: Nitrosamines are potent carcinogens and these are often found in soy protein foods. They are formed when you spray things out of a nozzle into the air at high temperatures. (Fallon, 2000) [15]

Answer: Nitrosamines are not found in traditionally made soy products. They are produced during the production of soy protein concentrates and other powdered food concentrates (powdered eggs, powdered milk, powdered dairy formulas, powdered creamers, etc.) and are the result of high temperature spray drying techniques and chemical processes used to produce the concentrates.

Claim: Soymilk was never a traditional beverage of either Japan or China (J. Phillips, 2005)

Answer: Archaeological and written evidence exists proving that soymilk was being made in China by 82 AD, but many scholars believe that soymilk and tofu existed several centuries earlier. Furthermore, a tomb uncovered from the Han Dynasty (25 -220 A.D.) revealed a stone slab with a mural featuring a kitchen scene, which illustrates the making of soymilk and tofu. Soymilk was called 'doujiang'. Dou means 'bean' (in China bean most always means soybean) and jiang (also known as chiang) means liquid, drink or beverage. It was used as a beverage and in making soy-based soups.

Claim: The soybean did not serve as a food until the discovery of fermentation techniques, sometime during the Chou Dynasty. The first soy foods were fermented products like tempeh, natto, miso, and soy sauce. (Fallon & Enig, 2000)

Answer: The above statement is inaccurate. For example, tempeh was not a traditional food of China. It originated in Java (Indonesia) several centuries ago. The sticky natto variety the authors are referring to is not an ancient Chinese food either, but a product invented in Japan sometime between the 13th and 16th centuries. According to ancient Chinese documents, China did not have an abundant, quality

source of protein and child mortality rates were quite high until the introduction of the soybean from the Jung and Hu, people of Manchuria. This occurred during the Chou Dynasty, often described as the era of expansion, 1134 to 246 BC. In the book 'The Loss and the Origin of Chinese Agriculture, 1969, Dr. Ping-ti Ho, professor of History at the University of Chicago stated, "The effect of the domestication of the soybean on Chinese agriculture and on the nutrition of the ancient Chinese cannot be exaggerated. At long last, the Chou Chinese had found a food plant that, instead of causing soil exhaustion, actually helped to preserve and enhance the fertility of the soil. The soybean supplied all classes of the population with cheaper and more abundant protein.... Not until the soybean was domesticated did the ancient Chinese cropping system become well balanced. Once the benefits of the soybean became known, its subsequent dissemination was fairly rapid. The various works written or compiled during the fourth and third centuries BC usually mention soybeans and millet as the two most important sources of food."

Claim: People of China, Japan, and other Asian countries eat very little soy, so there is no historical precedent for eating the amounts recommended. (Daniels, 2004)

Answer: This statement is misleading. True, there is no historical precedent for eating modern soy concoctions such as soy protein isolates, concentrates, supplements, powdered shakes, textured soy protein, etc. However, there is historical precedent for consuming traditional soy foods, whether fermented or unfermented. For centuries Asians have consumed traditional soy products such as miso, shoyu, tamari, tofu, and real soymilk. They have enjoyed the reputation of being among the healthiest people in the world. While it may be true that some areas of Asia today have low soy consumption, especially certain areas of China, it is not true for all of Asia. In the areas of Asia where soy consumption is still very high, health is at its optimum. One such area is Okinawa, Japan. Soy comprises about 12% of their daily diet. This is almost 20 times the amount the author claims Asians eat, yet Okinawans have the lowest disease rate in the world. It is important to note that the Okinawa population consumes traditional soy foods such as miso, shoyu, tamari, tofu, whole cooked soybeans, real soymilk (not soy formula), dried tofu, yuba (dried soymilk), natto and the like. They are not consuming modern highly processed soy isolates, soy concentrates, texture soy protein hot dogs and burgers, powdered soy shakes, power bars or soy supplements.

Claim: Soybeans do not supply fat-soluble vitamins D and A (retinol). These fat-soluble vitamins are found only in certain animal foods such as organ meat, butter, eggs, fish, and shellfish. (Fallon/ Enig, 1995) [16]

Answer: This statement again reveals the authors' agenda in promoting foods from animal sources. The American Dietetic Association, the American Heart Association and millions of others attest to the health benefit of vegetarian and vegan lifestyle choices. The 'debate' over whether vegetarian / vegan diets supply enough of needed nutrients has been settled long ago. It is true that soybeans do not supply vitamins D and A. Sunlight is the best source of vitamin D. Plant sources of beta-carotene, the

precursor to vitamin A retinol can be found in abundance in bright red, yellow, orange and dark green colored fruits and vegetables. Some beta-carotene rich foods are carrots, spinach, winter squash, sweet potatoes, dandelion, red peppers, apricots, and mango. Sea vegetable sources are nori, kombu, and dulse. As fat-soluble vitamins are stored in the body, one need not consume large amounts daily as this can lead to an over dose, especially with vitamin A.

Claims: Phytoestrogens can affect male animals' health and fertility, what about people? (SoyOnline, 2006); & researchers tested what happened to human sperm when exposed to genistein in a dish in a laboratory: The soy chemical was found to create a premature reaction in the sperm. (Mercola, 2006)

Answer: Saving the most outrageous claims from the anti-soy faction for last. If any of the bizarre reproductive claims were entirely true of real soy foods, why is the Asian population so large? If their claims were true, why aren't the soy food loving baby boomers, and the thousands of children fed soy formula since the 1960s, all infertile, childless or suffering from deformity? SoyOnline is a website that is basically a mouthpiece for the Weston Price Foundation, and members such as Sally Fallon, Mary Enig, Kaayla Daniels, Dr. Anthony Mercola, and a host of worldwide members in the Weston Price fan club, who like to continually rewrite articles from the 1990s and present them as the latest breaking news on the ills of soy. We have been observing these articles for a number of years and have noticed very little new news in their claims.

The study referred to in the above claim used human eggs and sperm, which were placed in Petri dishes in a laboratory. Then synthetic genistein was placed in the dish. Lo and behold the sperm couldn't swim to the eggs. Humans don't inject themselves with pure, synthetic genistein, which by the way affects the body in a very different manner than genistein obtained from a whole food containing other healthful components that provide balanced benefits and good nutrition.

Addressing the reproductive health issue, the FDA stresses the safety of whole soy foods versus supplements, writing that these concerns "focus on specific components of soy, such as the soy isoflavones daidzein and genistein, not the whole food or intact soy protein. These chemicals, available over the counter in pills and powders, are often advertised as dietary supplements for use by women to help lessen menopausal symptoms such as hot flashes. The problem, researchers say, is that isoflavones are phytoestrogens, a weak form of estrogen that could have a drug-like effect in the body. This may be pronounced in postmenopausal women, and some studies suggest that high isoflavone levels might increase the risk of cancer, particularly breast cancer. Research data, however, are far from conclusive, and some studies show just the opposite - that under some conditions, soy may help prevent breast cancer. It is this scientific conundrum, where evidence simultaneously points to benefits and possible risks, that is causing some researchers to urge caution ... Unlike the controversy surrounding soy isoflavones, available evidence on soy protein benefits is much clearer. That's why FDA limited its health claim to foods containing intact soy protein. The claim does not extend to isolated substances from soy protein" [17]

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