

Soya: Frequently Asked Questions

What is soya?

Soya is a bean that is part of the legume family that also includes peas, other beans and lentils. It has formed part of the traditional diet of East Asian populations for centuries. The low incidence of certain diseases among these populations, such as heart disease, osteoporosis, prostate and breast cancer has resulted in a huge amount of research investigating whether this may in part be due to soya.

Is soya nutritious?

Yes. The soya bean is low in saturated fat, a good source of polyunsaturated fats (especially the plant omega-3 fatty acids), contains one of the highest quality vegetable proteins around (similar in quality to meat and milk protein), is a source of fibre and contains various vitamins and minerals. Because of this nutritional profile, the soya bean fits in well to general healthy eating guidelines.

Of particular nutritional interest to health is:

- Soya Protein (heart health and possibly weight management)
- Isoflavones (menopause, bone health, prostate and breast cancer)
- Fibre (weight management)
- Fat profile (heart health)

What are isoflavones?

Soya beans, as well as chickpeas, beans, red clover, flaxseed and wholegrain cereals, contain natural plant compounds, called phytoestrogens. Phytoestrogens have a similar chemical structure to the hormone oestrogen. Soya beans are one of the richest food sources of a group of phytoestrogens called isoflavones.

Although isoflavones have a chemical structure similar to oestrogen they are far weaker. In fact it has been estimated that between 1000 and 400,000 more isoflavones would be needed in the human body to have the same biological effect as oestrogen. Yet these isoflavones are being investigated for their potential health benefits, as they appear to fit and interact at oestrogen receptors located around the body to positively affect various tissues and organs. Furthermore studies have also found them to have anti-oxidant, anti-inflammatory and anti-cancer effects.

What evidence is available to show that soya has particular health benefits?

Studies investigating populations who traditionally eat soya foods have found that people who eat more soya foods have lower incidences of certain diseases compared to those that eat less. Furthermore numerous clinical studies, examining the effect of soya on markers of disease risk, support these findings.

As a result of the wealth of scientific data now available, a number of organisations recommend the use of soya and/ or soya isoflavones. For example, the position of the **North American Menopause Society (NAMS)** - *'In women who need relief for mild vasomotor symptoms, NAMS recommends first considering lifestyle changes, either alone or combined with a non prescription remedy, such as **dietary isoflavones, black cohosh, or vitamin E.**'*ⁱ

In addition, a **EU funded project entitled 'Phytohealth'**, which is examining the health and safety of phytoestrogens, has commented *'On the basis of the available evidence, the panel has concluded that the consumption of whole soya bean foods and Soya Protein Isolates has some beneficial effects on lipid markers of cardiovascular risk in healthy postmenopausal women.'*ⁱⁱ

Not forgetting the international recommendations advising to increase the consumption of plant proteins in the form of legumes. For example,

World Cancer Research Fund: *'Choose predominately plant-based diets rich in a variety of vegetables and fruits, pulses (legumes) and minimally processed starchy staple foods.'*ⁱⁱⁱ

World Health Organisation: *'Daily intake of fresh fruit and vegetables (including berries, green leafy and cruciferous vegetables and legumes) is recommended to reduce the risk of coronary heart disease, stroke and high blood pressure.'*^{iv}

How can studies in Asian populations be used to draw conclusions about the benefits of soya in the West?

It's not just Asian population studies that show a beneficial effect of soya on health. There are also a number of studies in Western populations. For example in a study of 1033 British women (European Prospective Investigation into Cancer study), women consuming $\geq 6g$ of soya protein/ day had a **7.5% lower total cholesterol** and a **12.4% lower LDL cholesterol** than women eating $< 0.5g/$ day.^v

The same study has also examined the effect of genistein and the risk of prostate cancer in European men. Data from 10 European countries found that higher levels of genistein (a type of isoflavone found in soya) in the plasma was associated with a 26% lower risk of prostate cancer.^{vi} This may help to explain why men living in East Asian countries have a lower rate of prostate cancer compared to men living in Europe.

Furthermore numerous clinical studies examining the effect of soya on risk factors for disease have been conducted both in Western and Asian groups with similar findings.

Can soya foods be included as part of a heart healthy diet?

The nutritious profile of the soya bean makes it an ideal food to be enjoyed as part of a heart healthy diet.

Studies investigating diets of high soya consumers have found them to be lower in saturated fat and higher in fibre than low/ non-soya consumers. This is particularly relevant at a time when our intake of saturated fat still remains above the recommended levels.^{vii} Swapping foods which are a major contribution to saturated fat (meat and dairy products) with a vegetable protein (such as soya) can help to reduce our intake of these unhealthy fats and so reduce the risk of heart disease.

In fact, the American Heart Association's (AHA)^{viii} current position is that soy foods such as tofu, soya nuts and soya dairy alternatives are likely to be beneficial to cardiovascular health because of their low saturated fat content and their high polyunsaturated fat, fibre, and vitamin and mineral content.

Soya has formed part of the traditional diet of East Asian populations for centuries. The low incidence of certain diseases among these populations, including heart disease, has resulted in a huge amount of research investigating whether this may in part be due to soya. Of particular interest is the role of soya protein on cholesterol reduction. It has also been suggested that soya may have other heart benefits aside from its potential cholesterol lowering action. These include improving the health of blood vessels as well as its antioxidant effects.

Which foods contain soya?

Foods containing soya include soya dairy alternatives, tofu, miso, tempeh, natto, edamame (young soya beans), soya beans, soya nuts (roasted soya beans), soya mince and various meat alternatives such as veggie burgers, veggie sausages, etc.



Aren't traditional soya foods healthier?

No. There is little evidence to suggest that fermented soya foods (miso, tempeh and natto) are significantly superior to unfermented ones (tofu, soya milk, soya beans, soya nuts). Numerous human studies have used both processed and traditional soya foods and found no difference in results. Furthermore at least half of the total soya consumed in Japan and China comes from non-fermented foods.

Food labels should always be checked to determine the overall nutritional composition of the food to ensure it fits in with healthy eating recommendations.

Don't you have to eat huge amounts of soya to get benefits?

No. Based on typical Asian soya consumption, clinical studies and Asian population studies the optimal amount of soya protein appears to be around 15-25 grams of soya protein a day (50 – 90mg Isoflavones) which can be achieved in 2-3 servings of soya foods. The following table provides details of the amount of soya protein and isoflavones in commonly consumed soya foods.

Food	Protein Content (g per portion)	Isoflavone Content (mg per portion)
Soya Milk	8.25-9.25 (250ml)	18.3-27.4
Alternative to yogurt	4.9 (125g pot)	10.5-15.7
Dried soya beans	16 (100g boiled serving)	47
Soya desserts	3.75 (125g pot)	8.3-12.4
Green soya beans, (edamame)	9.8 (80g)	48.95
Soya 'Nuts'	9.3g (25g)	15-59
Tofu	8 - 12g (100g)	29-55
Meat alternatives	Variable	2-14mg/ 100g

Source: Phytohealth Venus Database, Manufacturers details, USDA Database for the Isoflavone Content of Selected Foods Release 2.0. N.B. Soya Protein content will vary between brands

I've heard that soya increases the risk of breast cancer – is this true?

No. Because of the oestrogen-like effects of isoflavones it was proposed that soya might increase the risk of breast cancer. Some rat and laboratory tests have found that isoflavones stimulate the growth of oestrogen receptor positive breast cancer cells. However, these studies can not be used to determine the safety of soya in humans as soya is metabolised very differently by humans compared to rats. **Human studies have found no effect of soya isoflavones on either breast tissue density^{ix, x, xi} or breast cell proliferation^{xii, xiii, xiv}** (both markers for increased breast cancer risk).

Even in those women who have breast cancer, emerging evidence is suggesting that soya in modest amounts is safe to consume. Data from the Shanghai Breast Cancer Survival Study included over 5000 breast cancer patients 6 months after cancer diagnosis. After a follow up of 3.9 years there were 444 deaths and 534 relapses or breast cancer deaths. Women consuming more soya protein (more than 15.31g a day) were **approximately one third less likely to die or suffer a reoccurrence** compared to women eating the least.^{xv}

In fact soya has been associated with a reduced risk of breast cancer and eating it earlier in life appears to offer the greatest protection.^{xvi}

Can soya cause hormonal imbalances?

Although isoflavones have a chemical structure similar to oestrogen, the majority of human studies show no effects on hormone levels following soya or isoflavone consumption in either men or women.

Findings from 32 trials did not find any effect of isoflavones (approximately 125mg a day) or soya protein (approximately 23 grams a day) on male reproductive hormones after one year.^{xvii}

In both pre-menopausal and post-menopausal women, neither soya (< 10g – 50g/ day) nor soya isoflavones (25mg to 100mg/day) had a statistically significant effect on oestrogen levels.^{xviii}

It is likely that soya isoflavones exert their benefits independent of hormone levels.

Can isoflavones affect male fertility or cause hormonal changes?

No. The large populations in Asian countries do not support the idea that soya causes infertility. Furthermore clinical studies in humans show that soya does not affect sperm quality. For example, in a study of 20 men who took either 160mg, 320mg or 480mg isoflavones a day for 3 months, there was no difference in ejaculated volume, sperm concentration, count and motility of sperm compared to baseline.^{xix} In another study 32 healthy men supplemented their diet with either milk protein, or soya protein low in isoflavones, or soya high in isoflavones for 57 days. No differences were seen in semen volume, sperm concentration, sperm count, total motile sperm count, sperm motility or sperm shape in men consuming soya protein containing low or high isoflavones.^{xx}

What's more a recent review of the evidence has found that soya bean isoflavones do not have a feminizing effect in men at intakes equal, and even considerably higher, to those typically consumed by Asian males.^{xxi}

Negative studies linking soya consumption to impaired fertility or hormonal changes often get media coverage. However these studies are usually based on animal or test-tube studies which can not be extrapolated to what 'might happen' in the human body. Interpreting results from animal and test tube studies are problematic:

1. Often an isolated and pure isoflavone compound is given in a very high dose. This does not reflect soya in its normal state nor does it reflect normal concentrations from a balanced diet.
2. In some animal studies, isoflavones are injected subcutaneously. This is very different to consuming soya orally as injecting isoflavones bypasses the important processes of digestion and metabolism which are known to change the isoflavones into a different form.
3. Animals metabolise isoflavones in a very different way to humans.
4. The timing of sexual development differs between animals and humans.
5. Cells in a test-tube are not the same as cells that form part of an organ.

Is soya safe?

Given the huge amount of research that is undertaken in the field of soya and health it is not surprising that some studies show adverse effects. However focusing on these studies gives a skewed perception of the safety of soya foods. When evaluating the safety it is important to look at the totality of the scientific research that shows soya foods to be safe and nutritious.



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