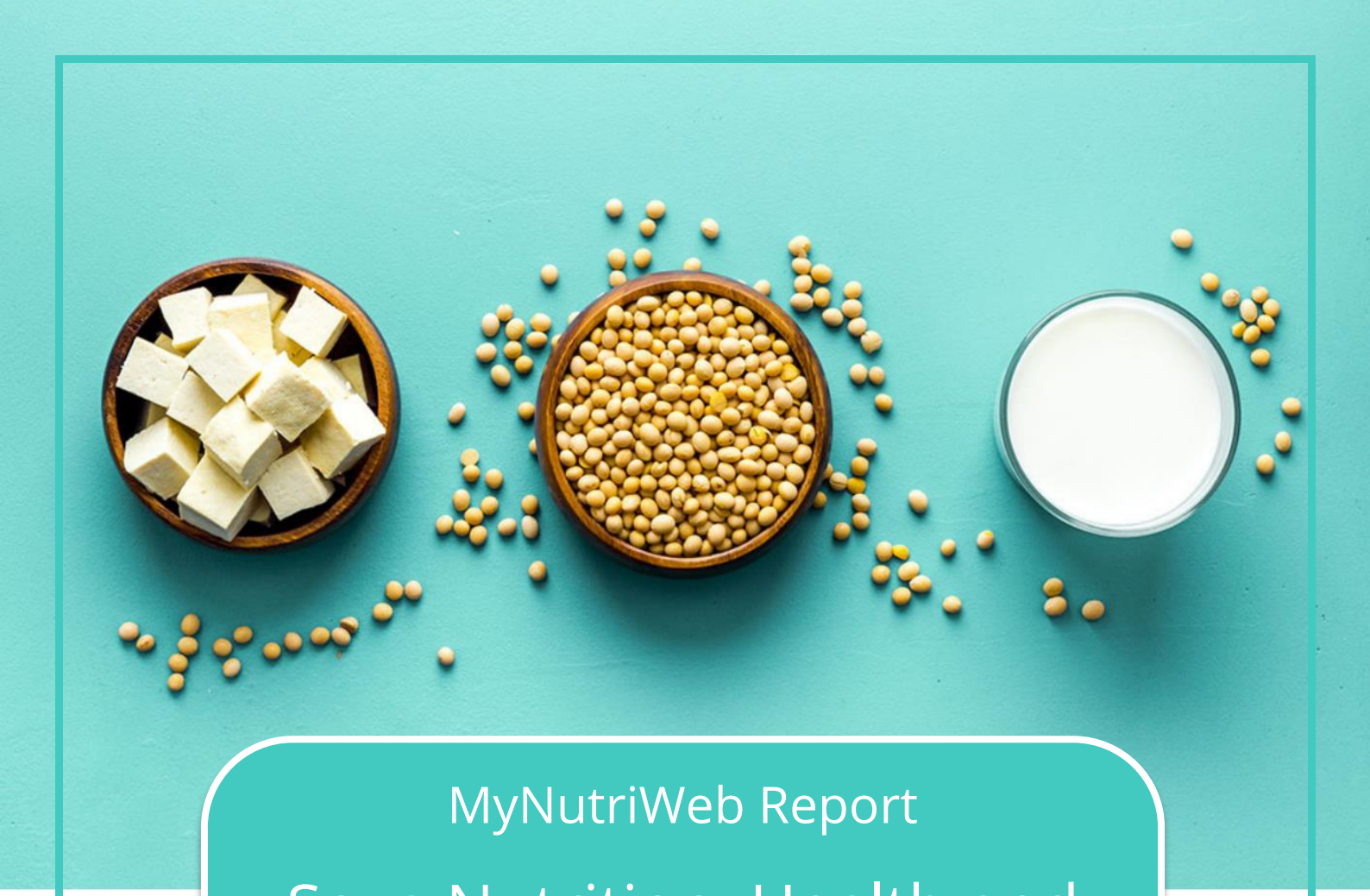

MyNutriWeb Report

Soya Nutrition, Health and Sustainability

The latest research and practical guidance on soya for human consumption

April 2021

MyNutriWeb

Expert nutrition and health learning

FOREWORD

Soya has been part of the human diet for centuries but in recent years our consumption of soya in the UK has really taken off, particularly in the form of dairy alternatives but also in the form of plant-based meat alternatives.

Global dietetic and health bodies consider soya to be the hero dairy alternative due to its unique protein content. There is an inescapable, urgent planetary health argument for plant-based diets. Dietitians, nutritionists and other health professionals are telling us that they are encountering a variety of questions and misconceptions from patients and the public about soya in connection to the menopause, muscle building, cancer, men's health and children's growth and development. A MyNutriWeb survey of 200 dietitians, nutritionists and other health professionals, conducted in March 2021, revealed that most (79%) are detecting a growing interest in soya from the patients and people that they advise.

There has been a raft of new academic research in this field and this month sees the publication in *Critical Reviews in Food Science and Nutrition* of the most extensive scientific review on soya isoflavones and whether they warrant classification as endocrine disruptors. This ten-author review overwhelmingly counters misplaced concerns and brings to light the overwhelming evidence that soya foods and drinks are not only safe but have the potential to health outcomes.[1]

MyNutriWeb was fortunate to host a Roundtable event in March with the lead author of this major review, Dr Mark Messina PhD, MS, Nutrition Matters Inc along with Prof. Ian Rowland, Emeritus Prof. of Human Nutrition, University of Reading; Dr Mark Driscoll, Founder and Director of Tasting the Future; Elphee Medici, Nutrition and Sustainable Diets Consultant and Kate Roberts RD, expert in plant-based diets, paediatrics and allergy. The discussion was chaired by Dr Hazel Wallace, founder of The Food Medic, an NHS medical doctor and registered nutritionist.

This expert panel has worked with MyNutriWeb to produce, this up-to-dated ***Guidance on Soya for Health Professionals***. It contains information from around the world with advice for health professionals to reflect the very latest peer-reviewed human research. It has been possible to convene our expert panel and share its findings with the MyNutriWeb community at no charge with financial support from the Science and Nutrition team at Alpro.

Nutrition and sustainability are inextricably entwined, so we have sought to also address the environmental credentials of soya used for human consumption. The evidence for soya grown for human consumption is very consistent with environmental objectives with over 90% coming from North America, Europe or Asia. Concern should, however, be apportioned to the soya grown for animal feed, which is predominantly sourced from the Amazon.

Our hope in sharing this Guidance with MyNutriWeb's community of 13K plus health professionals in the UK is that we can contribute to a greater understanding of the benefits of including soya within a healthy lifestyle and balanced and sustainable diet.

Yours in good health,

Tanya Haffner, **CEO, RD**

MyNutriWeb

April 2021

[1] Messina M, Blanco Mejia S, Cassidy A et al. Neither soyfoods nor isoflavones warrant classification as endocrine disruptors: a technical review of the observational and clinical data. Crit Rev Food Sci Nutr 2021;1-57. doi: 10.1080/10408398.2021.1895054. Online ahead of print.

EXECUTIVE SUMMARY

Soya's is different to other beans and pulses. Compared to most other beans and pulses, soya beans have a much lower carbohydrate content, are higher in protein quality and content and are significantly higher in total fat – mainly polyunsaturated fat, including both essential fatty acids, linoleic acid, and alpha-linolenic acid.

Soya consumption is on the rise in the UK. Soya foods and drinks have now become mainstream in the UK and are a regular feature seen on supermarket shelves.

National dietary recommendations and soya. In the UK, fortified soya drinks are incorporated within the '*Dairy and alternatives*' food group and soya proteins such as tofu and soya mince, within the '*Beans, pulses, fish, eggs, meat and other proteins'* group of the Eatwell guide for over 5's and adults.

The Eatwell guide introduced in 2016, incorporated environmentally sustainable factors within its recommendations and therefore prioritised plant food sources of protein over animal sources and reduced the recommended contribution from dairy foods and drinks.

The UK Government, Caroline Walker Trust and First Steps Nutrition Trust recommendations for children aged 1 to 5 years, include soya drinks and alternatives to yogurt and soya protein foods such as tofu and soya mince. Additionally, calcium fortified unsweetened soya drinks can be introduced from the age of 1 year as a main drink.

Soya is far better for the environment than meat and dairy. Compared to animal proteins, soya production for human consumption, produces significantly lower greenhouse gas (GHG emissions); uses significantly less land and fertilisers; requires less water; has a lower impact on biodiversity loss and causes lower damage to our seas and oceans.

The majority of soya grown on deforested land, including the Amazon, is used for animal feed and not for human consumption.

The EAT Lancet diet makes specific recommendations for soya foods within the protein food group. whilst UK dietary recommendations highlight soya foods and fortified drinks within the protein and dairy and alternatives food groups.

Soya consumption need not be exclusive. When providing direct consumer advice – we need to help consumers by keeping the message simple, positive and ensure it does not deviate too far from people's current day-to-day habits.

Breakfast is a great easy win to drive more plant foods and reduce consumption of one of the main GHG gas contributors – simply switching from cow's milk to fortified soya drink or a soya alternative to yogurt can significantly reduce our footprint without nutritional compromise.

Consumers and patients should be encouraged to eat more or switch to plant foods rather than emphasising reducing or cutting out meat/dairy altogether.

1-2 servings of soya foods and/or drinks daily. Based on the evidence, the favourable nutrition profile, and their environmental credentials 1-2 servings of soya foods or drinks as part of a balanced diet could provide benefits for both human health and planet health. *Two servings daily would equate* to 100g soya mince OR half a block of tempeh OR 100g young green soya beans (edamame) OR a large (250ml) glass soya drink plus 200g serve of plain soya alternative to yogurt.

Dismissing the myths. The most comprehensive ever review of the scientific literature investigating the safety of soya and isoflavones was published online in *Critical Reviews in Food*

Science and Nutrition on 28th March 2021. Ten global leading experts reviewed human data from over 400 publications and concluded that soya food and drinks consumed as part of a healthy balanced diet, is safe and has the potential to improve health outcomes.

The totality of the evidence indicates that neither soya nor soya isoflavones negatively impacted on women's or men's health. Outcomes assessed included breast cancer, hormone levels, children's growth and development, men's health including feminisation. Much of the concerns stemmed from animal studies, which are now well-established to be a poor representation of how isoflavones are absorbed and metabolised in humans.

Why isoflavones are not oestrogen

Soya foods and drinks contain naturally occurring plant components called isoflavones. Soya isoflavones' chemical structure is similar to the human hormone oestrogen, it is not identical. Isoflavones are sometimes classified as a phytoestrogen or plant oestrogen.

The extensive research has demonstrated that isoflavones act differently to oestrogen in the human body – here comes the technical bit:

- Unlike human oestrogen which binds with equal affinity to the two oestrogen receptors (alpha and beta) found in the human body, isoflavones preferentially bind to oestrogen receptors beta rather than alpha. Because of this, they are now more correctly classified as Selective Oestrogen Receptor Modulators (SERMs).
    - The two oestrogen receptors (alpha and beta) have different tissue distributions and, when activated, can produce different effects in the body.
- Sometimes, isoflavones can produce a weak oestrogen-like effect in the body without increasing or altering human oestrogen levels. They do this by interacting directly with oestrogen receptors found on organs and tissues around the body. As isoflavones are different compounds to oestrogen, they do not affect oestrogen levels.
- Sometimes, they produce effects in the body that are opposite to those of oestrogen.
- In many cases, they do not have any effect at all in tissues that are affected by human oestrogen.
- Isoflavones have been shown to possess other biological effects unrelated to oestrogen e.g., as antioxidants.

Men need not worry about the impact of soya on testosterone levels. A meta-analysis published this year that included 41 human studies and over 1,750 men showed no effect on testosterone or oestrogen levels.

Soya builds muscle as effectively as whey and other animal proteins. The latest evidence demonstrates that adequate protein intakes evenly consumed throughout the day alongside weight resistance exercise, is most critical for muscle building.

New research reports that over the long-term, there is no difference between consuming soya or animal proteins for building muscle size or strength amongst those performing weight resistance exercises. Thus, there is no need to consume more plant proteins than animal proteins to gain the same muscle effect. As long as one is consuming adequate energy and protein and the overall diet is balanced, there will be no difference in muscle gains for those wishing to follow a vegan, vegetarian or meat containing diet.

Soya can help with hot flushes in menopausal women and provide heart health benefits. The evidence indicates that consuming around 2 servings of soya foods and/or drinks as part of a balanced diet and lifestyle can be a positive for women during the menopause, especially with regard to hot flushes and cardiovascular health.

Hot flushes. Approximately 50mg of isoflavones consumed daily (2 servings of soya foods and/or drinks) have been associated with reduced frequency and severity of hot flushes. The exact mechanism is not yet fully understood, but it is speculated, that isoflavones attach themselves to oestrogen receptors in the body and exert a weak oestrogen-like effect and as they are a different compound to oestrogen, they do not alter oestrogen levels in the body.

Heart health. The menopause increases cardiovascular risk and blood cholesterol levels. Soya foods and drinks low in saturated fat can help maintain normal blood cholesterol levels and soya isoflavones have been associated with improved function of cell lining of blood vessels.

Soya is safe for women at risk of developing or with breast cancer. Safety of soya with regard to women's breast cancer risk, breast cancer sufferers and risk of recurrence is supported by the leading global cancer organisations: the American Institute of Cancer Research (AICR), American Cancer Society (ACS), the World Cancer Research Fund (WCRF) and WCRF continuous update programme and European Food Safety Authority.

Most population studies show that soya consumption certainly does not increase breast cancer risk with some studies indicating a modest (10-20%) reduction.

Additionally, there is some evidence to indicate that starting consumption during adolescence and maintaining intake during adulthood has a significantly more marked effect in reducing risk of breast cancer.

OUR CHAIR & EXPERT PANELLISTS

Dr Hazel Wallace
BSc MSc MBBCh ANutr, Doctor and Registered Associate Nutritionist, The Food Medic

Dr Mark Messina
PhD, MS, Soya Science expert
Nutrition Matters, Inc

Prof Ian Rowland
Emeritus Professor of Human Nutrition, University of Reading

Dr Mark Driscoll
Founder and Director of Tasting the Future

Kate Roberts
Expert in plant-based diets, specialist in paediatrics and allergy, nutrition writer

Elphee Medici
Nutrition & Sustainable Diets Communications Consultant

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TAKE-HOME MESSAGES FROM OUR EXPERTS

Prof. Mark Messina, PhD, MS, soya science expert, Nutrition Matters, Inc

"*I would like everyone to view soya as just another healthy food they can add to their diet – at the very least it's a great source of high-quality protein, healthy fat, and rich in vitamins and minerals. What's more, there is intriguing evidence that moderate amounts of soya may reduce risk of several chronic diseases include coronary heart disease, osteoporosis, and certain forms of cancer. Whilst animal studies have raised concern that soy may cause untoward effects, the totality of human data refutes this. Based on the evidence to date, people may benefit from consuming at least one serving a day of soya foods.*"

Prof. Ian Rowland, Emeritus Prof. of Human Nutrition, University of Reading

"*I'm a very enthusiastic proponent of plant-based diets – I'm involved in an organisation called Alpro Foundation which funds research into these diets. I think soya is a really critical component of a plant-based diet and soya can offer benefits which many other fruit and vegetable components cannot because it has naturally occurring bioactive components such as isoflavones."*

Dr Mark Driscoll, Founder and Director of Tasting the Future

"*Soya plays a really important role as part of a healthy nutritious and sustainable balanced diet in the context of some of these planetary health emergencies we confront whether it's biodiversity loss, climate change, society supported by governments really need to focus on that shift towards more plant-based diets. At the moment we do not have a level playing field in terms of regulations – a lot can be done by governments to influence and shape those food environments that we've touched on earlier*."

Kate Roberts, RD Expert in plant-based diets, specialist in paediatrics and allergy

"*I would just like it to be more widely known that soya is safe and beneficial in children's and adults' diets. It's amazing how these rumours and worries still persist…and as a vegan or as a parent people comment 'ooh you know…you shouldn't give your children soya' and I just really want that message to get out there and I'd like other healthcare professionals to reassure parents that it's good and it's good to add to your children's diets.*"

Elphee Medici RD, Nutrition and Sustainable Diets Consultant

"*From a dietetic perspective, soya is a great addition to a healthy plant-based diet, for both human and planetary health. The UK has been stuck with poor dietary habits for too long, we all need do as much as possible to really excite consumers and motivate them to shift and take action towards more plant-based eating. There's been lots of evidence presented today that soya foods and drink consumed as part of a healthful plant-based diet is the way forward for health and environment*."

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SOYA BASICS

SOYA BASICS

Soya is radically different to other beans and pulses

Compared to other beans and pulses, soya beans have a much lower carbohydrate content, higher protein content and are significantly higher in total fat – mainly polyunsaturated fat, including both essential fatty acids, linoleic acid, and alpha-linolenic acid.

	% of energy of cooked beans*	
	Soya beans	Other legumes
Carbohydrate	12%	70%
Protein	36% *High quality - equivalent to animal proteins*	27%
Fat	42%	3%

**DietPlan 7.00.56 (2019) - McCance and Widdowson 7th summary editions of The Composition of Foods plus the revised Composition of Foods integrated data set (CoFids) forming the complete UK Nutrient Databank. Forestfield Software Ltd; West Sussex, England.*

Types of soya foods and drinks

Soya foods and drinks have been consumed for many centuries, first in China then spreading to Japan and other Asian countries.

Fermented vs unfermented

Fermented soya products	Unfermented soya products
• Miso – mainly consumed as a soup • Natto – mainly consumed in Eastern parts of Japan • Tempeh – wildly consumed in Indonesia • Soya alternatives to yogurt	• Edamame / young / green soya beans: *harvested at around 80% maturity, contain more moisture and a little sweeter than standard fully mature soya beans* • Tofu / bean curd • Soya drink – from whole soya bean
Most soya is consumed as unfermented	

Soya Protein Ingredients

Ingredient	% protein
Soya flour	50%
Soya protein concentrate	65%
Soya protein isolate	90%

Soya protein ingredients are a concentrated form of soya protein widely used by the food industry:

- Functional: used in small quantities in foods such as bread to influence texture, increase moisture retention and/or extend shelf life
- Dairy/meat alternatives: often used as the base ingredient for dairy and meat alternatives
- Boost protein content: used to significantly enhance the protein levels of some foods e.g., cereals and protein bars

Soya ingredients have been rigorously investigated for their safety and health benefits. They are easy to incorporate into both animal and human diets and are easy to standardise and allow study subjects to be blinded, so they are widely used in clinical trials.

Common UK soya foods and drinks

Soya foods and drinks have now become mainstream in the UK and are a regular feature seen on supermarket shelves.

Soya food / drink	Serving	Protein g per serve	Estimated soya isoflavones* mg per serve	Other nutrients per serve
Soya drink	250ml	7.5-8	26-29	*Non-organic fortified variants* • 240mg calcium • 1.5-3mcg vit D • 0.8mcg vit B12 • Beginning to be introduced – iodine @ 45-90mcg
Soya alternatives to yogurt (plain)	125g	5	17	• 150mg calcium • 0.9mcg vit D • 0.5mcg vit B12
Edamame (green/young) soya beans (frozen and chilled)	80g	13	46	6g fibre
Tofu	½ a block ~90g	11	38.5	~400mg calcium *If a calcium setting agent is used (calcium sulphate E516) – check label*
Tempeh – similar to tofu but fermented and higher in protein	½ a block ~80g	17	60	• 7g fibre • 110mg calcium
Soya mince	100g	19	67	4g fibre
Soya burgers	1 ~90g	17	59	6g fibre
Soya sausages	2 ~80g	12	42	4g fibre

**isoflavones are calculated based on 3.5mg isoflavone content per g of protein. Messina M, Nagata C and Wu AH. Estimated Asian adult soy protein and isoflavone intakes. Nutr Cancer. 2006;55(1):1-12. doi: 10.1207/s15327914nc5501_1*

Soya and national and international dietary recommendations

The recently revised US Dietary Guidelines 2020-2025 incorporate soya within the guidelines.[1]

- Dairy group: fortified soya beverages and alternatives to yogurt. Soya drinks are the only plant-based substitutes seen as equivalent to dairy
- Protein group: tofu, tempeh, products made from soya flour, isolate and concentrate
- Vegetable group: edamame or soya beans
- Oils: soya bean oil – which in the US is 'vegetable' oil

Soya and UK dietary recommendations

In the UK soya foods and drinks are incorporated within the dairy and alternatives and the protein group

Over 5's and adult recommendations – the Eatwell guide

The Eatwell guide introduced in 2016, incorporated environmentally sustainable factors within its recommendations and therefore reduced the recommended contribution from dairy foods and drinks and in the protein group, plant food sources were prioritised over animal sources.

[1] https://www.dietaryguidelines.gov/sites/default/files/2020-12/Dietary_Guidelines_for_Americans_2020-2025.pdf

- Dairy and alternatives group: includes calcium fortified unsweetened soya and other plant-based drinks and alternatives to yogurt
- Beans, pulses, fish, eggs, meat, and other proteins group: which includes tofu / bean curd, textured vegetable protein (TVP), soya mince as plant protein options

Children (1-5 years) – *Government,[1,2] Caroline Walker Trust[3,4] and First Steps Nutrition Trust[5]*

Soya drinks and alternatives to yogurt and soya protein foods such as tofu and TVP are also incorporated within paediatric dietary recommendations

- Dairy and alternatives group: calcium fortified unsweetened soya can be introduced from the age of 1 year as a main drink. The UK government also recommends other plant-based drinks from the age of 1 year as long as they are unsweetened and fortified with calcium. Calcium fortified soya and other plant-based alternatives to yogurt are also mentioned
    - The Caroline Walker Trust 'Calcium foods' group also includes tofu and other beans and pulses
- Beans, pulses, fish, eggs, meat, and other proteins group: tofu / bean curd, TVP, soya mince is featured as one of the protein options

Are plant-based drinks and alternatives to yogurt better than dairy?

Plant-based/soya drinks and yogurt alternatives are becoming more popular, but are they really healthier and more sustainable than dairy?

With regard to environmental sustainability – the evidence shows that compared to dairy milk, soya-based drinks have a significantly lower carbon footprint, require less water and land.

Per litre *Poore and Nemecek 2018[6]*		Dairy	Soya
GHGe kg CO2 equiv.	Global	3.2	1.0
	Europe	*2.2*	*0.9*
Land use m^2	Global	9.0	0.7
	Europe	*2.2*	*0.5*
Water use L	Global	628	28
	Europe	*248*	*1.2*
Eutrophication (P and N use)	Global	11	1.1
	Europe	*69.2*	*4.2*

From a health perspective, soya drinks are naturally low in saturated fat and provide a good source of protein (with a high quality similar to dairy).[7] The majority of mainstream soya drinks on the market are standardly fortified with calcium to similar levels and of a comparable bioavailability to

[1]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/658870/Early_years_menus_part_1_guidance.pdf
[2] https://www.nhs.uk/conditions/baby/weaning-and-feeding/what-to-feed-young-children/
[3] https://cwt.org.uk/wp-content/uploads/2015/02/CHEW-1-4YearsPracticalGuide3rd-Edition.pdf
[4] https://cwt.org.uk/wp-content/uploads/2014/07/Under5s.pdf
[5]https://static1.squarespace.com/static/59f75004f09ca48694070f3b/t/5a926be4ec212d9451c595ce/1519545331398/Good_food_choices_and_portion_sizes_Jan2018.pdf
[6] Poore J and Nemecek T. Reducing food's environmental impacts through producers and consumers. Science 2018;360(6392):987-992. doi: 10.1126/science.aaq0216
[7] DietPlan 7.00.56 (2019) - McCance and Widdowson 7th summary editions of The Composition of Foods plus the revised Composition of Foods integrated data set (CoFids) forming the complete UK Nutrient Databank. Forestfield Software Ltd; West Sussex, England.

dairy. Additionally, mainstream soya drinks are fortified with vitamin D (not present in UK dairy milk) which will further enhance calcium bioavailability, vitamin B12 and vitamin B2 (Riboflavin). Organic variants are not fortified due to regulatory constraints.

With regard to the very topical iodine issue, many mainstream manufacturers have taken action and are beginning to fortify with iodine at levels of 22.5mcg to 40mcg per 100ml (dairy levels are around 31mcg/100ml).[1] Dairy is indeed the main source of iodine in the UK diet due to fortification of cattle fodder and transdermal transfer of iodine from iodine teat sterilisers.[2] Fish, although a much richer source of iodine, is consumed at too low a quantity to make a significant contribution.

It is not always useful to focus on the health benefits of individual foods or nutrients – as much depends on the overall dietary intake and lifestyle habits of an individual. Thus, soya drinks and other foods can benefit overall health and environment when consumed as part of a predominantly healthy and balanced plant-based diet such as the Eatwell guide.

HOW MUCH SOYA SHOULD WE BE CONSUMING?

Soya foods and drinks fit well with national dietary guidelines and the latest recommendations for diets to be more environmentally sustainable by shifting towards plant-based diets where plant proteins, in particular, are prioritised over animal protein and dairy food is moderated.

The EAT Lancet diet makes specific recommendations for soya foods within the protein food group, whilst the UK dietary recommendations highlight soya foods and fortified drinks within the protein and dairy and alternatives food groups.[3]

1-2 servings of soya foods and/or drinks daily

Based on the evidence, the favourable nutrition profile, and their environmental credentials 1-2 servings of soya foods or drinks as part of a balanced diet could provide benefits for both human health and planet health. Two servings daily would equate to:

- 100g soya mince OR half a block of tempeh OR 100g young green soya beans (edamame)
    - Split over 2 meals
- 2 large (2x250ml) glasses soya drink: use on cereal, in tea and coffee and in cooking
- 1 large (250ml) glass soya drink plus 200g serve of plain soya alternative to yogurt
- A serving (90g) firm tofu plus a 125g pot of soya alternative to yogurt or small serving (150ml) of soya drink

Best to spread out intake throughout the day. Spreading consumption throughout the day is recommended in view of optimal protein intake. A fuller explanation is provided further down with regard to hot flushes.

[1] Online supermarket assessment of plant-based drinks brands (mcg iodine/100ml), Alpro soya drink only (22.5mcg), Oatly (22.5mcg), Mighty Society (Pea) (31mcg), Blue Diamond (0mcg) Qwrkee (22.5mcg), Rebel Kitchen Mylk (0mcg), Innocent (0mcg) 3 retail own label. Tesco (soya drink – 22.5mcg), Sainsbury's (0mcg), Asda (25mcg), Marks and Spencer (45mcg). Information accessed 19/04/2021

[2] https://www.gov.uk/government/statistics/ndns-results-from-years-9-to-11-2016-to-2017-and-2018-to-2019

[3] Willet W, Rockstrom J, Loken B et al. Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. Lancet 2019;393(10170):447-492. doi: 10.1016/S0140-6736(18)31788-4

Is it practical and realistic for UK consumers?

How practical and realistic is it for consumers to incorporate soya foods in their day-to-day diet?

With the array of great tasting soya foods and drinks now readily available on our shelves – and the increase in plant-based recipes, there is no reason why the current growth in soya foods and drinks cannot continue to increase especially with soya's beneficial nutrition and environmental profile.

However, changing behaviour is not simple and we know that consumers, although willing to make improvements for health and planet are struggling to take action – less than 1% currently adhering to the Eatwell guide.[1]

There are multiple factors to be considered when driving behaviour change, however, changing the external food environment and media is incredibly powerful. "Normalising" plant foods can go a long way to shifting attitudes and behaviour e.g., soya drinks and yogurt alternatives can now be found alongside their dairy counterparts which has significantly influenced their continued popularity and acceptance. Media coverage of Veganuary and the vegan trend and the increased availability of plant-based alternatives is beginning to change attitudes and knowledge.

When providing direct consumer advice – it's important to keep it simple and positive and ensure it does not deviate too far from their current day-to-day habits e.g.

- Breakfast is a great easy win to drive more plant foods can help reduce greenhouse gas emissions – simply switching to fortified soya drinks or alternatives to yogurt can significantly reduce our footprint without nutritional compromise
- Encourage individuals to eat more and/or partly replace current animal protein with healthy plant foods rather than emphasising reducing or cutting out meat/dairy e.g.
    - adding a serving of edamame beans or more vegetables to accompany a main meal
    - part replacing meat in recipes with soya mince and/or other beans and veg

[1] Scheelbeek P et al. Health impacts and environmental footprints of diets that meet the Eatwell Guide recommendations: analyses of multiple UK studies. BMJ Open 2020;10(8):e03755 https://bmjopen.bmj.com/content/10/8/e037554

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SOYA ALLERGIES

SOYA ALLERGIES

How prevalent are soya allergies and do children grow out of them?

Soya is one of the 14 allergens listed by the European Union including cow's milk protein, shellfish, eggs, peanuts and tree nuts, gluten, lupin, celery, fish, sulphur dioxide, sesame, molluscs, and mustard).[1]

Soya allergy prevalence is lower than other food allergies such as peanut, egg and cow's milk protein.[2,3] Soya allergy prevalence is around 3 per 1,000 adults and in children marginally higher, however, 70% outgrow the allergy by the age of 10.[1,1]

Anyone with allergies should be under the supervision of a medical team and personalised dietetic advice should be sought from a registered paediatric dietitian.

[1] https://www.food.gov.uk/business-guidance/allergen-guidance-for-food-businesses#:~:text=The%2014%20allergens%20are%3A%20celery,of%20more%20than%20ten%20parts

[2] Messina M and Venter C. Recent surveys on food allergy prevalence. Nutr Today 2020;55:22

[3] Grimshaw KEC, Bryant T, Oliver EM et al. Incidence and risk factors for food hypersensitivity in UK infants: results from a birth cohort study. Clin Transl Allergy 2016; 6:1. DOI: 10.1186/s13601-016-0089-8

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ISOFLAVONES

WHAT ARE SOYA ISOFLAVONES?

Isoflavones are naturally found in many plants but soya beans and foods made from soya beans are uniquely rich sources. Other beans and legumes have very low levels. Soya food and drink provide on average 3-4mg of isoflavones per 1g soya protein.[1,2] The exception being soya isolates and concentrates because most isoflavone content is removed during the production process.

Soya isoflavone consumption – West vs East: In Japan, the average isoflavone intake is approximately 40 mg/d compared to Europe and US at less than <3mg/d.

Soya isoflavones have a chemical structure that has similarities, but is not identical, to the human hormone oestrogen and for this reason, it is sometimes classified as a phytoestrogen or plant oestrogen. Small differences in chemical structure can result in huge differences in physiological effects. A good illustration of this point is the differing effects of dietary cholesterol and phytosterols; phytosterols, which are almost identical in chemical structure to cholesterol, lower blood cholesterol levels, whilst dietary cholesterol increases blood cholesterol levels.

The extensive research has demonstrated that isoflavones act differently to oestrogen in the human body – here comes the technical bit:

- Unlike human oestrogen which binds with equal affinity to the two oestrogen receptors (alpha and beta) found in the human body, isoflavones preferentially bind to oestrogen receptors beta rather than alpha. Because of this, they are now more correctly classified as Selective Oestrogen Receptor Modulators (SERMs).
    - The two oestrogen receptors (alpha and beta) have different tissue distributions and, when activated, can produce different effects in the body.
- Sometimes, isoflavones can produce a weak oestrogen-like effect in the body without increasing or altering human oestrogen levels. They do this by interacting directly with oestrogen receptors found on organs and tissues around the body. As isoflavones are different compounds to oestrogen, they do not affect oestrogen levels.
- Sometimes, they produce effects in the body that are opposite to those of oestrogen.
- In many cases, they do not have any effect at all in tissues that are affected by human oestrogen.
- Isoflavones have been shown to possess other biological effects unrelated to oestrogen e.g., as antioxidants.

How can soya isoflavones both not interfere with hormones yet also cause positive changes for menopausal women?

Isoflavones are a different compounds to oestrogen, however their ability to directly bind to oestrogen receptors in the body, means they can produce a weak oestrogen-like effect without altering oestrogen levels in the body. In the case of the menopause, the exact mechanism of how isoflavones help to alleviate hot flushes is not fully understood. Hot flushes and other vasomotor symptoms are related to the changing levels of oestrogen in the body. In these circumstances, it is speculated, that the effect results from the ability of isoflavones to attach themselves directly to oestrogen receptors without altering oestrogen levels.

[1] Messina M, Blanco Mejia S, Cassidy A et al. Neither soyfoods nor isoflavones warrant classification as endocrine disruptors: a technical review of the observational and clinical data. Crit Rev Food Sci Nutr 2021;1-57. doi: 10.1080/10408398.2021.1895054. Online ahead of print.

[2] Messina M, Nagata C and Wu AH. Estimated Asian adult soy protein and isoflavone intakes. Nutr Cancer. 2006;55(1):1-12. doi: 10.1207/s15327914nc5501_1

MyNutriWeb Report

NEW STUDY

Soya is not only safe but beneficial to health

SOYA IS NOT ONLY SAFE BUT BENEFICIAL TO HEALTH – New Study[1]

Published on the 28th of March 2021: the most comprehensive review of the scientific literature on human data investigating the safety of soya and isoflavones in adults and children. The review was undertaken by ten leading experts from around the globe who reviewed over 400 publications (clinical and observational studies, meta-analysis and reviews).

The review confirms that soya food and drink consumption as part of a healthy balanced diet, is safe.

The totality of the evidence indicates that neither soya nor soya isoflavones negatively impacted on women's or men's health. Outcomes assessed included breast cancer, hormone levels, and male feminisation.

Concerns about isoflavones are based primarily on the results of animal studies.

The authors' conclusion:

'There is little evidence to suggest that isoflavones, when consumed at levels not exceeding Asian intake of 100 mg/d [which equates to >850ml soya drink or 250g tofu], exert untoward effects in adults. This evidence includes a lack of significant effect of isoflavones on reproductive hormone levels in men and women, a possible modest effect on menstrual cycle length, and a lack of effect on thyroid function and on markers of breast cancer risk.'

'The conclusion of this review of the observational and clinical studies covering a broad range of health outcomes likely to be affected by endocrine active substances is that neither soyfoods nor isoflavones warrant classification as endocrine disruptors. Future research exploring the biological effects of soy its constituent isoflavones should be encouraged.'

More details from this extensive review

Mark Messina and his colleagues' hot off the press publication is indeed the most comprehensive review of the scientific evidence for the safety of soya food and isoflavone consumption on human health.

Much of the safety concern around isoflavones, including endocrine disruption, stems from animal studies (rodents and mice predominantly), exposed to high doses of isoflavones. It is now well accepted that isoflavones differ from human oestrogen and their metabolism in humans differs significantly from rodents. Therefore, findings from animal studies are poor indicators of human effect.

Ten global expert scientists focused on all published studies undertaken in human subjects to draw out their conclusions. They reviewed over 417 reports of human studies:

- 229 observational studies
- 157 clinical studies
- 32 systematic reviews and meta-analysis

[1] Messina M, Blanco Mejia S, Cassidy A et al. Neither soyfoods nor isoflavones warrant classification as endocrine disruptors: a technical review of the observational and clinical data. Crit Rev Food Sci Nutr 2021;1-57. doi: 10.1080/10408398.2021.1895054. Online ahead of print

They investigated the impact of soya foods or isoflavone consumption through all life stages (from in utero right through to adulthood) on over 13 health outcomes, including:

- Thyroid function
- Male hormone levels and feminisation
- Male and female fertility
- Female health
    - Reproductive hormone levels and menstrual cycle
    - Breast cancer: prevention and consumption in breast cancer survivors and risk of recurrence
    - Endometrium: structure, inflammation and cancer
    - Uterine fibrosis
- Children's health
    - Onset of puberty
    - Hormone levels in girls and boys
- Foetal effects from maternal soya/isoflavones intake

After this extensive review of human studies, the evidence does not support classifying isoflavones as endocrine* disruptors. The overall evidence indicates that soya foods and/or drinks can be included as part of a healthy balanced diet and lifestyle.

*The human endocrine system is central to the production and regulation of hormones and therefore influences almost every cell, organ and process in the body. It impacts on how we metabolise foods, growth and development, emotional development and mood, fertility and sexual function, sleep and blood pressure.

Overall conclusions[1]

- ***Thyroid function***, especially in individuals with healthy thyroid and good iodine intake can incorporate soya foods and drinks.
- Those ***diagnosed with a thyroid disfunction*** (hypothyroidism or hyperthyroidism) and taking levothyroxine medication – can still take soya foods, but it's recommended they consume soya 30-60 mins either side of their medication as it has been identified, alongside other herbs, medicines and supplements to interfere with its absorption.
- ***Men*** can breathe a sigh of relief! Consuming soya foods will not adversely affect ***testosterone or oestrogen levels***, nor will it negatively impact on your ***fertility*** (sperm or semen parameters). This included studies where men consumed very high doses of isoflavones – in excess of 300mg daily which equates to 2.6L of soya drink or 2kg of soya alternative to yogurt or 450g of soya mince. To put it in perspective, traditional Japanese diets contain up to 50mg isoflavone per day.

[1] Messina M, Blanco Mejia S, Cassidy A et al. Neither soyfoods nor isoflavones warrant classification as endocrine disruptors: a technical review of the observational and clinical data. Crit Rev Food Sci Nutr 2021;1-57. doi: 10.1080/10408398.2021.1895054. Online ahead of print

- With regard to ***gynecomastia*** (man boobs), this concern has arisen from a case study where an individual was consuming in excess of 3L soya drink daily. Two human intervention studies have been carried out and found no effect on breast tissue in men consuming up to 100mg isoflavones daily – equates to 850ml soya drink or 690g soya altern. to yogurt or 240g (a whole pack) of tofu or 150g soya mince.
- Women who are concerned about ***breast cancer*** risk, or who have suffered from breast cancer and wish to reduce their risk of recurrence, can be reassured that consuming a serving of soya foods or drinks as part of their healthy balanced diet is safe. Extensive human evidence has been thoroughly investigated by cancer specialised groups around the world. They have all concluded that soya foods and drinks as part of a balanced diet do not place women at higher risk. Large population studies have shown no correlation between soya food and drink consumption and breast cancer risk or recurrence and intervention studies have demonstrated no increase in breast tissue density or breast cell proliferation (markers of breast cancer). Cancer specialised organisations have agreed that findings from animal studies investigating the impact of isoflavones cannot be extrapolated to humans.
    - European Food and Safety Association 2015
    - Permanent Senate Commission on Food Safety of the German Research Foundation (SKLM) 2018
    - American Cancer Society 2012
    - American Institute for Cancer Research Fund International 2021
    - World Cancer Research Fund International 2014 and 2018
    - Canadian Cancer Society (Eating Well After Breast Cancer) 2021

Although more evidence is needed to provide specific intake advice, soya foods and drinks are safe to consume as part of a healthy balanced diet without increased risk of breast cancer occurrence or reoccurrence.

Consumption of one to two servings of soya foods from childhood through to adulthood has been associated with a lower risk of developing breast cancer. This is speculative research work that does need confirming.

Although ***menstrual cycle length*** seems to be marginally increased in soya consumers, ovulation and fertility is not affected.

Limited insight could be gained about possible impacts of in utero isoflavone exposure, but the existing data is reassuring.

Adverse effects of isoflavone intake were not identified in *children*, but limited research has been conducted.

MyNutriWeb Report

SOYA & HEALTH

- Men's health
- Muscle building
- The menopause
- Breast cancer
- Children's health

SOYA & MEN'S HEALTH

Soya isoflavones and their influence on hormone levels in men

A meta-analysis published this year that included 41 human studies and over 1,750 men showed no effect on testosterone or oestrogen levels.[1]

MUSCLE BUILDING

Are plant proteins, which tend to be lower in leucine, as effective for muscle protein synthesis compared to animal proteins?

Recent evidence confirms that when it comes to protein, the most important consideration for muscle building is to consume the right quantity and ideally evenly distribute it throughout the day in conjunction with a regular weight resistance exercise programme.[2]

New evidence reports that over the long-term, there is no difference between consuming soya or animal proteins for building muscle size or strength amongst those performing weight resistance exercises.[3,4,5] Thus, there is no need to consume more plant proteins than animal proteins to gain the same muscle effect. As long as one is consuming adequate energy and protein and the overall diet is balanced, there will be no difference in muscle gains for those wishing to follow a vegan, vegetarian or meat containing diet.

How much and how frequently should protein be consumed to optimise muscle mass?

Based on the latest research investigating the long-term impact on muscle size and strength, there is no need to consume more plant proteins than animal proteins to gain the same muscle effect.[1,1,1] As long as one is consuming adequate energy and the overall diet is balanced, there will be no difference in muscle gains for those wishing to follow a vegan, vegetarian or meat containing diet.

For those undertaking regular and intense weight bearing activity, it is recommended that higher protein intakes are needed. Recommendations are to consume 1.4-2g per kg body weight per day, which is double the recommended daily intake for an average consumer.[6]

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[1] Reed KE, Camargo J, Hamilton-Reeves J et al. Neither soy nor isoflavone intake affects male reproductive hormones: An expanded and updated meta-analysis of clinical studies. Reprod Toxicol 2021 Mar;100:60-67. doi: 10.1016/j.reprotox.2020.12.019

[2] Kerksick CM, Arent S, Schoenfeld BJ et al. International society of sports nutrition position stand: nutrient timing. J Int Soc Sports Nutr 2017;14: 33. doi: 10.1186/s12970-017-0189-4

[3] Li C, Meng H, Wu S et al. Daily Supplementation With Whey, Soy, or Whey-Soy Blended Protein for 6 Months Maintained Lean Muscle Mass and Physical Performance in Older Adults With Low Lean Mass. J Acad Nutr Diet 2021 Feb 18;S2212-2672(21)00006-X. doi: 10.1016/j.jand.2021.01.006

[4] Hevia-Larrain V, Gualano B, Longobardi I et al. High-Protein Plant-Based Diet Versus a Protein-Matched Omnivorous Diet to Support Resistance Training Adaptations: A Comparison Between Habitual Vegans and Omnivores. Sports Med 2021 Feb 18. doi: 10.1007/s40279-021-01434-9

[5] Messina M, Lynch H, Dickinson JM et al. No difference between the effects of supplementing with soy protein versus animal protein on gains in muscle mass and strength in response to resistance exercise. Int J Sport Nutr Exerc Metab. 2018;28(6):674-685. doi: 10.1123/ijsnem.2018-0071

[6] Jäger R, Kerksick CM, Campbell BI et al. International Society of Sports Nutrition Position Stand: protein and exercise. J Int Soc Sports Nutr 2017;14:20. doi: 10.1186/s12970-017-0177-8

Additionally, it is important for older adults' muscle quality to participate in regular weight resistance exercises and increase their protein intake to 1-1.2g per kg body weight per day.[1]

For most adults taking light to moderate activity e.g., less than an hour three times a week, then protein intakes of 0.8g per kg per day are more than sufficient.

- ✓ Older adults should participate in regular weight resistance training and consume 1-1.2g protein per kg body weight
- ✓ Athletes or those undertaking intensive weight resistance exercises on a regular basis and who are of a healthy body weight, should consider upping their protein intake to at 1.4-2g per kg body weight per day
- ✓ Both soya protein and animal proteins will provide the similar benefits
- ✓ Important to spread the protein intake evenly throughout the days' meals and snacks

[1] Bauer j, Biolo G, Cederholm T. Evidence-based recommendations for optimal dietary protein intake in older people: a position paper from the PROT-AGE Study Group. J Am Med Dir Assoc 2013 Aug;14(8):542-59. doi: 10.1016/j.jamda.2013.05.021

MyNutriWeb Report

MENOPAUSE

THE MENOPAUSE

Why soya is so often associated with the menopause

During the menopause, women's heart and bone health is compromised and many women experience hot flushes, which vary in frequency and severity. These symptoms have been associated with the drop in oestrogen levels.[1]

Soya's nutritional profile is beneficial for heart health[2] and isoflavones are associated with a beneficial effect on hot flushes.[3]

Heart health

Soya and prioritising heart health for menopausal women: the exact mechanism of why heart health is compromised in menopausal women is not fully understood. Inclusion of soya foods and drinks as part of a healthy balanced diet have been associated with improved heart health outcomes and therefore should be encouraged:

- A reduction in oestrogen levels during the menopause is thought to play a role as oestrogen helps maintain the flexibility of heart vessels (arteries) to maintain blood flow. It is speculated that isoflavones' ability to directly bind to oestrogen receptors in cells around the body, can help produce an 'oestrogen-like' effect without affecting oestrogen levels in the body.
- During the menopause, blood levels of low-density lipoprotein (LDL) cholesterol increase. High blood levels of LDL cholesterol are a well-established key risk factor for heart disease. Soya foods and drinks as part of healthy diet and lifestyle, have been shown to be beneficial:
    - In the main, they are naturally low in saturated fat and can provide heart healthy unsaturated fats. When they are used in place of animal foods, they can help lower saturated fat intakes which as part of a heart healthy diet and lifestyle can help maintain normal blood cholesterol.
    - Additionally, soya protein itself has been shown to modestly lower blood cholesterol.

Is soya a viable solution for hot flushes?

Hot flushes affect 80-85% of western peri-menopausal and menopausal women. The frequency, severity and duration of hot flushes varies significantly among individuals with severe hot flushes disrupting quality of life. Although the exact cause remains unknown, it is thought to be related to the fluctuating and changing levels of oestrogen in the body.[4]

The exact mechanism of how isoflavones help to alleviate hot flushes is not fully understood. It is speculated, that isoflavones attach themselves to oestrogen receptors in the body and exert a

[1] Monteleone P, Mascagni G, Giannini A et al. Symptoms of menopause - global prevalence, physiology and implications. Nat Rev Endocrinol 2018;14(4):199-215. doi: 10.1038/nrendo.2017.180
[2] Ramdath DD, Padhi EMT, Sarfaraz S et al. Beyond the Cholesterol-Lowering Effect of Soy Protein: A Review of the Effects of Dietary Soy and Its Constituents on Risk Factors for Cardiovascular Disease. Nutrients 2017; 9(4): 324. DOI: 10.3390/nu9040324
[3] Taku K, Melby MK, Kronenberg F et al. Extracted or synthesized soybean isoflavones reduce menopausal hot flash frequency and severity: systematic review and meta-analysis of randomized controlled trials. Menopause 2012;19(7):776-90. DOI: 10.1097/gme.0b013e3182410159
[4] Monteleone P, Mascagni G, Giannini A et al. Symptoms of menopause - global prevalence, physiology and implications. Nat Rev Endocrinol 2018;14(4):199-215. doi: 10.1038/nrendo.2017.180

weak oestrogen-like effect. As they are a different compound to oestrogen, they do not alter oestrogen levels in the body.[1]

A meta-analysis reviewing a total of 13 studies showed that approximately 50mg isoflavones daily (as 2 servings of soya foods or drinks) could help reduce the severity and frequency of hot flushes.[1]

Consuming 2 servings of soya foods and/or drinks daily as part of a balanced diet and lifestyle is a positive dietary choice for women during the menopause.

How much soya foods and drinks? Any of the following options:

- 100g soya mince OR half a block of tempeh OR 100g young green soya beans (edamame)
    - Split over 2 meals
- 2 large (2x250ml) glasses soya drink: use on cereal, in tea and coffee and in cooking
- 1 large (250ml) glass soya drink plus 200g serve of plain soya alternative to yogurt
- A serving (90g) firm tofu plus a 125g pot of soya alternative to yogurt or small serving (150ml) of soya drink

Best to spread out throughout the day rather than one serving a day. Evidence indicates that isoflavones from soya foods and drinks are absorbed and are cleared from the system relatively quickly, therefore, to maintain adequate isoflavones levels throughout the day, it is recommended to add smaller quantities of soya foods and drinks to your meals or snacks throughout the day.

[1] Taku K, Melby MK, Kronenberg F et al. Extracted or synthesized soybean isoflavones reduce menopausal hot flash frequency and severity: systematic review and meta-analysis of randomized controlled trials. Menopause 2012;19(7):776-90. DOI: 10.1097/gme.0b013e3182410159

MyNutriWeb Report

BREAST CANCER

SOYA & BREAST CANCER

Should people be worried about soya and breast cancer?

Much of the concern stems from the fact that the majority of breast cancers are oestrogen dependent, and the misunderstanding that soya isoflavones are the same as oestrogen, thus there would be a theoretical risk that isoflavones could potentially stimulate the growth of oestrogen dependent tumours.[1] However, isoflavones and human oestrogen are very different compounds that act very differently in the body and especially with regard to influencing breast tissue.

This concern was further fuelled by findings from extreme studies in animals from the 1990s. The animal studies used immune-deficient, ovariectomized mice implanted with oestrogen dependent tumour cells which were fed very high doses of pure genistein (one of the soya isoflavones) which resulted in increased growth of the breast tumour cells. There is now consensus that findings from animal studies investigating soya and soya isoflavones cannot be extrapolated to human outcomes.[1,2,3]

Soya is safe for breast cancer patients – the evidence from human studies

Extensive human data from epidemiological studies in breast cancer patients consistently demonstrate that soya foods and drinks are safe – they do not increase risk of recurrence of tumours and indeed in several studies show both breast cancer mortality and recurrence are reduced in soya consumers.[1,1,4]

Intervention studies concur with the epidemiological evidence. Intervention studies have shown no increases in markers of breast cancer risk such as breast tissue density, breast cell proliferation.

Safety of soya foods and drinks with regard to women's breast cancer risk, breast cancer sufferers and risk of re-occurrence is supported by leading global cancer organisations: the American Institute of Cancer Research (AICR),[1] American Cancer Society (ACS),[1] the World Cancer Research Fund (WCRF)[1] and WCRF continuous update programme[1] and European Food Safety Authority.[1]

[1] Messina M, Blanco Mejia S, Cassidy A et al. Neither soyfoods nor isoflavones warrant classification as endocrine disruptors: a technical review of the observational and clinical data. Crit Rev Food Sci Nutr 2021;1-57. doi: 10.1080/10408398.2021.1895054. Online ahead of print

[2] https://www.aicr.org/resources/blog/soy-and-cancer-myths-and-misconceptions/

[3] Magee PJ, Rowland I. Soy products in the management of breast cancer. Curr Opin Clin Nutr Metab Care 2012;15:586-591

[4] https://www.wcrf.org/dietandcancer/breast-cancer-survivors

Does soya consumption reduce breast cancer risk in the general population?

Most epidemiological studies show that soya consumption does not increase breast cancer risk with some studies indicating a modest (10-20%) reduction in risk.[1,1,1] There is, however, some intriguing evidence that the timing of soya consumption may be an important factor affecting risk.

Large population studies have investigated the impact of soya consumption at different stages of life on breast cancer risk. The studies compared the impact of consuming soya during adolescence only versus in adulthood only versus consumption starting in adolescence and continuing through adulthood.[2]

- The evidence indicates that starting consumption during adolescence and maintaining intake during adulthood has a significantly more marked effect in reducing risk of breast cancer

Soya is safe for women at high risk of or with breast cancer

The human evidence from both population and intervention studies is conclusive that consumption of soya isoflavones do not pose any risk to women with breast cancer or those at high risk.[3,4,5]

Studies have investigated this in Asian and Western populations. A meta-analysis of 11,000 Asian breast cancer patients in China and the US showed a 25% reduction in recurrence and reductions in mortality of 15% in the patients that consumed the most soya compared with those consuming the least.[6] This is reassuring data that it is safe to consume soya foods.

Additionally, this study demonstrated that soya consumption does not interfere with treatment of breast cancer e.g., tamoxifen. These studies are epidemiological which means they can only be used to show association rather than cause.

Intervention studies concur with the epidemiological evidence.[1,1] Intervention studies have investigated the impact of soya on breast tissue density, breast cell proliferation and other breast cancer markers. Increased breast tissue density and increased breast cell proliferation is associated with higher risk of breast cancer. These intervention studies found no effect from soya isoflavone consumption even in one study where women consumed supplements containing isoflavone quantities equivalent to 12 servings of soya foods or drinks in one day.

There is very good evidence that soya consumption as part of a balanced diet is perfectly safe for breast cancer survivors and those at high risk.

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[1] Wei Y, Lv J, Guo Y et al. Soy intake and breast cancer risk: a prospective study of 300,000 Chinese women and a dose–response meta-analysis. Eur J Epidemiol 2020; 35(6): 567–578. doi: 10.1007/s10654-019-00585-4

[2] Messina M and Hilakivi -Clarke L. Early intake appears to be the key to the proposed protective effects of soy intake against breast cancer. Nutr Cancer 2009;61(6):792-8

[3] Messina M, Blanco Mejia S, Cassidy A et al. Neither soyfoods nor isoflavones warrant classification as endocrine disruptors: a technical review of the observational and clinical data. Crit Rev Food Sci Nutr 2021;1-57. doi: 10.1080/10408398.2021.1895054. Online ahead of print

[4] https://www.wcrf.org/dietandcancer/breast-cancer-survivors

[5] Magee PJ, Rowland I. Soy products in the management of breast cancer. Curr Opin Clin Nutr Metab Care 2012;15:586-591

[6] Chi F, Wu R, Zeng Y-C et al. Post-diagnois soy food intake and breast cancer survival: a meta-analysis of cohort studies Asian Pac J Cancer Prev 2013;14(4):2407-12. doi: 10.7314/apjcp.2013.14.4.2407

MyNutriWeb Report

CHILDREN

CHILDREN & SOYA

When can children have soya products?

UK guidelines for children. As long as it's not before 6 months, children can incorporate soya foods and drinks as part of their healthy balanced diet.

Soya foods and drinks are mentioned within all UK dietary guidelines for children including the NHS, UK government, Caroline Walker Trust and The Food First Nutrition Trust. [1,2,3,4,5]

- Fortified unsweetened soya drinks and other plant-based drinks are recommended from the age of 1 year as a main drink for healthy children following a mixed balanced diet. Soya is often preferred due to its superior protein quality and quantity.
- Fortified soya alternatives to yogurts are also an option within the dairy and alternatives group
- Soya foods such as tofu, TVP, soya mince and soya beans are part of the protein food group recommendations.

Soya and boys

There is a lot of misconception and unfounded concerns about giving boys soya foods and drinks. It is important that we reassure parents that soya foods and drinks are safe to incorporate into boys' balanced diets from 6 months and they are recommended within paediatric dietary guidelines as part of a mixed healthy diet.

We can help alleviate the concerns by highlighting that negative findings such as feminisation of boys and interference with hormones, stem from animal studies and cannot be extrapolated to humans.[6]

Often, it's that personal reassurance people need, seeing or hearing of other children that do consume soya foods and/or drinks regularly and are healthy.

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[1] https://www.nhs.uk/conditions/baby/weaning-and-feeding/what-to-feed-young-children/

[2] https://cwt.org.uk/wp-content/uploads/2015/02/CHEW-1-4YearsPracticalGuide3rd-Edition.pdf

[3] https://cwt.org.uk/wp-content/uploads/2014/07/Under5s.pdf

[4] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/658870/Early_years_menus_part_1_guidance.pdf

[5] https://static1.squarespace.com/static/59f75004f09ca48694070f3b/t/5a926be4ec212d9451c595ce/1519545331398/Good_food_choices_and_portion_sizes_Jan2018.pdf

[6] Messina M, Blanco Mejia S, Cassidy A et al. Neither soyfoods nor isoflavones warrant classification as endocrine disruptors: a technical review of the observational and clinical data. Crit Rev Food Sci Nutr 2021;1-57. doi: 10.1080/10408398.2021.1895054. Online ahead of print

MyNutriWeb Report

ENVIRONMENTAL IMPACT

SOYA & ENVIRONMENTAL SUSTAINABILITY

Why is a move towards more plant-based diets so important from a sustainability and planetary health perspective?

This is a good question. When we are discussing sustainability, we need to take a holistic view and bring health, nutrition, and environmental factors together.

Our food system and our food choices have the biggest impact on our planet.[1,2,3]

- The biggest contributor to greenhouse gas emissions (GHGe). A recent publications has established that our food system globally is responsible for 34% of all human generated GHGe.
- The single biggest driver of biodiversity loss with agriculture alone responsible for 68% of species extinction.
- Conversion of protein from feed crops to animal-based protein for human consumption is inherently resource inefficient and drives the negative impacts on the environment: e.g., GHGe and biodiversity loss.
- Humans use about half the available habitable land globally for agriculture. 77% of the use is for rearing livestock: grazing land or using land for animal feed production. Despite this dominant land allocation, meat and dairy only provide 17% of global calorific and 33% protein supply.
- A third of all food produced is wasted. This is a significant burden to the environment contributing to 8-10% of total GHGe, climate change, water and land waste and other environmental factors.

Therefore, our current food system based on animal agriculture is incredibly resource intensive and drives many sustainability metrics including climate change and GHGe, biodiversity loss, inappropriate use of fossil fuels and excess use of fertilizers.

However, you want to look at or cut the data, the single biggest step that would significantly reduce our environmental impact is for consumers to incorporate more plant-based proteins within their diets.

The big United Nations' Climate Summit (COP 26 meeting) in Glasgow (November) this year will be looking at ways to limit greenhouse gas emissions to 1.5 degrees warming. In order for progress, we need to look at opportunities to deliver health, nutrition, and sustainability throughout our food system. In addition, there is a big UN Food systems summit in September which presents a unique opportunity to look at policies and practices that support sustainable food systems.

Soya's environmental footprint

Plants do have environmental impact but nowhere near the same scale as livestock agriculture. We need to play much more attention on sustainable credentials of different plants.

Not all plant proteins are equal. For example, soya has an advantage because it's a legume, and therefore able to fix nitrogen into the soil. This is important as it reduces the need for nitrogen

[1] Crippa M, Solazzo E, Guiizzardi D et al. Food systems are responsible for a third of global anthropogenic GHG emissions. Nature Food 2021;2:198–209

[2] Benton TG, Bieg C, Harwatt H et al. (2021). Food system impacts on biodiversity loss: three levers for food system transformation in support of nature. Chatham House; London. https://www.chathamhouse.org/2021/02/food-system-impacts-biodiversity-loss

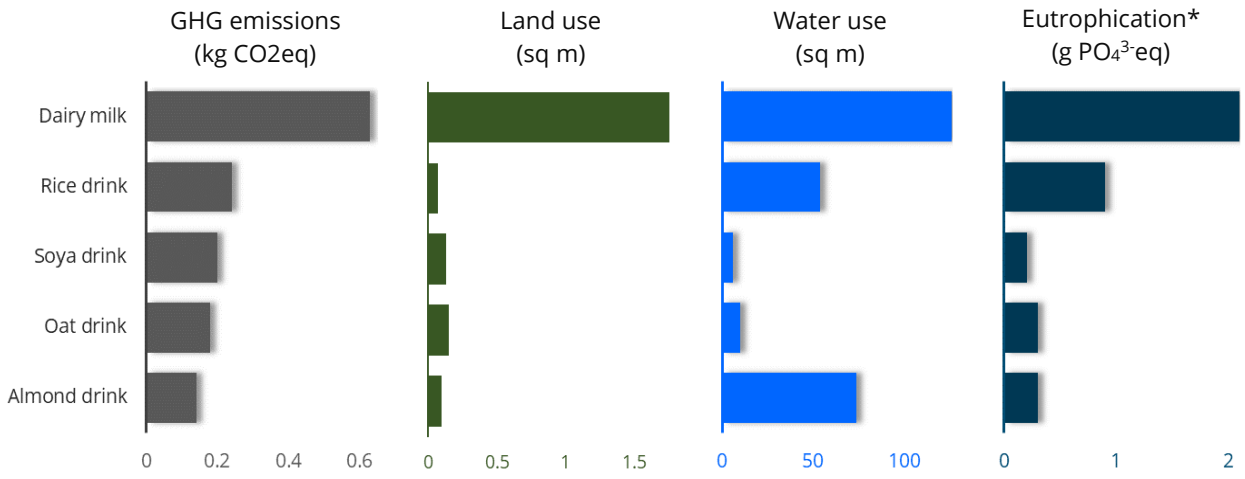
[3] Willett W, Rockström J, Loken B et al. Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. Lancet 2019;393(10170):447-492. doi: 10.1016/S0140-6736(18)31788-4

fertilizers to optimise yields. Nitrogen fertilizers negatively impact on the environment by producing one of the most potent GHG – nitrous oxide, contributing to biodiversity loss and leaking into our lakes, oceans and seas causing damage to marine life and causes dead zones.

Compared to animal proteins, soya production:[1,2]

- Produces significantly lower GHGe
- Uses significantly less land and fertilizers
- Requires less water
- Has a lower impact on biodiversity loss
- One of the best for causing the least damage to our seas and oceans

A comparison of the environmental impact of producing 200ml of a selection of plant-based drinks and dairy milk – a global average



*Eutrophication refers to the gradual increase in the concentration of phosphorus, nitrogen and other nutrients in waterways (lakes, rivers, seas and oceans) which become disruptive to marine ecosystems and produce dead zones. High use of phosphorous and nitrogen fertilisers in farming eventually runs off into our waterways making it one of the major contributors to eutrophication.

It's important to consider all environmental impacts of our food system, beyond GHGe when considering plant protein foods. As mentioned above, biodiversity loss, fertilizer use, impact on our waterways and of course water usage.[1] 70% of fresh water is used for food production and it is becoming more scarce especially in countries which produce most of our foods.[3,4] This is an important point when considering nuts as a plant protein source – careful consideration should be given to the country of origin and level of water stress e.g., production of Californian almonds is exceptionally water inefficient as it uses around 5L of water per almond.

[1] Additional data shared by authors – supplementary to original publication Poore J and Nemecek T. Reducing food's environmental impacts through producers and consumers. Science 2018;360(6392):987-992. doi: 10.1126/science.aaq0216. The graph represents the global average, and does not show the regional differences.
[2] Poore J and Nemecek T. Reducing food's environmental impacts through producers and consumers. Science 2018;360(6392):987-992. doi: 10.1126/science.aaq0216
[3] Willett W, Rockström J, Loken B et al. Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. Lancet 2019;393(10170):447-492. doi: 10.1016/S0140-6736(18)31788-4
[4] Benton TG, Bieg C, Harwatt H et al. (2021). Food system impacts on biodiversity loss: three levers for food system transformation in support of nature. Chatham House; London. https://www.chathamhouse.org/2021/02/food-system-impacts-biodiversity-loss

Does Soya cause destruction of the rainforests in the Amazon?

This is a common misconception.

The majority of soya grown in the Amazon is used for animal feed and not for human consumption. Soya from the Amazon is especially used for pigs and poultry fodder. In fact, over 90% of soya production for human consumption in Europe comes from North America, Europe or Asia.[1,2]

We still need to make sure that soya is grown as sustainably as possible e.g., using organic regenerative forms of soya production.

What does the government need to do to support more plant-based eating?

There are many beans that could be grown in the UK as a protein source in place of livestock farming. Opportunities for growing more legumous crops – from a sustainability perspective trials of several type crops e.g., chickpeas – opportunity for growing ancient type crops.

75 per cent of the world's food is generated from only 12 plants (mainly from maize, wheat and rice) and five animal species. However, there are 250,000 edible plant species that may be better adapted to water stress and climate change and therefore more needs to focus on those.[3]

If consumers were to shift their current consumption to meet Eatwell guide recommendations, we would reduce our carbon footprint and land use by 30% and water use by almost a fifth.[4] However, less than 1% of the UK population is currently achieving the Eatwell guide.[5]

There is a significant disjoint between the recommendations contained in the Eatwell Guide and government procurement standards which tend to be voluntary in nature. National procurement guidelines should reflect the need to encourage more plant-based eating patterns.

In addition, there will be a need for a wide range of financial incentives and disincentives, to influence both production and demand drivers, if more significant changes in behaviours towards more plant-based dietary patterns are to occur

Does soya accreditation for sustainable sourced impact on the price of soya foods and drinks?

It is important to note that over 90% of soya production for human consumption is not grown in deforested areas such as the Amazon, but instead comes from North America, Europe or Asia. The issue is with soya grown for animal fodder.

Accreditation schemes do have a price implication, however, based on quantities of soya produced, the accreditation costs become insignificant, just a few pennies per £100 produced. Sustainability accreditation schemes do guarantee that soya is sourced from areas that do not lead to deforestation.

[1] https://science.sciencemag.org/content/369/6501/246
[2] https://www.wwf.org.uk/updates/appetite-for-destruction
[3] http://www.fao.org/3/y5609e/y5609e02.htm
[4] https://www.carbontrust.com/resources/the-eatwell-guide-a-more-sustainable-diet
[5] Scheelbeek P et al. Health impacts and environmental footprints of diets that meet the Eatwell Guide recommendations: analyses of multiple UK studies. BMJ Open 2020;10(8):e03755). https://bmjopen.bmj.com/content/10/8/e037554

Watch the Roundtable Event

This up-to-date guidance was produced by our expert panellists following the key outcomes of the MyNutriweb roundtable event which took place on the 25th March 2021.

About MyNutriWeb

MyNutriWeb is a trusted nutrition and health learning hub for all professionals. Our ever-growing audience is currently predominantly registered dietitians, nutritionists, academics and students. We also attract doctors, practice nurses and press. We are always growing our reach, focusing this year on health visitors and community pharmacists.

We deliver expert, accessible content that enables professional development and discussion, and provides a collaborative voice for our sector. Our webinars and associated content provide both science and complementary information to apply to practice.

Our aim is for our community who act as change agents for better nutrition, to help others eat well, both for the benefit of people's health and the planet.

Contact MyNutriWeb

hello@mynutriweb.com • +44 (0) 20 8455 2126 • +44 (0)7980 802 126

The Brentano Suite, First Floor, Lyttelton House, 2 Lyttelton Road, London N2 0EF

@MyNutriWeb

MyNutriWeb
Expert nutrition and health learning