

# SOY

PHYTOESTROFRIENDS MAGAZINE

*CAN PHYTOESTROGENS  
BE YOUR FRIEND?*

ISSUE 23

Everything you need on edible EDCs: soy edition

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## MEET THE AUTHORS



### KENNEDY MEYER

Kennedy has been pescatarian for about 5 years, resulting in an overall increase of daily soy consumption, sparking her curiosity about this magic bean. She is intrigued by the properties of dietary phytoestrogens as while they are natural compounds found in many plants, they also have endocrine disrupting abilities similar to those of many industrially produced chemicals. Her favorite soy-based dish is the spicy Asian tofu sticks from LA's Erewhon Market.



### RACHEL SMITH

As a kid growing up, Rachel hated eating tofu. She claimed it was bland and avoided it at all costs. As her taste buds matured, she was able to enjoy the flexibility of tofu in the many delicious dishes her mom made that contained it. Since then, she has become accustomed to consuming a variety of soy food products (even trying natto for the first time!) and has taken an interest in the controversies surrounding soy and phytoestrogens. Her favorite soy-based food is the fried tofu sheets that are commonly eaten with hot pot.



### GRACE DANON

As incredibly picky eater in her youth, Grace took to tofu at a surprisingly young age and was essentially sustained on cubes of unseasoned tofu. Thankfully, she grew out of her pickiness and has since enjoyed a wide range of soy products in more adventurous preparations. The prospect of hormone-like chemicals in food fascinates her, and she's excited to see what new revelations and uses get discovered. Her favorite soy-based dish is [remarkably un-soy-like] tempeh bacon.



### MARY TRAN

Growing up in a Vietnamese household, soy products, especially tofu, for almost every meal was the norm for Mary. Whether fried, baked, grilled, or scrambled, she would unfailingly have some version of soy on her plate. While she has never been a big fan of soy, Mary has grown to enjoy and love certain soy dishes. With soy being such a big part of her nutrition profile all her life, Mary is extremely interested in looking at the benefits and risks associated with soy and phytoestrogen consumption. Her favorite soy dish is the pandan tofu dessert pudding with coconut sauce.



### HUSSAIN NAIB

Hussain was first exposed to soy and soy products when he discovered he was lactose intolerant at the age of 6- soy milk was his go to for the longest time to avoid a long bus ride of discomfort after his morning bowl of cereal. Now, Hussain is an avid eater of tofu, interested in how it fits into different cuisines around the world. He is also extremely interested in how soy's perception and acceptance in Western culture affects its place within cuisine. His favorite soy food is the Chinese dish Mapo Tofu.



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<https://search.creativecommons.org/photos/a96bb85e-2666-4618-8b93-eac8091779f6>





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# LETTER FROM THE EDITORS

The soybean. Ancient and versatile, the edible forms of this humble legume range from highly processed soy lecithin to simply steamed edamame. Essential to Asian cuisines, a key ingredient in vegetarian substitutes, and a popular feed for livestock, it is difficult to imagine a world without **soy** [1].

Like most widely consumed foods, soy's health effects have been deeply scrutinized. Unlike most foods, its health effects include hormone-disrupting properties which stem from phytoestrogens in the soybean [2]. **Phytoestrogens** are naturally-occurring **endocrine-disrupting chemicals (EDCs)** found in plant foods [2]. When consumed, these chemicals breakdown into hormone-like forms, altering normal endocrine function [2]. Soy is the most common and most potent source of phytoestrogens in modern diets [2].

These effects have been widely misrepresented as dramatically feminizing, exploiting conservative gender ideals to demonize soy itself. Consumers are still racked with confusion. Is soy good for you? Is it dangerous?

Throughout this magazine, you'll find that studies across the research spectrum have found...

variable outcomes  
conflicting results  
and ultimately, inconclusiveness.

Sorry to disappoint.

But whether you enjoy stir-fry or store-bought cereal, then you have a stake in soy. To get you up to date, we'll use social and scientific lenses to assess how history, culture, microbiology, nutrition, and gender impact this complex little bean. Read on, there's a lot to learn.

Soy-ncerely,

**GRACE DANON, HUSSAIN NAIB, KENNEDY MEYER,  
MARY TRAN, & RACHEL SMITH**



1. Doc\_Brown [Username]. (2007). Cocoa Puffs, Trix, Cinnamon Toast Crunch, Reese's Puffs, Corn Flakes and Rice Krispies [Photograph]. Flickr. <https://search.creativecommons.org/photos/21c2099e-a765-4b18-b96e-3132fd58f3db>
2. McIntosh, J. (2007). Tempeh Club @ M Café [Photograph]. Flickr. <https://search.creativecommons.org/photos/288334d-2919-4e28-a90f-fcc0f176f18fe>
3. Oliveira, G., & Hecht, S. (2016). Sacred groves, sacrifice zones and soy production: Globalization, intensification and neo-nature in South America. *The Journal of Peasant Studies*, 43(2), 251–285. <https://doi.org/10.1080/03066150.2016.1146705>
4. Rietjens, I. M. C. M., Louisse, J., & Beekmann, K. (2017). The potential health effects of dietary phytoestrogens. *British Journal of Pharmacology*, 174(11), 1263–1280. <https://doi.org/10.1111/bph.13622>
5. Worldoflard [Username]. (2012). soy sauce [119/366] [Photograph]. Flickr. <https://search.creativecommons.org/photos/488ca5c9-3cdd-4fd8-aab2-25ba2704ae3>

# A Tale of Tofu

By Hussain Naib



**When** Brenda Kwan woke up on this particular Tuesday morning, she was completely and utterly drenched. Rising up slowly, she took a long look at herself in the mirror opposite her bed- her hair was frizzy, her face and neck felt like a furnace, and her face resembled the brightest version of a setting California sun.

"Ugh, not today," she muttered while holding her hand to her forehead. She checked the clock, which read 8:30 AM- Joey was late for school.

"Crap."

Brenda, suddenly oblivious to her physical state, rushed to get dressed as fast as she could. She threw on yesterday's rumpled green top, a gray sweater, and a pair of high-waisted jeans, which, to her great exasperation, felt a little too snug all of a sudden. She rushed downstairs, but the smell of her mother's cooking instantly eased her anxiety. *Mapo Tofu, she thought. Maybe today won't be so bad after all.*

As soon as she walked into the kitchen, Brenda's mother, Meilin, scolded her for being so late. "Joey is going to be late! What took you so lo-" she paused, looking at Brenda's clearly red, glistening forehead with concern. "Are you sick? Oh no Brend-"

"I'm fine mom, it's just a cold. Save me some tofu for when I get back and I'll be good as new." Tofu was always Brenda's favorite, ever since she was little. It had been a staple in their household since she immigrated with her parents from Hong Kong almost 50 years ago, when she was only 4 years old. Now she takes infinite joy in watching her own son eat it the same exact way, just like she did.

"Okay JoJo, let's go. Hurry!" Joey, Brenda's 14-year old son, looked up at her from the dining table annoyed, clearly having been finished with his bowl of cereal for quite some time.

"Now you want to go? I'm already late mom, can't I just take the day off?"

Brenda's heart did a tiny somersault- Joey's voice had gotten so much deeper over the Summer, and it still caught her off-guard sometimes.

"Gung Gung thinks I should." Brenda's father, So-Yee, was sitting on the couch in the distance, watching the news. He looked up.

"Eh? Sure, why not? Seventh grade isn't so hard. What's the big deal with one day off?"



"I'm not in seventh grade Gung Gung, I'm in ninth grade.. I just told you this two days ago."

Brenda looked at her mother with concern, who returned the gaze back. Just go, we'll talk about it later. Brenda nodded and ushered Joey, who managed to get in a few last complaints, out of the house and into the car.

After dropping Joey off at school, Brenda brought down her front visor and opened the sliding mirror, daring to check her complexion after the mess she woke up to in the mirror. To her relief, she looked completely back to normal. With a few more seconds of quiet thinking, her expression turned back to nervous and she reached for her cell phone to dial a number.

"Hi, I'd like to make an appointment."



Later, at the doctor's office, Brenda sighed inside of the patient room she had been assigned. 40 minute wait time even after an appointment? Jeez. Finally her physician, Dr. Pruitt, entered the room, greeting her and apologizing for the wait.

"So, what brings you in today? Feeling a little bit under the weather?"

Brenda nodded and explained her symptoms- warm face and neck, lots of sweat, bloating, and red skin- all of which had pretty much subsided within fifteen minutes.

Hesitating, Brenda brought up what she didn't want to believe, but ultimately knew- it was a hot flash. Dr. Pruitt nodded.

"Yes, that's what it sounds like- and you said it's your first one? When was the date of your last menstrual cycle?"

Brenda explained that it was 6 months ago- and now she's currently undergoing the menopausal transition. It was bittersweet for her, as she had always wanted more children- but she knew that window had closed a long time ago anyways. Dr. Pruitt looked slightly surprised.

"Well, hot flashes are completely normal- in fact, it's abnormal to never have them until the transitional period. Tell me, what's your diet looking like? A lot of soy by any chance?"

Now it was Brenda's turn to look surprised. She agreed and explained that soy is an important part of their diet and culture, and they usually ate it many days out of the week. Dr. Pruitt nodded his head- he explained that soy has been shown, perhaps due to its estrogen-like compounds, to possibly counteract menopausal symptoms. Asian women in particular had been associated as being less at risk due to their levels of soy consumption. Brenda sat silently, absorbing this new information.



Driving on her way back from the doctor's office, Brenda continued to think about what Dr. Pruitt had said. Could it be true? Is mom's tofu really what's been helping me this whole time? Puzzled by these thoughts of tofu and its otherworldly capabilities, Brenda pulled into the local high school to pick up Joey, who got in the car almost immediately with a sour face

"What's wrong?" Brenda asked..

"Nothing," Joey said. He clearly didn't want to talk about it, but that had never stopped Brenda before. She

noticed his lunch box, which was still obviously bulging with the infinite amount of food her mom packed for him every day.

"Why didn't you eat your lunch Jojo?" Brenda was getting worried, and Joey knew it was only a matter of time before she got it out of him.

"It's nothing... just some stuff at school. It's been kind of hard fitting in since we got back from break. All the guys ever want to talk about is, well, stuff about girls. And they keep giving me crap for not joining in."

Brenda's mind raced- she had never had to handle this type of thing before. Above everything, she was proud of her boy for not contributing to that type of conversation.

But then again, this was a normal part of growing up for teenage boys wasn't it? And what did it have to do with him not eating his lunch?

"Okay, well, first of all I'm proud of you- you stayed respectful even though I bet your friends probably weren't.

But what does that have to do with your lunch?" Joey looked sheepish and averted his eyes, opting to look out the window at the all-too-familiar landscape of the San Gabriel Valley.

"Uh, it's pretty dumb. Apparently Evan's mom read some study on soy in a magazine last week that gave her the idea that it makes guys.. well.. less manly. Evan brought it up and since then everybody's been cracking jokes about it. I know it's not a big deal and it's probably not even true but.. I don't know. I guess I just didn't feel like eating it today."

Brenda didn't know what to say. A day prior, she would've laughed- the thought of their home cooking affecting them hormonally? Ludicrous. But now, after visiting the doctor, she really wasn't sure what it could do. Either way, she consoled him and offered to take him out for dinner, which cheered him up instantly.

On the inside, Brenda remained conflicted- here she was possibly benefitting from this food group, one that she grew up loving with all her heart, and her beloved son was suffering because of it? Something wasn't right.



When she reached home, she found her mother cleaning the kitchen after the cooking marathon she had run in the morning.

"Where's Dad?" Brenda asked.

"Napping. Thank God. He can't remember anything these days, and he always annoys me with his dumb questions!" Meilin said. Brenda sighed. She and her mother talked about her father's apparent cognitive decline in the last 10 years- it seemed to have come so suddenly and in full force, with neither of them knowing what to do.

After retiring to her room upstairs, Brenda opened up her laptop and researched the effects of soy on menopause. She found a few promising studies but mostly inconclusive results. Feeling unsatisfied, she tried researching the perceptions and impact of soy in males, finding more results but nothing with any biological or medical significance. Last of all, Brenda looked up the effects of soy on memory and cognitive function, and found some studies in older adults indicating certain responses but, again, nothing conclusive.

Brenda finally shut her laptop off, definitely relieved at the lack of much conclusive research, but still somewhat uncertain about how or if her family's tofu-eating was affecting them and their health. She went to the mirror opposite her bed and took a long look at her face, holding her hand to her forehead like before. It was cool to the touch- no physical sign of the symptoms or the mental shift that they day had provided.

## Works Cited

1. Korean-style mapo tofu (Mapadubu: 마파두부) recipe—Maangchi.com. (n.d.). Retrieved December 17, 2020, from <https://www.maangchi.com/recipe/korean-style-mapo-tofu>
2. Go In Or Call In? Here's Some Basic Guidance For Routine Health Care During COVID-19. (n.d.). Retrieved December 17, 2020, from <https://www.wbur.org/commonhealth/2020/06/15/see-doctor-use-telemedicine-coronavirus>
3. San Marino residents to Metro: Here's your \$32 million back, we don't want your road projects – Pasadena Star News. (n.d.). Retrieved December 17, 2020, from <https://www.pasadenastarnews.com/2019/05/15/san-marino-to-metro-heres-your-32-million-back-we-dont-want-your-road-projects/>
4. 20132 San Gabriel Valley Dr, Walnut, CA 91789—4 beds/2 baths. (n.d.). Redfin. Retrieved December 18, 2020, from <https://www.redfin.com/CA/Walnut/20132-San-Gabriel-Valley-Dr-91789/home/8062013>



<https://www.morinu.com>



# TERMS TO KNOW:

## Phytoestrogens

Arising in 1926, this term refers to polyphenol compounds that are from plants "phyto-", and resemble sex hormones "estrogen"

### Flavonoids

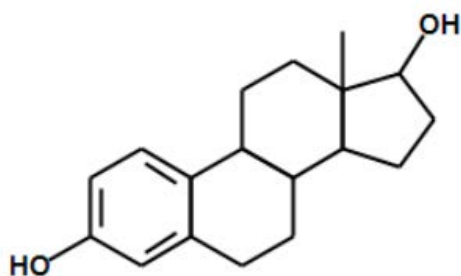
A class of compounds made by plants that are found in fruits, vegetables, tea, or ginger root

### Isoflavones

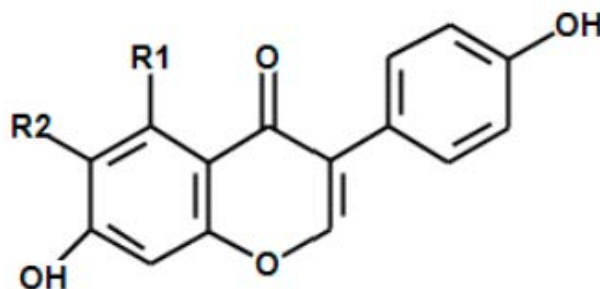
The largest subgroup of flavonoids most talked about for their phytoestrogenic activity

### Daidzin Genistin Glyctin

3 main soy isoflavones, note the suffixes may change & the latter is least estrogenic



**Estrogen**<sup>[2]</sup>



**Daidzin, Genistin, & Glyctin**<sup>[2]</sup>

By Rachel Smith. Source: [1] Kuryłowicz, A., Cąkała-Jakimowicz, M., & Puzianowska-Kuźnicka, M. (2020). Targeting Abdominal Obesity and Its Complications with Dietary Phytoestrogens. *Nutrients*, 12(2), 582.

<https://doi.org/10.3390/nu12020582> Source & Photos: [2] Rizzo, G., & Baroni, L. (2018). Soy, Soy Foods and Their Role in Vegetarian Diets. *Nutrients*, 10(1). <https://doi.org/10.3390/nu10010043>

# SOYSTORY

By Kennedy Meyer

7

Unlike most endocrine disrupting chemicals that have been derived only over the last century, dietary phytoestrogens have been medicinally used by humans for thousands of years [1].

Estrogenic compounds are found in more than 300 plant species but few of these are consumed by animals or humans [2]. While this may come as a surprise to our anthropocentric society, plant phytoestrogens do not exist to serve humans as they play a large role in the larger ecosystem. They are chemicals that may act as fungicides, regulate plant hormones, and protect plants from UV radiation [1]. The term ‘phytoestrogen’ appeared in 1926 to categorize these compounds. More recently, researchers have looked beyond traditional remedies to investigate how they could have a place in modern health care [1].

The distinction between industrially originated estrogenic compounds such as DDT and PCBs and those that are derived from plants is a critical one. PCBs and DDT are synthetic endocrine disrupting chemicals that have been banned for more than 30 years, but they have already contaminated our environment and bodies so deeply that decades of cleanup efforts have not yet been able to erase their threats to our health [8]. Unlike some industrial xenoestrogens which usually bioaccumulate in adipose tissue and remain in the body for many years, dietary phytoestrogens are metabolized and discharged from the body more quickly [1]. During this time though, they can be impactful on body systems due to a variety of factors including, timing of exposure, repeated exposure, and levels of exposure [1].

Furthermore, just because they are “naturally produced,” doesn’t make them automatically harmless or beneficial; popular media has sometimes glorified phytoestrogens to be cure-all solutions, but such theories require more examination [3]. While industrially derived chemicals receive a large amount of investigative attention as human-made compounds, dietary phytoestrogens deserve interdisciplinary analysis as well. Since the 1990s, the field of phytoestrogens has seen an exponential spike in research, and the collection of studies continues to expand.

*~Among the most popular estrogenic plants is the soybean, and in this issue of Phytoestrofriendeds, we embark on an exploration of this “magic bean” to break down the social, medical, cultural, economic, and environmental implications of its estrogenic properties~*

Soybeans are mostly composed of the phytoestrogens, isoflavones, the two major ones being genistein and daidzein. These isoflavones have the ability to bind to estrogen receptors in the body and can cause weak estrogenic or anti-estrogenic activity [4].

Scientists have begun to piece together the picture of phytoestrogens by looking at populations who consume them the most [1]. Asian populations have historically had diets rich in phytoestrogens as soy has been culturally tied to many of their food traditions [1]. Phytoestrogens have developed into a field of research and there are a number of studies looking into positive effects of soy consumption on cholesterol levels, bone health, menopausal symptoms, and reduction in the relative risk of breast cancer, prostate cancer, and endometrial cancer [1]. However, other studies have shown contradictory evidence and suggest that breast cancer patients should avoid soy; one commonly cited study reported that dietary genistein may actually prompt the growth of estrogen-dependent tumors in individuals with low estrogen levels. [3] Other potential risks of soy phytoestrogens are being scrutinized as well. Several sources have discussed the possible dangers of soy-based infant formulas as receiving high levels of isoflavones during fetal development may have long-term health advantages for hormone-dependent diseases [6]

Research by Setchell et al. showed that “infants fed soy-based formula have high concentrations of daidzein and genistein in their plasma, 13,000 to 22,000 times higher than E2 in early life and proportionately higher than normal adult intake of isoflavones” [5]. This finding has elicited concern about the

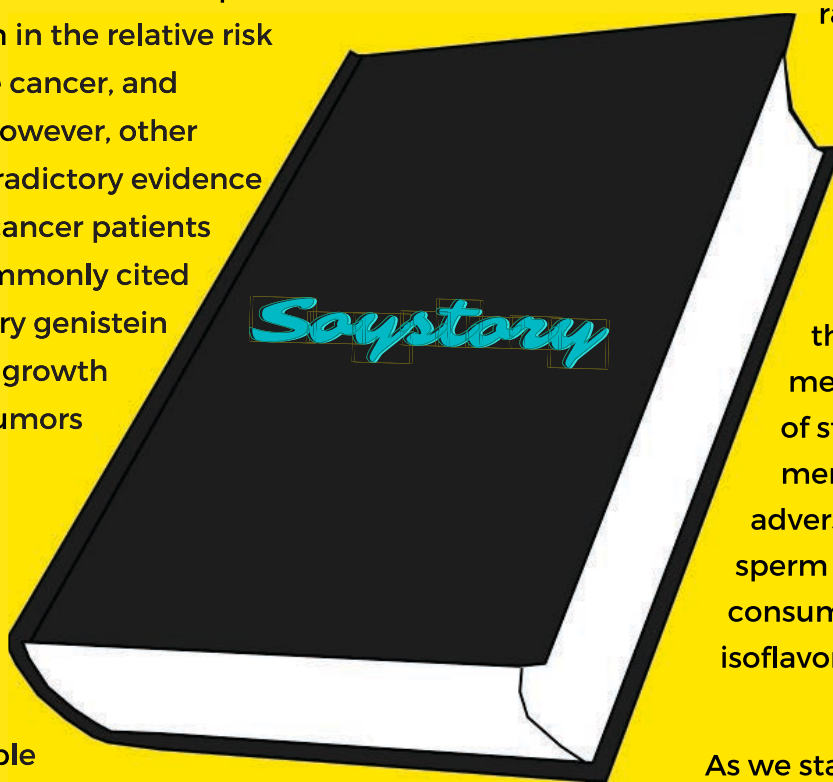
benefits and long term consequences that phytoestrogens may have on maturing and developed neuronal function and the interplay of phytoestrogens with estradiol (E2) throughout perinatal brain development [3]. And lingering effects of soy are not exclusive to females. There has also been much speculation of the impact of soy on the reproductive health of males. These hypotheses have had significant social

ramifications that we will delve into later on.

While such melodramatic claims have circulated among the public through media, recent reviews of studies on adult men showed no adverse effects on sperm quality with the consumption of soy isoflavones [7].

As we start to get a better grasp of the technicalities of

phytoestrogens, additional studies are needed to further weigh the risks of phytoestrogen consumption in individual development. While soybeans and their estrogenic compounds are not new to the world, our understanding of them is still fragmentary, and inquiry will be most thorough coming from a multitude of angles. As soy's role in society and daily life has become more prominent, we are able to better observe the implications across a range of disciplines.





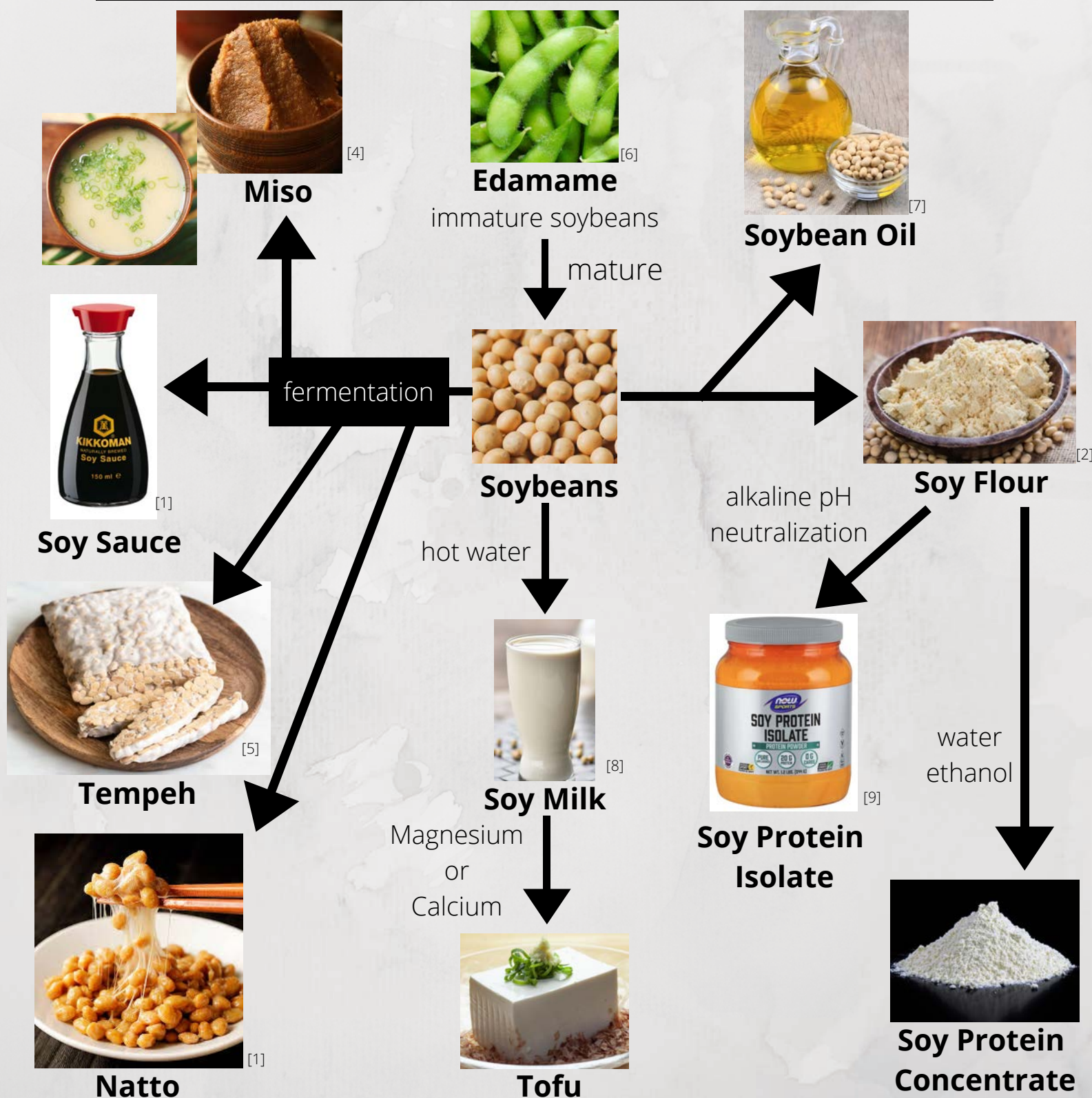
## Works Cited

1. Barrett, J. (1996). Phytoestrogens: Friends or Foes? *Environmental Health Perspectives*, 104(5), 478-482. JSTOR. <https://doi.org/10.2307/3432986>
2. Bennetau-Pelissero, C. (2018). Natural Estrogenic Substances, Origins, and Effects. In J.-M. Mérillon & K. G. Ramawat (Eds.), *Bioactive Molecules in Food* (pp. 1-70). Springer International Publishing. [https://doi.org/10.1007/978-3-319-54528-8\\_10-1](https://doi.org/10.1007/978-3-319-54528-8_10-1)
3. Ososki, A. L., & Kennelly, E. J. (2003). Phytoestrogens: A review of the present state of research. *Phytotherapy Research*, 17(8), 845-869. <https://doi.org/10.1002/ptr.1364> Boston, 677 Huntington Avenue, & Ma 02115 +1495-1000. (2018, August 6).
4. Straight Talk About Soy. The Nutrition Source. <https://www.hsph.harvard.edu/nutritionsource/soy/>
5. Setchell, K. D., Zimmer-Nechemias, L., Cai, J., & Heubi, J. E. (1997). Exposure of infants to phyto-oestrogens from soy-based infant formula. *Lancet* (London, England), 350(9070), 23-27. [https://doi.org/10.1016/S0140-6736\(96\)09480-9](https://doi.org/10.1016/S0140-6736(96)09480-9)
6. Setchell, K. D., Zimmer-Nechemias, L., Cai, J., & Heubi, J. E. (1998). Isoflavone content of infant formulas and the metabolic fate of these phytoestrogens in early life. *The American Journal of Clinical Nutrition*, 68(6 Suppl), 1453S-1461S. <https://doi.org/10.1093/ajcn/68.6.1453S>
7. Kurzer, M. S. (2002). Hormonal effects of soy in premenopausal women and men. *The Journal of Nutrition*, 132(3), 570S-573S. <https://doi.org/10.1093/jn/132.3.570S>
8. PCBs and DDT. (n.d.). Toxic-Free Future. Retrieved December 15, 2020, from <https://toxicfreefuture.org/key-issues/chemicals-of-concern/pcbs-and-ddt/>
9. Lamnee. Vegetable and fruit, illustration wallpaper of hand drawn sketch fresh green soybean or edamame pods isolated on white background [Photograph]. WDRfree. <https://wdrfree.com/stock-vector/download/hand-drawn-of-fresh-green-soybeans-background-272870876>





# SOY FOOD PRODUCTS:



By Rachel Smith. Adapted from: Wang, S., Wang, Y., Pan, M.-H., & Ho, C.-T. (2017). Anti-obesity molecular mechanism of soy isoflavones: Weaving the way to new therapeutic routes. *Food & Function*, 8(11), 3831–3846. <https://doi.org/10.1039/C7FO01094J> [1] 7 Reasons Natto Is Super Healthy For You. *STYLECRAZE*. <https://www.stylecraze.com/articles/health-benefits-of-natto/> [2] Hyslop, G. (2018, April 12). Soya flour offers bakers the protein boost to capitalize on growing trend. *Bakeryandsnacks.Com*. <https://www.bakeryandsnacks.com/Article/2018/04/12/Soya-flour-offers-bakers-the-protein-boost-to-capitalize-on-growing-trend> [3] KIKKOMAN soy sauce online at [Hollandshop24.com](https://www.hollandshop24.com/kikkoman-soy-sauce). (n.d.). KIKKOMAN Soy Sauce Online at [Hollandshop24.Com](https://www.hollandshop24.com). Retrieved December 11, 2020, from <https://www.hollandshop24.com/kikkoman-soy-sauce> [4] Lewin, J. (2018, October 1). The health benefits of miso. *BBC Good Food*. <https://www.bbcgoodfood.com/howto/guide/health-benefits-miso> [5] Losune. (2020, July 2). Tempeh. *Simple Vegan Blog*. <https://simpleveganblog.com/tempeh/> [6] Ogles, C. Z., Guertal, E. A., Weaver, D. B., & Mitchell, C. (2018, December 10). Edamame in the Home Garden. *Alabama Cooperative Extension System*. <https://www.aces.edu/blog/topics/lawn-garden/edamame-in-the-home-garden/> [7] Pillsbury, C. (2018, April 16). Soybean Oil. <https://blog.watson-inc.com/nutri-knowledge/soybean-oil> [8] Soy milk. (n.d.). Retrieved December 11, 2020, from <https://cookidoo.thermomix.com/recipes/recipe/en-US/r364760> [9] Soy Protein Isolate, Unflavored Powder. (2016, January 29). [Text]. *NOW Foods*. <https://www.nowfoods.com/sports-nutrition/soy-protein-isolate-unflavored-powder>

# *Delicious Flavor-Flavones*

## A Nutritional look behind the soy pod

by Rachel Smith

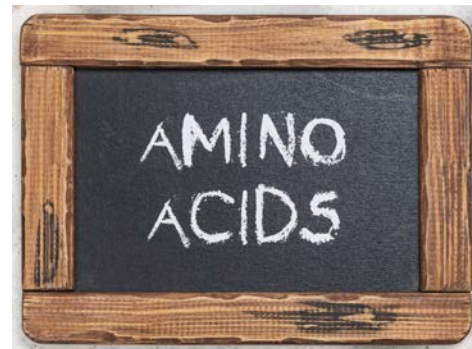
**C**hances are if you are reading this, you have had an experience with soy. Perhaps you were disgusted by it, loved it, eat it regularly, have sworn against it, or even have a preference for which soy foods you consume. Soy could be a regular part of your diet if you have digestion difficulties with milk, if you have removed certain meats from your diet, if you view soy as part of a healthy diet, or if you are a big fan of Asian cuisine.

zinc, and phytochemicals. One of the most notable reasons for the popularity of soy is due to it being one of the few plants that has all the essential amino acids, making it a complete protein with content levels between 36% and 46% [1].

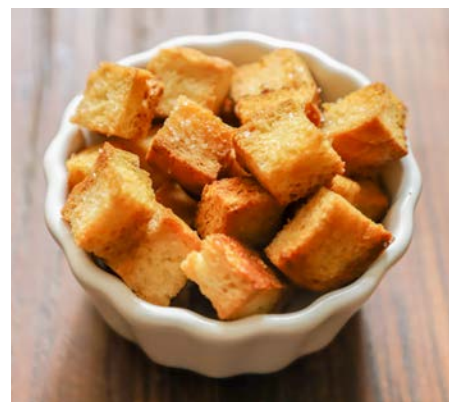


Soy or soya, scientifically known as *Glycine max* (L.), is a plant that has been consumed in Asia for thousands of years [1, 3]. The average macronutrient content of soybeans by weight are 40-41% proteins, 8.1-24% lipids, and 35% carbohydrates. This impressive resume could be why we have seen an increase in soy consumption and new products that utilize soy [2]. The nutritional makeup of soybeans makes them good sources for fiber and polyunsaturated fatty acids (PUFAs) like linoleic acid (omega-6), and alpha-linolenic acid (omega-3). They are also known for being good sources of B vitamins, calcium, iron,

More recently, soy has come under fire in the field of Endocrine Disrupting Chemicals (EDCs) for its isoflavone content: chemical phytoestrogens from the plant that have a similar structure and function to human endogenous estrogens. This means that the phytoestrogens in soy could produce estrogenic activity, anti-estrogenic activity, or no activity depending on the tissue [1]. In addition to soybeans, isoflavones are biosynthesized by other members of the Fabaceae botanical family,



known as legumes, that comprise of red clover, kidney beans, mung bean sprouts, navy beans, and Japanese arrowroot [1]. The three main isoflavones in soy include genistein, daidzein, and to a lesser extent glycitein. Isoflavones are produced by plants for protective reasons in response to environmental stress, oxidative stress, or infections. While there is the possibility of endocrine disruption, there are also possible health benefits to soy which contains "the highest content of isoflavones" as far as dietary sources go [1].





Since soy is high in isoflavones and Asian countries consume the most soy, it follows that Japanese men consume ten times more isoflavones than British men. If we were to look at western culture, we would expect the growing number of vegetarians to be consuming more soy and thus isoflavones, which is what we find. USA and Europe consume less than 3mg per day of soy isoflavones while vegetarians consume more than double at 7-12mg per day [1].

However, not all soy grown around the world is created equally. As you can see from the figure on the right, the amount of isoflavone content in soy beans actually differ slightly depending on where the soybeans were grown. These variations are due to differences in temperature, soil moisture, as well as different cultivation practices. In order to grow soybeans with the highest isoflavone content, they must be grown at low temperatures and it is helpful if the soil has high moisture [1].

Country	Isoflavone per 100 g
Australia	120.84
Brazil	99.82
China	118.28
Europe	103.56
Japan	130.56
Korea	178.81
Taiwan	85.68
USA	159.98

[1]



The four classes of soy foods are: traditional, second-generation, added ingredient, and functional ingredient. Traditional soy foods like tofu, soy milk, miso, soy sauce, and tempeh, have been around for a long time. Second-generation soy foods are more modern and processed creations like soy burgers. Soy ingredients include processed soy for flour, protein concentrates, and isolates. Finally, functional ingredient soy food products like processed

meat, baked goods, pasta, and infant formula are where the use of soy has an added function to boost protein nutritional content, or texture [2]. The sheer versatility of soy to turn into vegan and vegetarian meat alternatives like cheese, burger patties, bacon, or eggs is astounding. As an alternative to beef, soy as a meat analogue has the same amino acids with added benefits due to polyunsaturated fatty acids, calcium, phosphorous, and potassium. Unfortunately, like many of the other foods in our industrialized eating society, the more soybeans are processed the more there will be changes in its nutrient, antinutrient, and artificial compound content. So, before you go reaching for the soy-based alternatives for the health benefits of soy in the diet, you should know that highly refined soy products can lose 80% to 90% of its isoflavone content by the time it's ready for consumption. This makes the meat alternative products a poor source of phytoestrogens for its health benefits, or suspected negative effects, depending on which literature you're looking at [1].

Food	Isoflavone mg per 100g
Miso	41.45
Edamame	17.92
Natto	82.29
Soy Cheese	6.02 - 25.72
Soy Lecithin	15.7
Soy Protein Isolate	91.05
Shoyu (Soy Sauce)	1.18
Soybeans, Raw	154.53
Soybeans, Roasted	148.5
Soy Milk	0.7 - 10.73
Tempeh	3.82
Tofu	13.1 - 34.78
Soybean Oil	0

[1]



[5]

beans and sprouts in Germany, Spain, & the Netherlands; grain products in Italy; soy meat substitutes in Denmark; and dairy substitutes in the U.K. You should note, however, that the European Union defines milk as “substances secreted from mammary gland” and therefore refer to soy milk as soy “drink” [1]. If you find yourself preferring soy drink



[4]



[6]

Contrarily, the soaking and fermentation processes that have been historically ingrained in Asian cuisine increases the bioavailability of isoflavones, the vitamin content, and has additional probiotic functions. Perhaps instead of reaching for the soy cheese in the grocery aisle, you reach for tempeh, soy sauce, miso, natto, or traditional tofu to take advantage of ancient culinary wisdom. As for Europe, the main source of soy-based food consumption is

over milk, soy alternatives over meat, or you're just in the mood for something different, soy foods have been perfecting their flavor for thousands of years in Asia as well as new and modern creations of alternatives. You're bound to find something that suits your taste buds. And while the level of isoflavones in each product vary widely, maybe it's not something you should be too concerned over given the other nutritional benefits the little beans provide.

**\*The content in this article is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Always consult your physician or other qualified healthcare provider in regards to health, diet, and medical conditions.**

Source & Tables: [1] Rizzo, G., & Baroni, L. (2018). Soy, Soy Foods and Their Role in Vegetarian Diets. *Nutrients*, 10(1). <https://doi.org/10.3390/nu10010043>

Sources: [2] Wang, S., Wang, Y., Pan, M.-H., & Ho, C.-T. (2017). Anti-obesity molecular mechanism of soy isoflavones: Weaving the way to new therapeutic routes. *Food & Function*, 8(11), 3831–3846. <https://doi.org/10.1039/C7FO01094J> [3] Zaheer, K., & Akhtar, M. H. (2017). An updated review of dietary isoflavones: Nutrition, processing, bioavailability and impacts on human health. *Critical Reviews in Food Science and Nutrition*, 57(6), 1280–1293. <https://doi.org/10.1080/10408398.2014.989958>

Photos: [4] Shelly, R. (2019, September 4). Trader Joe's Soy Slices Cheese Alternative.

<http://www.whatsgoodattraderjoes.com/2019/09/trader-joes-soy-slices-cheese.html> [5] Tofu cartoon character searching with a vector image on VectorStock. (n.d.). VectorStock. Retrieved December 17, 2020, from <https://www.vectorstock.com/royalty-free-vector/tofu-cartoon-character-searching-with-a-vector-33783994>

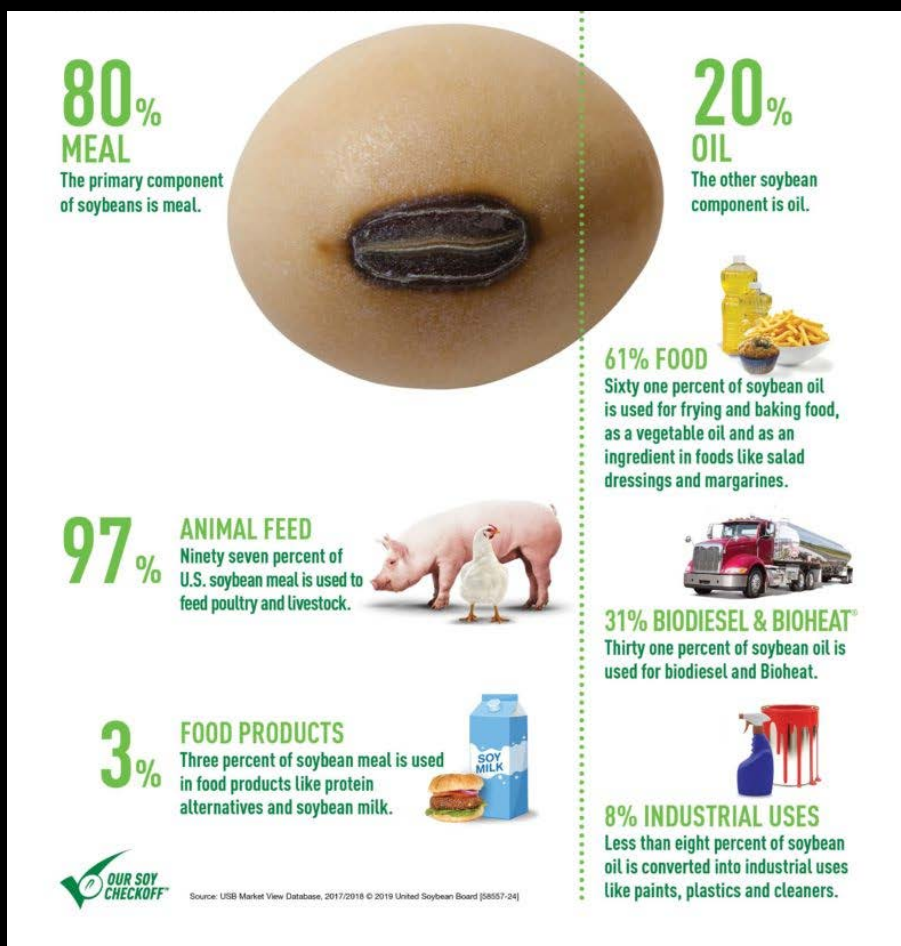
[6] Download Soy Milk And Soy Bean On Wooden Table. For free. (n.d.). Freepik. Retrieved December 17, 2020, from [https://www.freepik.com/free-photo/soy-milk-soy-bean-wooden-table\\_5072030.htm](https://www.freepik.com/free-photo/soy-milk-soy-bean-wooden-table_5072030.htm)

# SOY-VOLUTION

By Kennedy Meyer

Soy has undergone quite the makeover over the course of the 20th century. The soybean began the century sorting its genetic heritage into standard varieties, and ended with the ever-popular modern process of genetic modification [1]. The industrialization of soy allowed the crop to be produced in mass quantities, and the splitting of the soybean into oil and meal on an unprecedented scale allowed soy to be reconstructed into a large assortment of new products [1]. Soybean meal was used as animal feed to fuel meat and dairy production, while extracted soybean protein was made into imitations of meat and treated and flavored soy milk into a closer semblance of cow's milk [2].

[4]



As soy became more widely used, research sought to further understand the manipulable properties of the crop, and the initial findings and concerns of isoflavones had substantial impact on society [1]. Genetic engineering of the soybean was introduced as an industrial agricultural development in 1996 by the company Monsanto. This development made the crop resistant to the herbicide, Glyphosate [7]. Soy then took on an ethical connotation, and this new reputation stemmed from genetic modification, as soy was deemed as “good soy” and “bad soy” [1]. Genetically modified soybeans took the market by storm and currently account for 93% of all soybeans produced [7]. This has become not just a domestic issue but an international dispute. While European Green and other environmental parties banned GMO soybeans altogether from the continent of Europe until 2004, just the labeling of GMOs in consumer goods in the US has not been successful [1]. Industry has been very adamant about keeping GMOs out of public attention, arguing that this labeling would cause unnecessary concern. Especially in the US, industry has a lot of pull in policy as multi-billion dollar corporations are able to dominate the conversation.

While the current status of industrialized soy as a food source is highly contested, the future for soy as an energy efficient fuel source may be promising. Green manufacturing has seen potential for SoyDiesel, a clean burning sulfur free alternative to diesel made from petroleum [3].



As the public has become more aware of the prevalence of GMOs, industry has capitalized on marketing “GMO free” and “non GMO” on products. Genetic engineering has become quite a controversial issue, and among the Americans who mistrust GMOs, one group curiously absent is scientists. While 37% of the general public believe it is safe to eat genetically modified foods, 88% of scientists responded that it is harmless [1]. The long-term health effects of GMOs have been hotly contested and more research is necessary to make definitive claims about their lasting impact.

Another popular product of the industrialization of soy is isolated soy protein isoflavones. Scientists expressed concerns as early as 2000 about the increased popularity of soy isoflavone supplement pills, which provided roughly 10x the daily dose of isoflavones than the Japanese gained eating traditional foods [1]. Increasing concern of estrogenic effects of soy isoflavones on men were consistent with growing concern about environmental exposure to synthetic chemicals that mimicked the effects of estrogen on the male body [1]. This was a prime example of media’s “sex obsession” as they jumped on the opportunity to broadcast these juicy theories. An evangelical writer wrote “soy is making kids gay,” and by 2017, there was speculation that soy was responsible for generation of sex confused men [1].



[6]

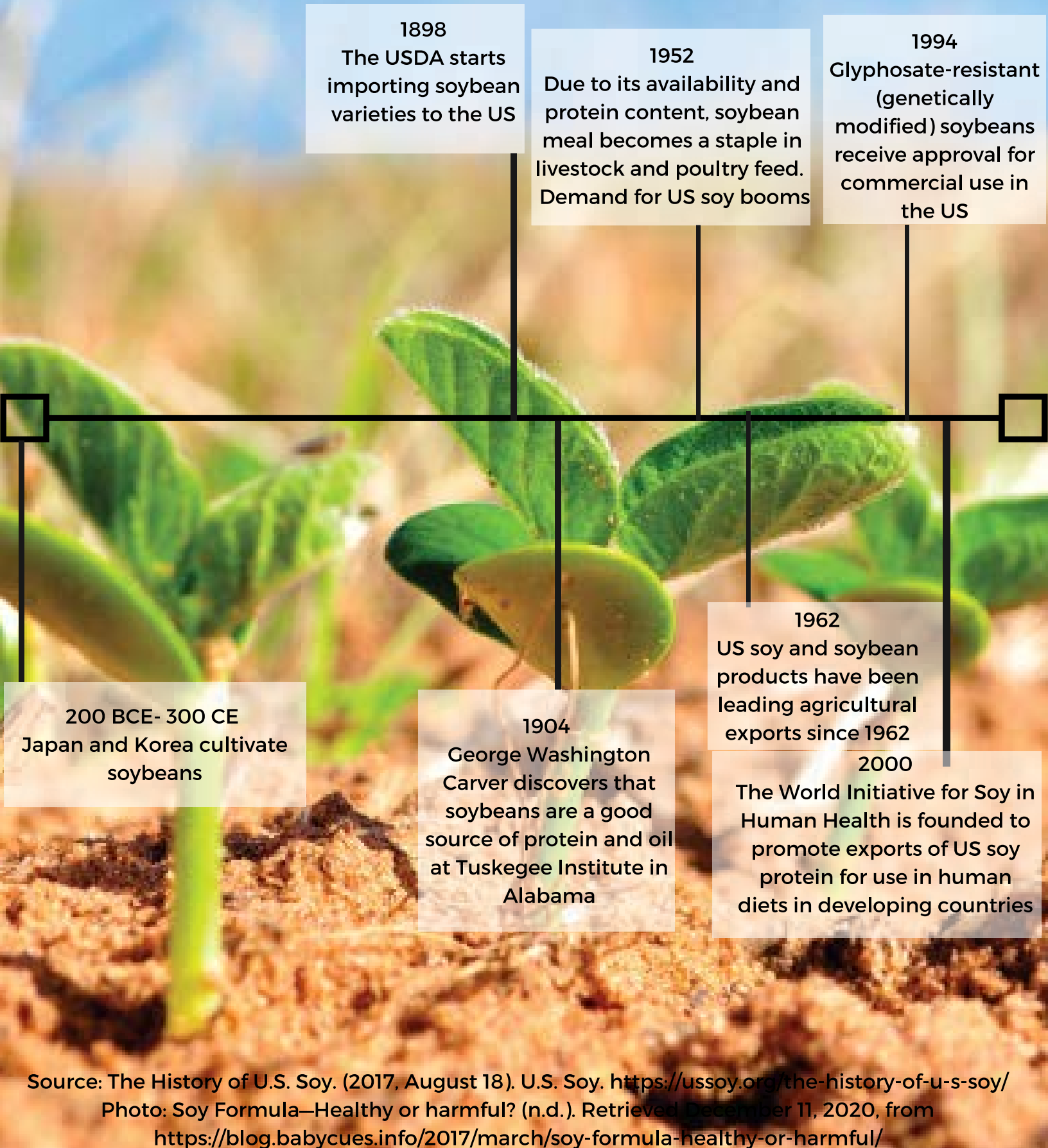
Tying back the effects of genetic alteration on overall phytoestrogen content, research is extremely minimal. One pioneer study looked into this relationship and reported a decline in phytoestrogen levels of 12-14% in the genetically modified soybean strains [5]. The researchers acknowledge the widespread medical uses of soy-based foods, and suggest that those making recommendations for the use of soy products consider the origin and actual phytoestrogen levels of them to ensure consistent clinical results among their patients [5].

## Works Cited

1. ROTH, M. (2018). EPILOGUE: HERE TO STAY? In E. Doss & P. J. Deloria (Eds.), *Magic Bean* (pp. 256-272). University Press of Kansas. <https://doi.org/10.2307/j.ctv1nhq2c.15>
2. Morse, W. J., Cartter, J. L., & Agron, A. (n.d.). IMPROVEMENT IN SOYBEANS. 36.
3. Tsai, J.-H., Chen, S.-J., Huang, K.-L., Lin, Y.-C., Lee, W.-J., Lin, C.-C., & Lin, W.-Y. (2010). PM, carbon, and PAH emissions from a diesel generator fuelled with soy-biodiesel blends. *Journal of Hazardous Materials*, 179(1), 237-243. <https://doi.org/10.1016/j.jhazmat.2010.02.085>
4. Soy New Uses—New Jersey Soybean Board. (n.d.). Retrieved December 8, 2020, from <https://njsoybean.org/check-off-at-work/industrial-uses/>
5. Lappé, M. A., Bailey, E. B., Childress, C., & Setchell, K. D. r. (1998). Alterations in Clinically Important Phytoestrogens in Genetically Modified, Herbicide-Tolerant Soybeans. *Journal of Medicinal Food*, 1(4), 241-245. <https://doi.org/10.1089/jmf.1998.1.241>
6. Soy Protein Isolate: Soy Protein Powder - Manufacturers & Suppliers. (n.d.). Retrieved December 1, 2020, from <https://titanbiotechltd.com/collagen-protein/soya-protein-isolate/>
7. Herbicide Tolerant Crops. (n.d.). Beyond Pesticides. Retrieved December 16, 2020, from <https://www.beyondpesticides.org/programs/genetic-engineering/herbicide-tolerance>



# A Wrinkle in (Soy) Time



Source: The History of U.S. Soy. (2017, August 18). U.S. Soy. <https://ussoy.org/the-history-of-u-s-soy/>

Photo: Soy Formula—Healthy or harmful? (n.d.). Retrieved December 11, 2020, from <https://blog.babycues.info/2017/march/soy-formula-healthy-or-harmful/>

## THE CULTURAL HISTORY OF

## SOY

By Mary Tran



[4]



[1]



[3]

The soybean has been around for almost 3,000 years, though not in the capacity that we know it as today. When soybeans were first cultivated by Chinese farmers 3,000 years ago, the products were not ending up on the plates of humans. Rather, for almost a thousand years they were being sown back into the ground as fertiliser for other crops in China, used as feed for war horses in Japan, and even when it first appeared in America, was used as feed for livestock [2], [3], [4].

It wasn't until the Zhou Dynasty in China (1050-256 BC) that soy's nutritional value was discovered; even then, the boiled soybean was an unpopular alternative to other, more enticing grains [4]. As the soybean began to migrate to other parts of Asia, its nutritional benefits were being recognized, and despite the unpleasant taste that comes with eating whole, boiled soybeans, the dynasties that followed the Zhou's began to discover all the nutritional value this magical bean had to offer [4]. Before the soybean was introduced to the Americas in the 19th century, it had a diverse history spanning hundreds of years, with the bean's cultivation spreading to Japan and Southeast Asia long before it came to America [4].



As the soybean became more prevalent in Asian countries, more innovations in soybean preparation came with. From soy milk, to fermented soybeans, soy sauce to tofu: those living in Asian countries have had a lot more time to get accustomed to the different soy products that are available in the US today, which may explain why soy products are so much more popular in Asia than they are here. Not only that, but soy products have been integrated into many Asian diets due to religion. With the introduction of Buddhism around 2,000 years ago came a belief in a meatless diet as well [4]. Monks used soybeans as a source of protein instead of meat, and as Buddhism spread to and around Japan, Korea, and China, soy products became more and more ubiquitous as a source of nutrition in everyday life [1], [3], [4].

Pretty soon, soy products became a staple in Asian cuisine, serving as a cheap form of protein, a healthy substitute for meat, and a source of medicinal benefits as well [1].

Not only was the soybean used as a meat alternative for religious reasons, but it was also used in Buddhism for medicinal purposes as well. Research has shown that in traditional Korean Buddhism, hard boiled soybeans were eaten for conditions from paralysis to detoxification and diuresis [1]. The beneficial health effects soy products are believed to hold is not limited to those who practice Buddhism. On the contrary, dishes such as natto, miso soup, and tofu have been consistently touted for their health benefits in Asian countries such as Japan [2]. Soy's presence in Asia for the last few thousand years illustrates how the soybean has ingrained itself into Asian cuisine and lifestyle, both because of its utility and health benefits as a food source. Although it may seem that soy has been around in America for a substantial amount of time, this shows that soy has a long history with roots in China, which may explain why soy foods are so much more utilized and consumed in Asian cuisine.

#### Sources:

1. Kim, H., Song, M.-J., & Potter, D. (2006). Medicinal efficacy of plants utilized as temple food in traditional Korean Buddhism. *Journal of Ethnopharmacology*, 104(1), 32–46. <https://doi.org/10.1016/j.jep.2005.08.041>
2. Kamiya, S. (2003, June 22). Singing the praises of soy. *The Japan Times*. <https://www.japantimes.co.jp/community/2003/06/22/general/singing-the-praises-of-soy/>
3. Soybeans—Living History Farms, Iowa | learning-fields. (n.d.). Retrieved December 10, 2020, from <https://www.lhf.org/learning-fields/crops/soybeans/>
4. Stephen, J. (2019). Soy Story: The History of the Soybean. *Eating China*. Retrieved November 14, 2020, from <https://www.eatingchina.com/articles/soystory.htm>

#### Photos:

1. Chinese White Soybean Milk (豆浆) – Aroma Asian. (2019). Retrieved December 10, 2020, from <https://aromasian.com/recipe/homemade-soybean-milk/>
2. DIY Basic Vegetarian Miso Soup. (2019, October 11). *The Spruce Eats*. Retrieved December 10, 2020, from <https://www.thespruceeats.com/basic-miso-soup-3377886>
3. Natto: The Ultimate Japanese Superfood | original | Tokyo Business Today | All the news you need to know about Japan. (2016, May 26). Retrieved December 10, 2020, from <https://toyokeizai.net/articles/-/119646>
4. Seven, J. (n.d.). How a Chinese Crop Became an American Winner. *HISTORY*. Retrieved December 10, 2020, from <https://www.history.com/news/soybean-china-american-crop-tariffs>

[2]

# SO(Y) WHAT ARE YOU EATING?

BY MARY TRAN

Every region has their own cuisine. From tortas to hot dogs, phở to pasta, every dish is made with a plethora of ingredients that result in a unique dish with unimaginable flavors. In this melting pot that is America, how likely are you to try out these new dishes and ingredients? When it comes to soy, the answer is mixed.

Originally from China, the soybean was first used more as fertilizer than it was food [7]. As time went by and its nutritional value was discovered, soy quickly became a staple in the Asian diet. Tofu, tempeh, soy sauce, soy milk ... the list goes on. What was once undiscovered over 3000 years ago has recently taken the world by storm, making it into American households as meat substitutes, animal feed, and even crayons!

Although there definitely have been positive responses to soy in the US as a potential food source, the general consensus on soy, specifically its phytoestrogenic qualities, has been mixed. Is this because of soy's potential endocrine disrupting qualities, or is it more of a cultural and racial preference? Many surveys studying Americans' consumption of, knowledge of, and attitudes towards soy have been carried out among various populations and compared to those of populations that have historically been more exposed to soy.



SOYBEAN CRAYONS [1]

What they found pointed to not only race and culture as a determining factor in whether one was likely to consume soy in their lifetime, but also a lack of awareness about soy's potential health benefits and soy in general. Here, we discuss why there is such a large gap in soy utilization between different cultures and geographic regions.

70.0%, 37.7%, and 25%. The percentage of Asian, Caucasian, and black college students that were aware soy protein could play a role in lowering cholesterol levels [3].



Although the percentage gaps can be assumed to have decreased today, this difference in awareness, especially within individuals of the same geographical region and educational status, indicates that culture and race plays a large role in the knowledge of soy and its benefits. The study further cements this correlation by asking a follow up question of where the participants learned about the benefits of soy. While an equal percentage of Asian Americans and Caucasians within their respective 70 and 37.7 percent responded saying either family or TV, none of the black participants within the 25% reported learning about this from their family [3]. Knowing that the prevalence of soy in history and cuisine is greater in regions of Asia, it is safe to say that one's culture and race plays a role in whether one is aware of soy and its benefits. But is this the only reason people are less likely to consume soy? If all it takes to increase soy consumption for the health benefits is education, wouldn't the US population be at a much lower risk for high cholesterol levels than they are now? Further research shows that it is not just lack of awareness about health benefits that stops different populations from consuming soy products.

“WHEN I USED TO HEAR THE WORD ‘SOY’ I’D THINK OF THE WHITE STUFF THAT WOULD SHAKE IN JELLY AND IT WAS JUST GROSS [6].”



RAW TOFU [2]

“Weird,” “yucky,” and “gooey”- three words that were used to describe tofu by shoppers they surveyed in mainstream supermarkets [4]. The perception of soy products as a jiggly blob made of who knows what turns most away from soy as a food product, even before they’ve tried it. A 2004 cross-sectional survey asked over 200 black and white women about their attitudes towards soy: their perception of it, their feelings on consuming it, and their actual behaviors related to it [5]. A large portion of the women from both groups saw soy in a negative light and said they were not likely going to purchase soy products in the next month, largely because of the taste and texture that tends to be associated with soy products such as tofu [5]. This is a little confusing, given that less than 10% of the women had even tried a soy product before. So, how can we change the viewpoint of soy products from one of disgust to one of enjoyment?

The answer might be within the presentation of soy. In American cuisine, where burgers and many dairy products reign supreme, people might be more open to the idea of soy burgers, milk, and cheese than they would a block of tofu or bean curd. In a country where the predominant diet is nonvegetarian, it is difficult to get over the sense of disgust that often comes with novel plant foods [6].

In contrast, plant foods such as soy have historically been a staple in Asian cuisine for a long period of time, explaining why this feeling of disgust is not seen in Asian cultures as much as it is American cultures. The phytoestrogen intakes of different regional populations support this notion, with studies finding Asian women, mainly Japanese and Chinese, consuming 13-20 times more phytoestrogens than non-Asian women [4]. With all this research showing how unlikely it is for Americans to consume soy products as is, it's difficult to imagine that a change in presentation of the products would make soy more palatable. However, that is exactly what research indicates.

A large proportion of non-Asian American women asked to taste a variety of soy products (burger, milk, tofu) said that the taste and texture of foods was important in whether they were perceived as pleasant. Unsurprisingly, the product that was most similar to something that is typical in American cuisine, the soy veggie burger, had the most women rating the taste as pleasant (55%, as opposed to 38% and 39%) [5]. Likewise, taste and texture was cited as the most important factor in whether people would decide to consume soy products in the supermarket study as well, with soy consumers saying improvements in soy taste would increase the amount of people willing to consume soy products [6]. In regards to texture, an experiment substituted 23 foods in a preschool with their soy-enhanced counterparts, and after a three week cycle, found no difference in the amount of lunch eaten between the soy and non-soy meals [1]. Anyways, what does all this research and data mean?

There will always be a distaste for the novel. Because soy has only been around in American culture and cuisine for a couple of decades and only recently blew up, it makes sense that the idea of soy products is concerning to some.



**BLACK BEAN BURGER [3]**

The prevalence of plant foods in Asian cuisine and the long standing role of soy products in the Asian diet explains why soy products are consumed in higher quantities than they are here in the US. However, given its potential health benefits and the soy protein health claim that the FDA approved in 1999, there have been efforts to integrate soy into American culture and cuisine [2]. While the idea of soy may not be appealing to you right now, that notion might change the next time you pick up a soy veggie burger from your local supermarket.

Photos:

1. Christine. (2016, May 17). Soybean Crayons 4 Pack (250 units). Kidstar. <https://kidstar.com/product/new-soybean-crayons-4-pack-250-units/>
2. Raw tofu cut in dices on wooden board. (n.d.). 123RF. Retrieved December 8, 2020, from [https://www.123rf.com/photo\\_19283754\\_raw-tofu-cut-in-dices-on-wooden-board.html](https://www.123rf.com/photo_19283754_raw-tofu-cut-in-dices-on-wooden-board.html)
3. Hackett, J. (2019, December 9). Black Soy Bean Burgers. The Spruce Eats. Retrieved December 8, 2020, from <https://www.thespruceeats.com/black-soy-bean-burgers-3378617>

## Bibliography:

1. Endres, J., Barter, S., Theodora, P., & Welch, P. (2003). Soy-enhanced lunch acceptance by preschoolers. *Journal of the American Dietetic Association*, 103(3), 346–351.  
<https://doi.org/10.1053/jada.2003.50046>
2. Health claims: Soy protein and risk of coronary heart disease (CHD), 21 C.F.R. § 101.82 (1999).
3. Herring, T. A. (2000). A Survey to Determine the Knowledge, Attitudes, and Practices of College Students in Regard to Soy Protein and Coronary Heart Disease [Thesis, Virginia Tech].  
<https://vtechworks.lib.vt.edu/handle/10919/31296>
4. Huang, M.-H., Norris, J., Han, W., Block, T., Gold, E., Crawford, S., & Greendale, G. A. (2012). Development of an Updated Phytoestrogen Database for Use With the SWAN Food Frequency Questionnaire: Intakes and Food Sources in a Community-Based, Multiethnic Cohort Study. *Nutrition and Cancer*, 64(2), 228–244.  
<https://doi.org/10.1080/01635581.2012.638434>
5. Rah, J. H., Hasler, C. M., Painter, J. E., & Chapman-Novakofski, K. M. (2004). Applying the Theory of Planned Behavior to Women's Behavioral Attitudes on and Consumption of Soy Products. *Journal of Nutrition Education and Behavior*, 36(5), 238–244.  
[https://doi.org/10.1016/S1499-4046\(06\)60386-2](https://doi.org/10.1016/S1499-4046(06)60386-2)
6. Schyver, T., & Smith, C. (2005). Reported Attitudes and Beliefs toward Soy Food Consumption of Soy Consumers versus Nonconsumers in Natural Foods or Mainstream Grocery Stores. *Journal of Nutrition Education and Behavior*, 37(6), 292–299.  
[https://doi.org/10.1016/S1499-4046\(06\)60159-0](https://doi.org/10.1016/S1499-4046(06)60159-0)
7. Stephen, J. (2009). Soy Story: The History of the Soybean. *Eating China*. Retrieved November 14, 2020, from  
<https://www.eatingchina.com/articles/soystory.htm>

Kikkoman Soy Sauce Press «Dave Jenner | Kikkoman, Kikkoman soy sauce, Clever advertising. (n.d.). Pinterest. Retrieved December 10, 2020, from <https://www.pinterest.com/pin/412783122097405318/>

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[1]

**50% soy fire logs  
for cleaner longer burn**



[1]

**Soy Candles**



[1]

**Paintballs**



[1]

**Gum**



[2]



[1]

**Spray foam  
insulation**



[1]

**Astro Turf**

**Soy-backed mats  
at the Pentagon**



[3]

**Nascar Tires**



[1]

**Ink**



[1]

**Wood Stains**

By Rachel Smith. Source: The Top Five Most Interesting Uses of Soy. (2015, June 11). Hungry for Truth. <https://www.hungryfortruthsd.com/the-top-five-most-interesting-uses-of-soy/> Source & photos: [1] Flammini, D. (n.d.). 10 Things Made with Soybeans. Retrieved December 13, 2020, from <https://www.farms.com/ag-industry-news/10-things-made-with-soybeans/> [2] Soy-Backed Mats Step Up Performance and Sustainability Efforts at the Pentagon. (2014, July 28). United Soybean Board. <https://www.unitedsoybean.org/article/soy-backed-mats-step-up-performance-and-sustainability-efforts-at-the-pentagon/> Photo: [3] Andrew Del-Colle. (2015, December 3). An Inside Look at the Incredible Engineering Behind NASCAR's Tires. Road & Track. <https://www.roadandtrack.com/motorsports/news/a27475/more-than-you-ever-want-to-know-about-nascar-tires/>



# ASK THE PHYTOESTROFRIENDS

**Q:** Hi Phytoestrofriends! I am new to the soy product world, and I love trying all the different dishes restaurants have to offer! I really want to incorporate products like tofu into the dishes I make at home, but I just can't seem to make it taste as good as restaurants do. I don't know how restaurants manage to make their dishes so delicious - every time I try making any tofu dish, it ends up looking like a gooey, unappetizing mess. Any advice on how to make tofu taste good at home?

~Jenny

**A:** Hi Jenny! Your question brings up something that is very common, as a lot of people are not accustomed to the taste and texture of tofu when they try to incorporate it into their diets. A large part of the “bleh” factor comes from not knowing how to prepare tofu, or simply not knowing what to use tofu in! Some things I have always been told when preparing tofu is to not be afraid of seasoning it. Tofu by itself can be very bland and, as you said, unappetizing, but all of that can change with some spices of your choice. You can also prevent the gooey, goopy mess by taking out the excess moisture out of your tofu. Before doing anything with your tofu, first wrap it in paper towels and put something of decent weight on it for approximately 20 minutes [1]. Then, prepare it as you wish and enjoy! If you are stuck on which dishes to make or what to try, the Phytoestrofriends have included their favorite soy dishes in their author bios! Some other ideas include: a simple miso soup, firm tofu in a saute with veggies, or even deep fried. Thanks again for your soyperb question, and we wish you luck on your soy journey!

## Sources:

1. Bellefonds, C. de. (2016, July 28). 7 Genius Ways to Make Tofu Actually Taste Good. Women's Health. <https://www.womenshealthmag.com/food/g19982006/way-to-make-tofu-taste-good/>

## Photo:

1. Tofu in a minimalist aesthetic for dark food photography. Plates from Cost Plus World Market Food photography and styling b... | Food, Photographing food, Food hacks. (n.d.). Pinterest. Retrieved December 10, 2020, from <https://www.pinterest.com/pin/654781233301905111/>



# *THE EVOLUTION OF EQUOL-ITY*

BY GRACE DANON

[1]

Phytoestrogens are special by their very nature. Unlike other EDCs, they can be delicious. They're not just inhaled or absorbed through the skin, but get ingested as an inherent component of the food we eat. However, to suggest that eating equates exposure would be an oversimplification. Metabolization of any food is complex and inter-individual variations abound [16].

Behold the microbiota: a whole world of microscopic organisms living in and on us [16]. They break down our food into its component parts, producing usable fuel for cell and tissue function [16]. The composition of this tiny universe is not only shaped by external microbial exposures, but also by diet [3]. Population-based differences in microbial distributions are well established, and the diversity of global eating patterns likely contribute to this variation [15].

So what does this mean for soy? Simply put: sweeping generalizations about soy's phytoestrogenic abilities are moot. The malleability of digestion in response to diet and culture-based dissimilarities in soy consumption must be taken into account when assessing soy's potential impacts on the body [14]. So here's what we know (and what we don't):

## **1) Phytoestrogens are not uniformly absorbed [15].**

The phytoestrogenic chemicals in soy are classed as isoflavonoids, daidzen and genistein being the most important [10]. Gut bacteria metabolize daidzen into one of two products: equol or O-desmethylangolensin (O-DMA) [6]. The former isn't just easier to pronounce, it's more bioactive too [6]. Thus, your metabolization status is crucial to determining whether soy isoflavones can actually affect your endocrine function. Researchers have attempted to quantify how many people produce equol, how many produce O-DMA, and how many don't produce anything at all, percentages which are not uniform across cultures [6],[15]. The specific bacterial strain responsible for daidzen digestion has been identified, but, like other gut microbes, its abundance depends on factors like antibiotic use, hormone levels, and importantly, diet, which leads to the next point [6]..

## 2) Diet probably determines whether you're a producer or not [15].

Levels of soy consumption vary greatly based on culture and lifestyle [15]. Soy is a staple of Asian cuisine and is a common source of protein for vegetarians [15]. Compared to the typical Western diet, these groups eat soy differently...but do they also absorb soy differently? A study by Setchell and Cole compared the urinary and serum equol concentrations of vegetarian and meat-eating Westerners after consuming soy milk for three consecutive days [15]. Interestingly, they found that 59% of vegetarians produced equol versus 25% of meat-eaters [15]. Though the study was underpowered, this high percentage of producers in the vegetarian sample parallels data from Japanese adults (55-60% producers), suggesting that diet might influence equal metabolization status [15]. An additional clue: younger Japanese adults, whose diets are more likely to have been "Westernized," exhibit lower equol levels than older kin [5]. Whether these observed metabolization capacities are determined by soy or by other dietary components warrants further research as discussed next.



**Japanese McDonald's [2]**

The global expansion of American fast food chains to other nations like Japan is a telling look at how Asian diets are being "Westernized." Red meat, dairy, and saturated fat galore...

## 3) Other foods might affect isoflavone metabolization [15].

Does a diet high in soy alter the ability to absorb its isoflavones? Are other factors involved? Attempts to establish whether soy intake itself boosts equol production have been inconclusive [5]. In general, diets high in carbohydrates and low in saturated fat (characteristics of both traditional Japanese and most vegetarian diets) have been linked with greater equol levels [11],[7]. The abundance of specific gut bacteria and overall microbe diversity have also been tied to equol-production status [5]. However, attempts to induce equol production through administration of prebiotics or probiotics were met with mixed results, possibly due to differences between the model systems [1]. In light of all these variables, it ultimately seems as though the metabolization of equol requires: a) sufficient soy intake b) equol-producing bacteria in the gut and c) suitable gut conditions [14].

So, from a physiological standpoint, different diets mean different microbiomes which mean different isoflavone metabolites. This microscopic breakdown can make it easy to forget what we're actually talking about: the soybean. It's a staple crop, it's a food, but it's also a cultural entity. An underacknowledged component of this entire discussion is the reciprocal evolution of humans and what we eat [8]. What do cross-cultural metabolization differences say about our responsive biology? Taking an anthropological lens, one might interpret the equol-producing efficiency in Asian and vegetarian groups as a testament to adaptability.



When a food becomes a significant part of a culture's diet—as soy has for Asian populations—our lifestyles and values visibly shape it [12]. Through crop cultivation, processing, and culinary preparation, the food's very physical structure gets molded to culture-specific needs [12]. The anatomical evolution of hominins suggests that in turn, humans have been and continue to be shaped by our food (see Fig. 1) [8].

Importantly, the types of soy foods consumed by Asian populations have very different isoflavone contents than typical Western soy foods, which needs to be taken into account when assessing cultural differences in equol production [2]. In Western diets, where soy is commonly consumed as protein isolate or infant formula, it takes a very different physical shape, serves a very different function, and has very different cultural relevance [14]. Not only do these dissimilarities manifest in cross-culturally disparate exposure to soy, but they might also influence the populations' responsiveness to these chemicals [14].

In fact, genetic and epigenetic differences have been associated with an equol-producing phenotype, suggesting current soy intake and diet are not the only variables [4],[9]. Similar to the evolution of lactase persistence in pastoral populations, perhaps the Asian food landscape (centuries-long cultivation of soy) has cued adaptive genetic changes so that soy's phytoestrogens can be taken advantage of [13]. Changeability of equol-status and non-soy influences like vegetarianism would be important factors to incorporate in this research.



In conclusion, amidst all this research on soy's metabolism, it is important to keep something in mind: its deliciousness. Isolating soy from its dietary context to study its chemical effects overlooks the importance of that very context. Unlike other EDCs, isoflavones' physiological effects are tied to culture and to the resilient intimacy of people and food. The biological breakdown and endocrine effects are not just dependent on quantifiable variables, but on a rich history of growing, eating, and being shaped by food.



natto [4]



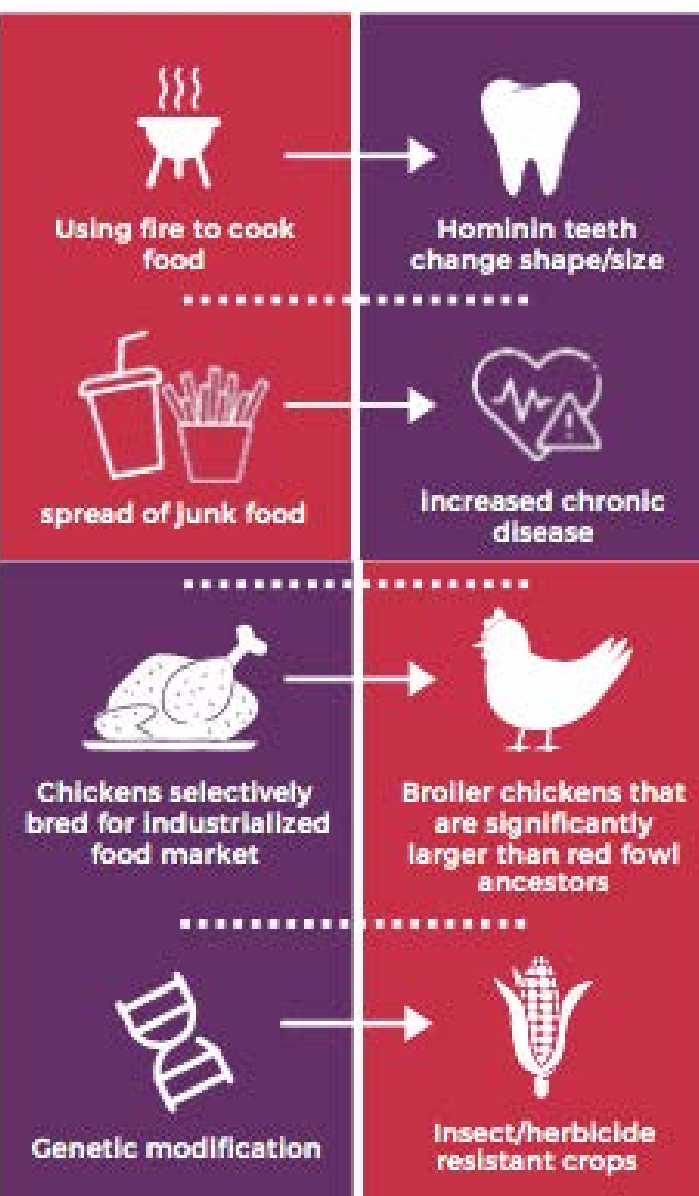
infant formula [3]

#### PHOTOS:

1. Lamnee. (n.d.). Vegetable and fruit, illustration wallpaper of hand drawn sketch fresh green soybean or edamame pods isolated on white background [Photograph]. WDRfree. <https://wdrfree.com/stock-vector/download/hand-drawn-of-fresh-green-soybeans-background-272870876>
2. kojihachisu [Username]. (2002). McDonald's (Japanese Version) [Photograph]. Flickr. <https://search.creativecommons.org/photos/2ee34936-3d5a-4d77-8453-900f0ffa06e7>
3. National Institute of Korean Language. (2016). File:infant formula.jpeg [Photograph]. Wikimedia Commons. [https://owl.purdue.edu/owl/research\\_and\\_citation/apa\\_style/apa\\_formatting\\_and\\_style\\_guide/reference\\_list\\_audiovisual\\_media.html](https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/reference_list_audiovisual_media.html)
4. snowpea&bokchoi [Username]. (2010). Natto [Photograph]. Flickr. <https://search.creativecommons.org/photos/6f925892-7707-435b-9c92-a782ffd3ce34>

# FOOD X HUMANS

## A STORY OF COEVOLUTION



**Fig 1** [1],[2],[3],[4]

1. Key, S., Ma, J. K.-C., & Drake, P. M. (2008). Genetically modified plants and human health. *Journal of the Royal Society of Medicine*, 101(6), 290-298. <https://doi.org/10.1258/jrsm.2008.070372>
2. Laster, J., & Frame, L. A. (2019). Beyond the calories—Is the problem in the processing? *Current Treatment Options in Gastroenterology*, 17(4), 577-586. <https://doi.org/10.1007/s11938-019-00246-1>
3. Luca, F., Perry, G. H., & Di Rienzo, A. (2010). Evolutionary adaptations to dietary changes. *Annual Review of Nutrition*, 30, 291-314. <https://doi.org/10.1146/annurev-nutr-080508-141048>
4. Otter, C. (2014). Industrializing diet, industrializing ourselves. In C. Helstosky (Eds.), *The routledge history of food*. Routledge. DOI: 10.4324/9781315753454.ch12

1. Chen, L.-R., Ko, N.-Y., & Chen, K.-H. (2019). Isoflavone supplements for menopausal women: A systematic review. *Nutrients*, 11(11). <https://doi.org/10.3390/nu11112649>
2. Coward, Lori., Barnes, N. C., Setchell, K. D. R., & Barnes, Stephen. (1993). Genistein, daidzein, and their .beta.-glycoside conjugates: Antitumor isoflavones in soybean foods from American and Asian diets. *Journal of Agricultural and Food Chemistry*, 41(11), 1961-1967. <https://doi.org/10.1021/jf00035a027>
3. David, L. A., Maurice, C. F., Carmody, R. N., Gootenberg, D. B., Button, J. E., Wolfe, B. E., Ling, A. V., Devlin, A. S., Varma, Y., Fischbach, M. A., Biddinger, S. B., Dutton, R. J., & Turnbaugh, P. J. (2014). Diet rapidly and reproducibly alters the human gut microbiome. *Nature*, 505(7484), 559-563. <https://doi.org/10.1038/nature12820>
4. Frankenfeld, C. L., Atkinson, C., Thomas, W. K., Goode, E. L., Gonzalez, A., Jokela, T., Wähälä, K., Schwartz, S. M., Li, S. S., & Lampe, J. W. (2004). Familial Correlations, Segregation Analysis, and Nongenetic Correlates of Soy Isoflavone-Metabolizing Phenotypes. *Experimental Biology and Medicine*, 229(9), 902-913. <https://doi.org/10.1177/153537020422900906>
5. Iino, C., Shimoyama, T., Iino, K., Yokoyama, Y., Chinda, D., Sakuraba, H., Fukuda, S., & Nakaji, S. (2019). Daidzein Intake Is associated with equol producing status through an Increase in the intestinal bacteria responsible for equol production. *Nutrients*, 11(2), 433. <https://doi.org/10.3390/nu11020433>
6. Kolátorová, L., Lapčík, O., & Stárka, L. (2018). Phytoestrogens and the intestinal microbiome. *Physiological Research*, 67(Suppl. 3), S401-S408. <https://doi.org/10.33549/physiolres.934022>
7. Lampe, J. W., Karr, S. C., Hutchins, A. M., & Slavin, J. L. (1998). Urinary equol excretion with a soy challenge: Influence of habitual diet. *Proceedings of the Society for Experimental Biology and Medicine*. Society for Experimental Biology and Medicine (New York, N.Y.), 217(3), 335-339. <https://doi.org/10.3181/00379727-217-44241>
8. Luca, F., Perry, G. H., & Di Rienzo, A. (2010). Evolutionary adaptations to dietary changes. *Annual Review of Nutrition*, 30, 291-314. <https://doi.org/10.1146/annurev-nutr-080508-141048>
9. Niculescu, M. D., Pop, E. A., Fischer, L. M., & Zeisel, S. H. (2007). Dietary isoflavones differentially induce gene expression changes in lymphocytes from postmenopausal women who form equol as compared with those who do not. *The Journal of Nutritional Biochemistry*, 18(6), 380-390. <https://doi.org/10.1016/j.jnutbio.2006.06.002>
10. Rietjens, I. M. C. M., Louisse, J., & Beekmann, K. (2017). The potential health effects of dietary phytoestrogens. *British Journal of Pharmacology*, 174(11), 1263-1280. <https://doi.org/10.1111/bph.13622>
11. Rowland, I. R., Wiseman, H., Sanders, T. A. B., Adlercreutz, H., & Bowey, E. A. (2000). Interindividual variation in metabolism of soy isoflavones and lignans: Influence of habitual diet on equol production by the gut microflora. *Nutrition and Cancer*, 36(1), 27-32. [https://doi.org/10.1207/S15327914NC3601\\_5](https://doi.org/10.1207/S15327914NC3601_5)
12. Sedivy, E. J., Wu, F., & Hanzawa, Y. (2017). Soybean domestication: The origin, genetic architecture and molecular bases. *New Phytologist*, 214(2), 539-553. <https://doi.org/10.1111/nph.14418>
13. Ségurel, L., & Bon, C. (2017). On the Evolution of Lactase Persistence in Humans. *Annual Review of Genomics and Human Genetics*, 18(1), 297-319. <https://doi.org/10.1146/annurev-genom-091416-035340>
14. Setchell, K. D. R., & Clerici, C. (2010). Equol: history, chemistry, and formation. *The Journal of Nutrition*, 140(7), 1355S-1362S. <https://doi.org/10.3945/jn.109.119776>
15. Setchell, K. D. R., & Cole, S. J. (2006). Method of defining equol-producer status and its frequency among vegetarians. *The Journal of Nutrition*, 136(8), 2188-2193. <https://doi.org/10.1093/jn/136.8.2188>
16. Singh, R. K., Chang, H.-W., Yan, D., Lee, K. M., Ucmak, D., Wong, K., Abrouk, M., Farahnik, B., Nakamura, M., Zhu, T. H., Bhutani, T., & Liao, W. (2017). Influence of diet on the gut microbiome and implications for human health. *Journal of Translational Medicine*, 15. <https://doi.org/10.1186/s12967-017-1175-y>



# *SOY: THE EDC THAT PREVENTS CANCER?*

BY MARY TRAN

Breast and prostate cancer - the second most common types of cancer for women and men, respectively [1], [2]. These hormone-dependent cancers affect many men and women every year, and yet, the cancer incidences aren't uniform between different races and geographic regions. With Asian men and women being less likely to develop prostate and breast cancers than their non-Asian counterparts, one has to wonder whether it is somewhat due to the high soy diet rich in phytoestrogens not typically seen in western diets. Phytoestrogens are naturally occurring chemicals found in plants such as soybeans and have the ability to mimic estrogens, interfering with the normal functions of the endocrine system [4].

Wait, interfering? If phytoestrogens interfere with the way our bodies normally work, then wouldn't high levels increase cancer incidence? Potentially. As soy products and consumption increase in western culture, so does the body of research on the potential risks/benefits of the phytoestrogens present in these products.

While there is no one clear answer on whether phytoestrogens are "bad" or "good" for you, it has been shown that certain levels of phytoestrogen consumption may have a preventative effect in regards to hormone dependent cancers [4]. As with almost everything else, however, intake levels are key.

Speaking of intake levels, just how much soy do people eat on average? In one study looking at populations that regularly eat soy, specifically the Hong Kong Chinese population, daily soy intake was equivalent to two servings a day [5]. In a population-based case control study of non-Asian women in the San Francisco Bay area, however, soy intake was equivalent to one serving of soy a week [4]. To put that into perspective, one serving of soy protein would be equivalent to around one cup of soymilk [7]. That's a big difference, but does it even matter? Research says yes. Differences in diets have been said to account for as much as 50% of breast cancer incidences [3]. It has been posited that the change in dietary habits of the younger generation in Japan and Korea could result in lower soy consumption, and,





as a result, an increase in the risk of prostate cancer [5]. It could be that different races and ethnicities simply have a different genetic component or way of metabolizing soy that decreases their risks of breast and prostate cancers, with the amount of phytoestrogen intake actually having no effect on cancer incidence. While this may be true, comparisons between Asian immigrants to more western countries and Asian individuals who had not migrated suggest that there is, in fact, a relationship between phytoestrogen intake and breast cancer prevention [3].

Case control studies looking at the incidence of breast cancer in Chinese-, Japanese-, and Filipino-American women looked at tofu intake between those who migrated to America and those who were born in America; the researchers found that among those who migrated to America, tofu intake was two times higher than the intake of those who were born in America [3]. What's more was that the longer the immigrants stayed in the US, the more tofu intake decreased. This on its own is trivial, but when paired with the fact that, after controlling for confounding facts, breast cancer risk was lower for those who had a higher intake of tofu [3]. However, it was noted that although the incidence of breast cancer is higher in Asian-American women than Asian women, it is still lower than that of non-Asian women in America. This may be because soy intake during childhood

provides the most preventative effect against breast cancer, when compared to adolescent and adult soy intake levels [6]. If this is true, it would explain why Asian-American migrants still have a lower incidence of breast cancer rates than when compared to non-Asian American women. All of this research seems to support the idea that phytoestrogens have a protective effect against different types of cancer, but it may be misleading.

A similar study done on non-Asian women in America found that phytoestrogen consumption actually had no effects on breast cancer incidence rate. With a weekly soy intake of one serving, no significant preventative effect was found between soy consumption and breast cancer incidence [4]. How can studies produce such different results? The answer may be within the levels of phytoestrogen intake each population has. Phytoestrogens such as equol, a bio-transformed metabolite of isoflavones, have a low affinity for estrogen receptors when compared with estradiol [3]. However, the more that is produced due to increases in soy consumption, the more these phytoestrogens compete with estradiol, effectively interfering with estradiol function [3]. This biochemical relationship may be the reason why non-Asian American women do not reap the protective effect that soy can have against breast cancer, as it has been suggested that equol production may be linked to a decreased likelihood of breast and prostate cancer [3].



Regardless of the existing literature today on phytoestrogens and its relationship to hormone related cancers, there is no definitive answer, and may never be, on whether phytoestrogens completely help or harm an individual.

With such inconsistent findings, it is safe to say that the world of endocrine disrupting compounds, naturally occurring or not, is definitely not black and white. When looking at the effects that phytoestrogens can have on a population, one cannot simply look at the biological mechanisms and processes associated with them, but must also consider how phytoestrogen consumption is related to race, culture, migration, and many other social factors not discussed in this piece. Keeping these interactions in mind will help direct future research in a culturally and biologically relevant way that will allow for a better understanding of both how phytoestrogens work and how the interplay of culture and cuisine affect these biological processes.

#### PHOTOS:

Lamnee. Vegetable and fruit, illustration wallpaper of hand drawn sketch fresh green soybean or edamame pods isolated on white background [Photograph]. WDRfree. <https://wdrfree.com/stock-vector/download/hand-drawn-of-fresh-green-soybeans-background-272870876>

#### Bibliography:

1. CDCBreastCancer. (2020a, June 17). Breast Cancer Statistics. Centers for Disease Control and Prevention. <https://www.cdc.gov/cancer/breast/statistics/index.htm>
2. CDCBreastCancer. (2020b, June 19). Prostate Cancer Statistics. Centers for Disease Control and Prevention. <https://www.cdc.gov/cancer/prostate/statistics/index.htm>
3. He, F.-J., & Chen, J.-Q. (2013). Consumption of soybean, soy foods, soy isoflavones and breast cancer incidence: Differences between Chinese women and women in Western countries and possible mechanisms. *Food Science and Human Wellness*, 2(3), 146-161. <https://doi.org/10.1016/j.fshw.2013.08.002>
4. Horn-Ross, P. L., John, E. M., Lee, M., Stewart, S. L., Koo, J., Sakoda, L. C., Shiau, A. C., Goldstein, J., Davis, P., & Perez-Stable, E. J. (2001). Phytoestrogen Consumption and Breast Cancer Risk in a Multiethnic Population The Bay Area Breast Cancer Study. *American Journal of Epidemiology*, 154(5), 434-441. <https://doi.org/10.1093/aje/154.5.434>
5. Kim, J. (2008). Protective Effects of Asian Dietary Items on Cancers—Soy and Ginseng. *Asian Pacific Journal of Cancer Prevention*, 9(4), 543-548.
6. Korde, L. A., Wu, A. H., Fears, T., Nomura, A. M. Y., West, D. W., Kolonel, L. N., Pike, M. C., Hoover, R. N., & Ziegler, R. G. (2009). Childhood Soy Intake and Breast Cancer Risk in Asian American Women. *Cancer Epidemiology and Prevention Biomarkers*, 18(4), 1050-1059. <https://doi.org/10.1158/1055-9965.EPI-08-0405>
7. Mangels, R., Messina, G., Norris, J., & Wolfram, T. (2003-2018). Soy Part 2—Research. *VeganHealth.Org*. Retrieved November 30, 2020, from <https://veganhealth.org/soy-part-2/>





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of the World.  
[https://www.adsoftheworld.com/media/print/silk\\_soymilk\\_strength\\_in\\_every\\_pour\\_0](https://www.adsoftheworld.com/media/print/silk_soymilk_strength_in_every_pour_0)



# Does Soy Make Me Look Fat?

*The relationship between soy phytoestrogens and disease*

by Rachel Smith



Depending on your dietary choices, food can either be your cure or your poison. In fact, diet is one of the main causes for preventable and non-communicable disease (disease that does not transmit from person to person). Diet is responsible for more than 70% of all deaths around the world [4]. So the question we often ask ourselves is... Is this safe to eat? We're so used to having a definitive answer about what's good or bad for our diet, but when it comes to soy food products and their isoflavones, the answer may surprise you.

## The Big Fat Controversy

Within the last two decades, adult obesity in the U.S. has skyrocketed from 30.5% to 42.4% and reached worldwide numbers of 1.9 billion people affected and 2.8 million dying every year [2, 5]. We have steadily been losing the pandemic of obesity and its related diseases long before the COVID-19 pandemic. And while progress in understanding its pathology is always being made, the need for prevention and treatment is essential. Since the hormone estrogen can affect adipogenesis, lipid metabolism, insulin resistance, and adipose inflammation, the controversial topic of phytoestrogen containing soy is brought to the table [5].

What makes soy food products so controversial is that studies done on soy products and their isolates tend to have contradictory evidence when it comes to weight, obesity, and obesity-related diseases (type 2 diabetes, hyperlipidemia, hypertension, etc). This could be due to phytoestrogens in soy having both estrogenic and anti-estrogenic activity or it could be due to the actual studies themselves. For example, the World Health Organization's survey of 167 countries found a positive correlation between soy intake and obesity, but soy intake approximations from questionnaires doesn't provide the most reliable data. More accurate studies like the National Health and Nutrition Examination Survey (NHANES) are able to measure phytoestrogens in urine and have found in many studies (2003–2008, 2001–2010, and 2003–2010) an inverse relationship between phytoestrogens and obesity [5]. So what's the final verdict? The jury is still out. Two of the most recent meta-analyses on soy and obesity that looked at randomized controlled trials (RCTs) had conflicting results which could be related to the many studies' differences in methodology, participant characteristics, number of participants, variations in metabolism and microbiome, type of intervention, length of intervention, and soy composition. So the conclusion is that soy food products may be beneficial in reducing weight and visceral adipose tissue for some people if you take into account composition and metabolic activities [5].

## Food for Thought

Food not only affects weight and metabolism but can impact your brain as well. Cognitive decline in the elderly can be caused by neurodegenerative diseases like dementia, which affects memory, thinking, behavior, and the ability to do daily tasks [7]. Five million Americans are affected by dementia, costing \$259 billion in the year of 2017 alone. These high costs are expected to increase in America to \$1.1 trillion, along with worldwide cases tripling, by the year 2050 [1, 7]. The important role dietary factors can play in preserving cognitive function and preventing dementia make ubiquitous soy consumption a desirable research topic, especially in regard to dementia, since “a delayed onset of 5 years reduces the degree of dementia prevalence by 41%” [6].



Unfortunately, like with the studies on obesity, many observational studies on cognitive function and soy product and/or isoflavone intake have been conflicting or inconclusive. For example, a Japanese cross-sectional study using a three-day food log and psychological exam found soy isoflavone intake to be protective from cognitive decline in women, with no effect on men [7]. A similar Taiwanese study using the Nutritional and Health Survey in Taiwan (NAHSIT) 2005-2008, with 85.6% of participants consuming soy products daily, found soy-based foods were negatively associated with cognitive decline in elderly regardless of gender [6]. Additionally, another observational study reported that while frequent consumption of tofu may increase risk for

dementia, the high folate in tempeh (which is fermented) may be protective against alleged negative phytoestrogenic effects of soy [3]. There are quite a lot of conflicting studies out there, which makes it hard to cut through the noise, but a recent and first of its kind meta-analysis has taken a stance. This systematic review looked at 16 randomized controlled trials (RCTs) that included 1386 men and women with a mean age of 60 years old, only 2 Asian countries, a median intervention of 17 weeks, and isoflavone intake ranging from 60 to 160mg/day. It was concluded that soy isoflavones had a significant effect on memory and improved cognitive function in adults. This was the case for postmenopausal women as well as premenopausal women and men. It was indicated that isoflavones can reduce inflammation and oxidative stress which would protect the brain and lower the risk of cognitive decline associated with dementia [1]. While many more studies are needed to confirm this, there is at least a glimmer of hope found in the tiny bean.



## The Heart of the matter

In contrast to the debate on soy and obesity or dementia, soy's relationship to the vascular system is a bit clearer. Soy has been shown to lower cholesterol in many studies since 1958, with the FDA authorizing the health claim in 1999 of soy intake (6.25 to 25g/day) being linked to reducing coronary heart disease. A meta-analysis of 38 clinical trials helped the FDA come to that conclusion because it showed a reduction in total cholesterol, LDL, and triglycerides, while increasing HDL. A more recent meta-analysis that looked at studies from the last 10 years confirmed the results and found increased benefits for whole soy and soy foods rather than extracts, with isoflavone supplementation having no effect



[9]. Curious whether or not soy sauce would increase blood pressure, a Japanese cross-sectional study of 25,738 people in the 2012–2016 National Health & Nutrition Survey (NHNS) showed there was no association between soy sauce or miso portion sizes and blood pressure [8]. Slightly better than no association, a meta-analysis found soy proteins modestly lowered blood pressure, thus lowering the risk of cardiovascular disease. Strangely, the recent meta-analysis showed benefits to be significant for Asian studies and non-significant for Western studies [9]. If diet's relationship to the heart and arteries is a concern for you, soy food may be safe and beneficial in these regards.

## The Main Takeaway

If you're still with me on this dizzying journey of soy's effect on the body, mind, and heart, and are not sure what to make of it, you're not alone. Studies on soy phytoestrogens are for the most part frustrating to wrap one's head around. This makes sense because the human body is complex and estrogenic compounds can have many different opposing effects in the body by many different mechanisms. Aside from diseases related to obesity, dementia, and cholesterol, soy phytoestrogens have been accused of causing thyroid disorders and cancers. Most of these health concerns are originally based in in vivo and animal studies, which are challenging to relate to human health since we are complex as an organism, consume different concentrations of soy, and have distinct microbiomes with unique metabolic capabilities [9].



If you enjoy the taste of soy milk, a tofu dish, or any other soy product, there's no need to shy away from it. It's unlikely to cause you devastating harm as a large population study of 92,915 Japanese with a 15-year follow-up concluded that total soy product intake was not associated with all-cause total mortality. But just to sweeten the deal, in this mega-study, fermented soy products like natto had inverse associations with all-cause mortality in both sexes [9]. While the slimy natto soybeans might be an acquired taste, there are many other reasons why soy products can be part of a healthy diet. Not only may they be protective against chronic diseases caused by or exacerbated by the diet, but they may also have wide ranging health boosting effects. The isoflavone and non-isoflavone compounds in soybeans suggest that soy can be antioxidative, antiviral, anticancer hepatoprotective, cardiovascular protective, bone protective, menopausal symptom relieving, renal health boosting, immunity boosting, and reproductively healthy [9]. \*



**\*The content in this article is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Always consult your physician or other qualified healthcare provider in regards to health, diet, and medical conditions.**

Sources: 1. Cui, C., Birru, R. L., Snitz, B. E., Ihara, M., Kakuta, C., Lopresti, B. J., Aizenstein, H. J., Lopez, O. L., Mathis, C. A., Miyamoto, Y., Kuller, L. H., & Sekikawa, A. (2020). Effects of soy isoflavones on cognitive function: A systematic review and meta-analysis of randomized controlled trials. *Nutrition Reviews*, 78(2), 134–144. <https://doi.org/10.1093/nutrit/nuz050> 2. Galvin, G. (2020, February 27). America Has Gotten Much Fatter in the Past Two Decades. *US News & World Report*. <https://www.usnews.com/news/healthiest-communities/articles/2020-02-27/us-obesity-rate-passes-40-percent> 3. Hogervorst, E., Kassam, S., Kridawati, A., Soni, M., Xin, X., Shifu, X., & Rahardjo, T. B. (2017). Nutrition research in cognitive impairment/dementia, with a focus on soya and folate. *The Proceedings of the Nutrition Society; Cambridge*, 76(4), 437–442. <http://dx.doi.org/10.1017/S0029665117000404> 4. Katagiri, R., awada, N., Goto, A., Yamaji, T., Iwasaki, M., Noda, M., Iso, H., & Tsugane, S. (2020). Association of soy and fermented soy product intake with total and cause specific mortality: Prospective cohort study. *BMJ*, 368. <https://doi.org/10.1136/bmj.m34> 5. Kuryłowicz, A., Cakała-Jakimowicz, M., & Puzianowska-Kuźnicka, M. (2020). Targeting Abdominal Obesity and Its Complications with Dietary Phytoestrogens. *Nutrients*, 12(2), 582. <https://doi.org/10.3390/nu12020582> 6. Lin, H.-C., Peng, C.-H., Huang, C.-N., & Chiou, J.-Y. (2018). Soy-Based Foods Are Negatively Associated with Cognitive Decline in Taiwan's Elderly. *Journal of Nutritional Science and Vitaminology*, 64(5), 335–339. <https://doi.org/10.3177/jnsv.64.335> 7. Nakamoto, M., Otsuka, R., Nishita, Y., Tange, C., Tomida, M., Kato, Y., Imai, T., Sakai, T., Ando, F., & Shimokata, H. (2018). Soy food and isoflavone intake reduces the risk of cognitive impairment in elderly Japanese women. *European Journal of Clinical Nutrition*, 72(10), 1458–1462. <https://doi.org/10.1038/s41430-017-0061-2> 8. Okada, E., Saito, A., & Takimoto, H. (2018). Association between the Portion Sizes of Traditional Japanese Seasonings-Soy Sauce and Miso-and Blood Pressure: Cross-Sectional Study Using National Health and Nutrition Survey, 2012–2016 Data. *Nutrients*, 10(12). <https://doi.org/10.3390/nu10121865> 9. Rizzo, G., & Baroni, L. (2018). Soy, Soy Foods and Their Role in Vegetarian Diets. *Nutrients*, 10(1). <https://doi.org/10.3390/nu10010043>

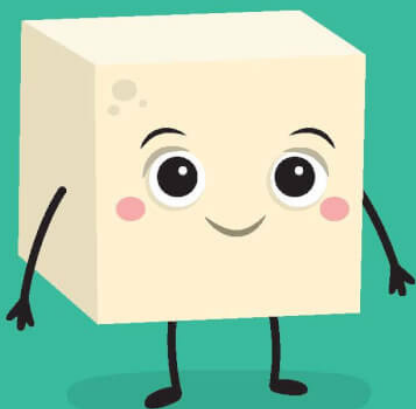
# Soy Word Search

Take a break and learn some soy terms with a word search!

G	O	E	C	R	G	H	U	F	O	T	I	E	O
I	S	O	F	L	A	V	O	N	E	S	T	P	S
G	T	V	G	R	I	Z	A	V	O	T	A	G	E
N	T	O	I	V	C	O	S	I	M	A	E	E	E
P	H	Y	T	O	E	S	T	R	O	G	E	N	S
O	Y	S	S	O	S	D	N	U	T	S	L	I	E
P	R	P	G	S	N	I	C	S	G	C	A	S	V
G	L	A	A	O	I	E	A	S	E	E	I	T	O
V	E	G	E	T	A	R	I	A	N	Q	D	E	I
R	E	T	E	M	P	E	H	D	T	U	Z	I	M
N	V	S	F	N	F	N	A	T	T	O	E	N	Z
N	O	E	R	V	S	T	O	E	E	L	I	N	M
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VEGETARIAN  
 ISOFLAVONES  
 MISO  
 NATTO  
 TEMPEH  
 GENISTEIN  
 LAIDZEIN  
 EDCS  
 TOFU  
 ESTROGENIC  
 PHYTOESTROGENS  
 EQUOL

PETA. (2020) Tofu Never Caused a  
 Pandemic [Advertisement]. PETA.  
[https://www.peta.org/media/psa/type/billboard/?category\\_name=vegan](https://www.peta.org/media/psa/type/billboard/?category_name=vegan)



**TOFU NEVER  
 CAUSED A  
 PANDEMIC.**

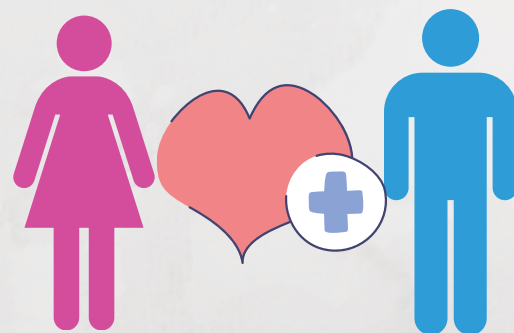
*Try it  
today!*

**PETA**



# Soy and its Sex-Based Effects on Health and Disease

By Hussain Naib



While it's clear that soy intake has demonstrated positive and negative associations with cancer based on certain levels of dietary consumption, we can dig even deeper into how phytoestrogens can interact with and affect our individual bodies. Research has found indications that, due to its endocrine disrupting properties that could enhance estrogenic and anti-estrogenic activity within the body, soy may be associated with health effects and concerns that differ based on sex and resulting endocrine function. It's also important to note that while we will mostly be referring to subjects as either men or women for the context of this article, we are strictly looking at soy's potential medical effects based on sexual and hormonal anatomy rather than gender identity.

Within women, studies regarding soy and health have largely shown either positive or inconclusive results. Breast and ovarian cancer (both of which are largely associated with an individual's endocrine function as they age) have both shown potentially reduced risks associated with soy consumption.

Studies done on women in Shanghai found lowered risk of premenopausal breast cancer rates as significant as 59% in response to long-term soy consumption, and other studies done (primarily within Asian populations, which is important to note) have found similar results [1]. Despite these positive indications, there have still been very few total studies done on soy's relationship with cancer in women, indicating the need for more research.

One area where results are more conclusive is within menopause- soy and other phytoestrogens have shown promising results as potential alternative treatments to hormonal replacement therapy (which carries long term concerns for increased risk of disease such as breast cancer or strokes) by boosting estrogenic activity in women with declining hormone levels [2]. In Asian countries with high levels of soy consumption, one study discovered that women were found to have lower than average amounts of menopausal symptoms such as hot flashes, lowered libido, etc. [2]. However, other studies found inconclusive results as well, indicating that the amount of estrogenic activity due to external soy/phytoestrogen intake was too insignificant to truly lower menopausal symptoms [3]





clearly more studies are needed, and the exact mechanism through which soy may interact and benefit women during menopause is yet to be discovered.



In men, the situation regarding soy and health is more controversial due to soy's female hormone-enhancing reputation, which has led people to associate it with feminine and even emasculating qualities. This is mainly based on claims that soy and other phytoestrogen levels impact male testosterone- which has been disproven multiple times within academia, with even the strongest study only finding marginal hormonal effects due to soy consumption in the absence of control over a variety of factors such as overall diet, genetics, environment, etc [4]. Going off of this, almost no studies have found conclusive negative results regarding soy's effects in men's health. With prostate cancer, observational studies have found associations between intake of soy and a reduced risk of prostate cancer.

One study in particular finding an increased risk in Chinese and Japanese men who moved to Western countries and adopted Western diets with lower levels of phytoestrogens compared to their previous diets (soy isoflavones such as genistein have been found to accumulate in prostate tissue which may have endocrine-altering effects) [5]. However, many studies have also found no significant effect by soy on prostate antigen levels, indicating the need for more research [5].

Despite overall inconclusiveness, there are a few medical areas where research has shown stronger negative health effects associated with soy intake in men. One study found significant associations between semen quality and semen phytoestrogen levels, noting lower levels of sperm count and motility in response to the presence of high urinary phytoestrogen levels [6]. However, this was an observational study that could not examine causality, indicating a host of other possible explanations for these associations. One other study, possibly one with the most significant results, found strong associations with soy phytoestrogen intake and altered levels of speed of cognitive processing (SOP) in men and women- older men were found to have lower SOP in response to an increase in phytoestrogen levels, while the inverse was found to be true with women [7].





**This study in particular, while nowhere near conclusive, poses interesting implications as data from studying menopausal women has indicated that soy has some of the highest potential for endocrine interaction within individuals with decreasing hormone level, indicating the need for further study. The various data indicates some level of soy-endocrine interaction with potential for various effects on both men and women. Future research is definitely necessary and should focus on identifying the exact mechanisms through which soy and other phytoestrogens impact endocrine function, especially in aging adults of various sexual identities.**

#### Works Cited

1. Allred CD, Allred KF, Ju YH, Virant SM, Helferich WG. Soy diets containing varying amounts of genistein stimulate growth of estrogen-dependent (MCF-7) tumors in a dose-dependent manner. *Cancer research*. 2001 Jul 1;61(13):5045-50.
2. Lethaby A, Marjoribanks J, Kronenberg F, Roberts H, Eden J, Brown J. Phytoestrogens for menopausal vasomotor symptoms. *Cochrane Database Syst Rev*. 2013 Dec 10;(12):CD001395
3. Sacks FM, Lichtenstein A, Van Horn L, Harris W, Kris-Etherton P, Winston M. Soy protein, isoflavones, and cardiovascular health: an American Heart Association Science Advisory for professionals from the Nutrition Committee. *Circulation*. 2006 Feb 21;113(7):1034-44.
4. Kurzer, M. S. (2002). Hormonal Effects of Soy in Premenopausal Women and Men. *The Journal of Nutrition*, 132(3), 570S-573S.  
<https://doi.org/10.1093/jn/132.3.570S>

5. van Die MD, Bone KM, Williams SG, Pirotta MV. Soy and soy isoflavones in prostate cancer: a systematic review and meta-analysis of randomized controlled trials. *BJU international*. 2014 May;113(5b):E119-30.
6. Yuan, G., Liu, Y., Liu, G., Wei, L., Wen, Y., Huang, S., Guo, Y., Zou, F., & Cheng, J. (2019). Associations between semen phytoestrogens concentrations and semen quality in Chinese men. *Environment International*, 129, 136–144.  
<https://doi.org/10.1016/j.envint.2019.04.076>
7. Alwerdt, J., Patterson, A. D., & Sliwinski, M. J. (2019). Gender Differences in Phytoestrogens and the Relationship with Speed of Processing in Older Adults: A Cross-Sectional Analysis of NHANES, 1999-2002. *Nutrients*, 11(8).  
<https://doi.org/10.3390/nu11081780>
8. Pros and Cons of Soy for Menopause. (n.d.). Lisa Health Blog. Retrieved December 18, 2020, from  
<https://blog.lisahealth.com/blog/2019/9/28/pros-and-cons-of-soy-for-menopause>



<https://www.walmart.com/ip/Menopause-Complex-Herbal-Support-Supplement-PhytoEstrogen-Pills-Black-Cohosh-Red-Clover-Soy-Isoflavones-Relief-Hot-Flashes-Mood-Swings-Night-Sweats/258132053>



# Soy's Strange Relationship with Western Masculinity

By Hussain Naib



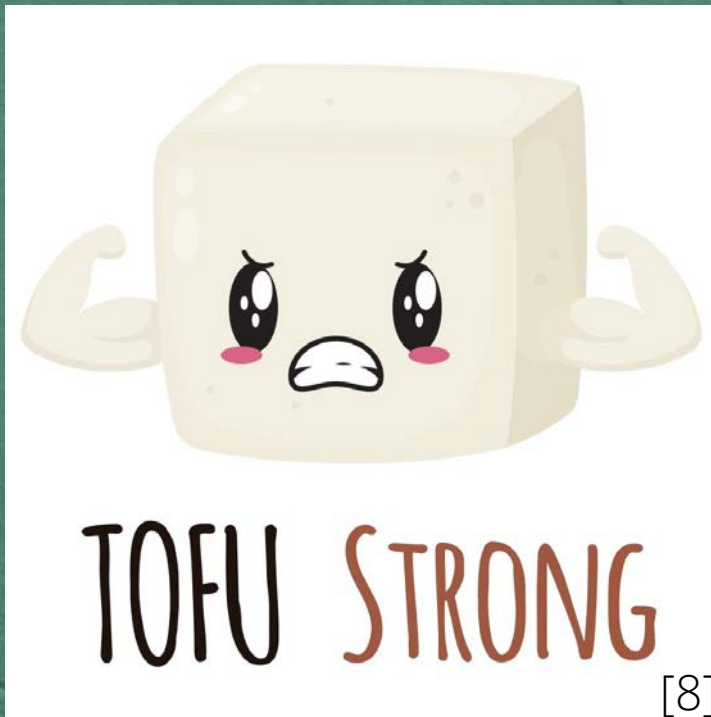
When most of us read the word soy, we often associate it in our minds with a particular niche it fulfills in society. We may think of soy milk, which for a long time was the most popular milk alternative for our lactose-intolerant and vegan comrades, or of tofu, the most commonly known staple food item made from soybeans that is extremely popular in many cuisines around the world. These associations often stem from our own personal identities, sociocultural influences, and backgrounds that consciously and subconsciously affect our perception of soy. Because of Soy's relevance as a phytoestrogen that can potentially induce hormonal responses, gender identity plays a large role in how we view its place in society and in our diets. Men in particular have been found to have a significantly negative worldview in which soy acts as a harmful feminizing agent, posing a supposed threat to their perceived masculinity[1].



So where exactly did these feelings of soy and feminization arise? The foundation for these societal tropes have actually existed for hundreds of years. During colonial times, “effeminate rice eater” was used to describe people, particularly non-western males, as physically and intellectually inferior, comparable to having qualities more similar to a woman due to their cultural differences [1]. The influence of these colonial values lead to widespread sentiments associating physical and mental superiority, and therefore virility, to the white, western man who had abundant access to meat within his culture and household [1]. As we can see, the original associations between a vegetarian-based diet and femininity occurred largely because of racist attitudes towards Asians, but how about now in the 21st century?



The arrival and mainstream distribution of soy milk in the 20th century acted as a catalyst and extremely easy target for these archaic pillars of masculinity. Along with meat, milk had also become a symbol of western and male superiority- this made soy milk, a product that exuded Asian cultural influence while also trying to replace milk, a clear violation of this paradigm [1]. The alt-right, or the right-wing political movement at odds with mainstream conservatism, then historically used the dairy vs. soy milk divide in order to reinforce their own racist and sexist agendas. This led to the term “soy boys”, an insulting slang word used to describe males who utterly lack all masculine qualities [2]. These harmful associations were only reinforced by scientific studies (most of which were inconclusive) within the last 30 years indicating a possible relationship between soy/phytoestrogen consumption and lowered testosterone, allowing what had previously been purely offensive alt-right sentiment to now have academic and logical value, propelling it into the mainstream.



Today, a very large amount of the male population within western society view soy and its derivatives as feminizing and detrimental to their masculinity. When asked for justification, many cite the mechanism of soy mimicking estrogen in the body. The truth is that, in actuality, the level of estrogenic activity and lowered testosterone (one of the supporting pieces of “evidence” given as a consequence of phytoestrogens) has been proven over and over to be extremely insignificant, especially in younger males with high levels of natural hormone production [3].



Despite this, targeted misinformation still prevails- many men believe that estrogen is an evil substance that would violate their identity, when in reality estrogen is just as essential to men as it is to women, being responsible for a variety of homeostatic processes within the body that are essential to good health and daily function. This is only amplified by the media, which portrays the ideal man as eating meat in a variety of different settings, from fast food commercials to children's books [4]. In multiple studies, males were found to justify their meat consumption at a much higher rate than women, often directly or indirectly citing their masculinity or gendered societal roles as justification [5]. While this is not directly researching soy, it does show strong evidence of men viewing meat as more and more masculine and essential to their identity, potentially causing them to continuously look down upon soy and soy products as "fake" versions of meat which could hinder their identities as men. While more research is certainly needed to obtain conclusiveness regarding the presence of soy's physiological effects in males, it is abundantly clear that male gender bias surrounding soy is still highly prevalent and, based on history, most likely the result of multiple interdisciplinary social interactions. Future research looking into the male-centered health effects of soy needs to keep these biases and cultural attitudes in mind, especially when selecting research subjects, designing experiments, and sharing results with the public.

#### Works Cited

1. Gambert, I., & Linné, T. (2018). From Rice Eaters to Soy Boys: Race, Gender, and Tropes of 'Plant Food Masculinity'. <https://doi.org/10.2139/ssrn.32984672>
2. Inside the "soy boy" conspiracy theory: It combines misogyny and the warped world of pseudoscience | Salon.com. (n.d.). Retrieved December 1, 2020, from [https://www.salon.com/2018/11/14/the-soy-boy-conspiracy-theory-alt-right-thinks-left-wing-has-it-out-for-them-with-soybeans\\_partner/3](https://www.salon.com/2018/11/14/the-soy-boy-conspiracy-theory-alt-right-thinks-left-wing-has-it-out-for-them-with-soybeans_partner/3)
3. Hamilton-Reeves, J. M., Vazquez, G., Duval, S. J., Phipps, W. R., Kurzer, M. S., & Messina, M. J. (2010). Clinical studies show no effects of soy protein or isoflavones on reproductive hormones in men: Results of a meta-analysis. *Fertility and Sterility*, 94(3), 997–1007. <https://doi.org/10.1016/j.fertnstert.2009.04.0384>
4. How The Game Changers Flipped the Script on Men and Meat. (n.d.). Retrieved December 1, 2020, from <https://thebeet.com/how-the-game-changers-flipped-the-script-on-men-and-meat/5>
5. De Backer, C., Erreygers, S., De Cort, C., Vandermoere, F., Dhoest, A., Vrinten, J., & Van Bauwel, S. (2020). Meat and masculinities. Can differences in masculinity predict meat consumption, intentions to reduce meat and attitudes towards vegetarians? *Appetite*, 147, 104559. <https://doi.org/10.1016/j.appet.2019.1045596>
6. Rothgerber, H. (2013). Real men don't eat (vegetable) quiche: Masculinity and the justification of meat consumption. *Psychology of Men & Masculinity*, 14(4), 363–375. <https://doi.org/10.1037/a0030379>
7. Adhikari, S. (2016, May 20). Top 10 Traditional Ancient Chinese Foods. Ancient History Lists. <https://www.ancienthistorylists.com/china-history/top-10-traditional-ancient-chinese-foods/>
8. Tofu Strong Buddy T-Shirt Design in 2020 | Tofu, Vegan, Vegan gifts. (n.d.). Pinterest. Retrieved December 16, 2020, from <https://www.pinterest.com/pin/609041549595017151/>



# An Amazon.com "Review" of Soy Isoflavones

By: Grace Danon

*Soy isoflavones' estrogenic qualities make them a marketable treatment for hormonal health issues. However, due to inter-individual differences in metabolism (see pg. \_\_\_\_), soy-based treatments are less effective for some than others [4]. You can find plenty of evidence for this in scientific literature, but what does Amazon.com have to say? Looking at the way soy isoflavone supplements are marketed and rated can provide some insight into public understandings of soy's capabilities, as well as what needs to be considered in the use of such products.*



**NOW Supplements, Soy Isoflavones, 60 mg (Plant Compounds Particularly Concentrated in Soybeans, like... 120 Count (Pack of 1)**

★★★★★ ~ 114

**\$17<sup>21</sup>** (\$0.14/Count)

Save 5% more with Subscribe & Save

[12]



**Hormone Balance & Menopause Relief for Women | 120 Capsules 2 Months of Hot Flash | Support for Women | Black Cohosh, Dong Qu...**

★★★★☆ ~ 727

**\$25<sup>00</sup>** (\$0.21/Count) ~~\$35.99~~

[6]

Using the search term “soy isoflavones” on Amazon.com, you’ll be welcomed with 15 pages of bottled tablets, capsules, and liquid formulas (plus some protein powders) [13]. For many results, “soy isoflavones” are included only in the ingredients list, and don’t headline the package fronts—perhaps to avoid any soy-based stigma [6]. Bland medicinal labels are interspersed with stereotypically “feminine” branding (e.g. pinks and purples, flowers, the greek female symbol) [12],[11]. From this, it seems that women are the intended consumers.

You’ll find quite a few major brands (e.g. One a Day, Nature’s Way, Solgar, NOW) and smaller brands as well [13],[12],[11]. Products themselves are either pure soy isoflavones (all 3) or blends of various herbal ingredients (e.g. red clover, black cohosh), minerals, and vitamins [12],[6]. Many advertise as being non-gmo, and several others boast vegetarian capsules [1]. It appears as though brands either mimic traditional medicine with simply-designed bottles and precise indication of milligrams, or appeal to alternativeness, with images of plants emphasizing their natural yet obscure ingredients [12],[6]. In this way, soy isoflavones become a solution for conservative and unorthodox patients alike.



**BlueBonnet Non-GMO Soy Isoflavones Supplement, 60 Count 60 Count (Pack of 1)**

★★★★★ ~ 29

[1]





Steve Taylor **TOP 500 REVIEWER** **VINE VOICE**

★★★★☆ **Debatable Outcome**

Reviewed in the United States on March 26, 2016

**Verified Purchase**

My wife has been taking this supplement to balance out her system and help control the mood swings. She claims it's not working but I say it is. As the recipient of said mood swings I think my opinion matters more then hers since it effects me most. It's been a month now and I'm going to keep ordering it.

39 people found this helpful

Helpful

Comment

Report abuse

[15]

Top reviewer, Steve Taylor, echoes research (probably inadvertently) with his “Debatable Outcome” conclusion [15]. His review actually reveals some disconcerting gender differences in isoflavone evaluations. Obviously, the perceived effect and experienced effect of the supplements are not equal. The interpretive definitions of menopause symptoms like mood swings or hot flashes necessitates a critical review of how these issues and their treatments are assessed by researchers. What does it really mean when a supplement “works”? Hopefully, misogyny isn’t coloring scholarly measurements of isoflavone efficacy they way it does in Steve’s review... Love it when men think *they* are the victims of menopause!



doggiesmom

★★★★★ **HUGE help with menopause symptoms....highly recommend**

Reviewed in the United States on April 10, 2016

**Verified Purchase**

I take this in combo with Black cohosh root to manage those pesky menopause symptoms every day and have noticed a HUGE improvement when I added the soy isoflavones. Ecspecially with the hot flashes and night sweats. I have been taking the two together for several years and am convinced it has enabled me to not have to take hormone replacement's instead. That is important to me to be able to manange these symptoms more naturally. I tried several types of soy isoflavones purchased at area drug stores before finding this brand on Amazon, and am positive this brand offered me the best relief and will be the only one I take going forward. When discussing my options with my doctor, he told me only approx. 40% of women get relief from the supplements, so I guess I am one of the lucky ones.

[5]

14 people found this helpful

Helpful

Comment

Report abuse

Doggiesmom eloquently summarizes both the appeal and the variability of soy isoflavones. She directly attributes her symptoms’ improvement to the supplements, conveying deep relief [5]. From her comments, it seems as though the supplements’ “naturalness” is a valuable quality, making them a coveted alternative to hormone replacement therapy’s “artificiality” and side effects [9]. Her doctor’s warnings that the supplements are effective in only 40% of women reflects current findings on disparate isoflavone absorption [8]. Interestingly, doggiesmom observed differences between brands [5]. This might point to some important variables in determining supplements’ efficacy, such as concentration and type(s) of isoflavones. Perhaps, combinatory effects with other ingredients play a role. If the next isoflavone publication I read lists doggiesmom as the first author, I won’t be surprised.

results for "soy isoflavones"

Advertised benefits

The advertised uses for the supplements clearly target female consumers, almost all being tied to either menopause or fertility [6],[2]. Bottles suggest shockingly diverse benefits: “emotional wellbeing,” hot flash relief, butt and bust enhancement, heart and bone health [6],[3],[2]. Thankfully, small, asterisked print admits these claims have not verified by the FDA, reminding us that the use of soy phytoestrogens for medical purposes is entirely unregulated. That said, I personally have more trust in Amazon.com than the FDA (...because B.P.A.), so judging from the high ratings, these products must not be totally ineffective. Conversely, Amazon doesn’t control for the placebo effect, so we better ask science what soy isoflavones actually help with. A recent literature review notes that while debate still exists, isoflavones appear to “reduce hot flashes... attenuate lumbar spine bone mineral density (BMD) loss, show beneficial effects on systolic blood pressure during early menopause, and improve glycemic control in vitro,” however effects on cognition are inconclusive [4]. Sadly, not as eye-catching as butt and bust enhancement.

Amazon could learn a bit from science...

Chen et al. point out that lack of standardized study protocols have made it difficult to establish isoflavones’ impact on menopausal symptoms [4]. Studies have noted that subjects’ equol production status influenced the isoflavones’ efficacy—a caveat left unmentioned on every supplement package [7]. Without knowing their equal production status, consumers trying out soy isoflavones are in a game of pure chance—a game they don’t even know they’re playing.

Future directions

For isoflavone supplements to be effective, new and improved approaches must seek to optimize absorption, rather than just increasing soy intake. Prebiotic and probiotic interventions are now being investigated as potential promoters of isoflavone metabolism [10]. The results of such studies have been mixed, so more research will be necessary to identify ideal methods for enhancing the activity and/or abundance of equol-producing bacteria [14]. Another promising avenue is the direct administration of equol [4].

WHILE A FEW PRODUCTS BRANDISH A MEASLY 3 STARS, THE VAST MAJORITY CLAIM BETWEEN 4 AND 5 [11], [12], [1]. MOST CUSTOMER REVIEWS SIMPLY STATE WHETHER THE PRODUCTS HAVE WORKED FOR THE REVIEWER OR NOT [5], [15].

It’s doubtful that most Amazon.com browsers understand exactly how soy works to relieve menopause symptoms. Isoflavone supplements should be more transparent about their variable metabolism in order to help consumers make informed choices. That said, because hormone replacement therapy is understandably undesirable for many women, it is crucial that research continues to refine and improve affordable alternatives like the supplements offered on Amazon [4].

Alexa, how do I find menopause relief?

## BIBLIOGRAPHY

- 1) "BlueBonnet non-gmo soy isoflavones supplement, 60 count." Amazon. Retrieved November 24, 2020, from [https://www.amazon.com/s?k=soy+isoflavones&qid=1606349115&ref=sr\\_pg\\_1](https://www.amazon.com/s?k=soy+isoflavones&qid=1606349115&ref=sr_pg_1). Screenshot by author.
- 2) "Bulksupplements soy isoflavone powder (100 Grams)." Amazon. Retrieved November 24, 2020, from [https://www.amazon.com/Bulksupplements-Soy-Isoflavone-Powder-Grams/dp/B077QH6HC/ref=redir\\_mobile\\_desktop?ie=UTF8&aaxitk=EMeMom0NmTDTEj5oMy1Sxw&hsa\\_cr\\_id=3290010100801&ref=sbx\\_be\\_s\\_sparkle\\_mcd\\_asin\\_0](https://www.amazon.com/Bulksupplements-Soy-Isoflavone-Powder-Grams/dp/B077QH6HC/ref=redir_mobile_desktop?ie=UTF8&aaxitk=EMeMom0NmTDTEj5oMy1Sxw&hsa_cr_id=3290010100801&ref=sbx_be_s_sparkle_mcd_asin_0)
- 3) "Butt and bust natural breast & butt augmentation and enlargement pills - 60 tablets (Double Potency, 2640 mg)." Amazon. Retrieved November 24, 2020, from [https://www.amazon.com/Natural-Breast-Augmentation-Enlargement-Pills/dp/B01CFBPILC/ref=sr\\_1\\_26?dchild=1&keywords=soy+isoflavones+butt+and+bust&qid=1606350404&sr=8-26](https://www.amazon.com/Natural-Breast-Augmentation-Enlargement-Pills/dp/B01CFBPILC/ref=sr_1_26?dchild=1&keywords=soy+isoflavones+butt+and+bust&qid=1606350404&sr=8-26). Screenshot by author.
- 4) Chen, L.-R., Ko, N.-Y., & Chen, K.-H. (2019). Isoflavone supplements for menopausal women: A systematic review. *Nutrients*, 11(11). <https://doi.org/10.3390/nu11112649>
- 5) [doggiesmom]. (2016, April 10). HUGE help with menopause symptoms....highly recommend [Online forum post]. Amazon. [https://www.amazon.com/gp/customer-reviews/R3A5J4JN5CDN04/ref=cm\\_cr\\_dp\\_d\\_rvw\\_ttl?ie=UTF8&ASIN=B00NB34GIU](https://www.amazon.com/gp/customer-reviews/R3A5J4JN5CDN04/ref=cm_cr_dp_d_rvw_ttl?ie=UTF8&ASIN=B00NB34GIU)
- 6) "Hormone balance & menopause relief for women | 120 capsules 2 months of hot flash | Support for women | Black cohosh, dong quai, sage, red clover, licorice & soy isoflavones | Estrogen pills for women." Amazon. Retrieved November 24, 2020, from [https://www.amazon.com/s?k=soy+isoflavones&ref=nb\\_sb\\_noss\\_2](https://www.amazon.com/s?k=soy+isoflavones&ref=nb_sb_noss_2). Screenshot by author.
- 7) Jackson, R. L., Greiwe, J. S., Desai, P. B., & Schwen, R. J. (2011). Single-dose and steady-state pharmacokinetic studies of S-equol, a potent nonhormonal, estrogen receptor  $\beta$ -agonist being developed for the treatment of menopausal symptoms. *Menopause* (New York, N.Y.), 18(2), 185-193. PMID: 21341397
- 8) Kolátorová, L., Lapčík, O., & Stárka, L. (2018). Phytoestrogens and the intestinal microbiome. *Physiological Research*, 67(Suppl. 3). S401-S408. <https://doi.org/10.33549/physiolres.934022>
- 9) Krebs, E. E., Ensrud, K. E., MacDonald, R., & Wilt, T. J. (2004). Phytoestrogens for treatment of menopausal symptoms: A systematic review. *Obstetrics and Gynecology*, 104(4), 824-836. <https://doi.org/10.1097/01.AOG.0000140688.71638.d3>
- 10) Mathey, J., Mardon, J., Fokialakis, N., Puel, C., Kati-Coulibaly, S., Mitakou, S., Bennetau-Pelissero, C., Lamothe, V., Davicco, M. J., Lebecque, P., Horcajada, M. N., & Coxam, V. (2007). Modulation of soy isoflavones bioavailability and subsequent effects on bone health in ovariectomized rats: The case for equol. *Osteoporosis International*, 18(5), 671-679. <https://doi.org/10.1007/s00198-007-0351-y>
- 11) "Maxi womax, women's formula, 60-Count." Amazon. Retrieved November 24, 2020, from [https://www.amazon.com/s?k=soy+isoflavones&page=5&qid=1606269437&ref=sr\\_pg\\_5](https://www.amazon.com/s?k=soy+isoflavones&page=5&qid=1606269437&ref=sr_pg_5). Screenshot by author.
- 12) "NOW supplements, soy isoflavones, 60 mg (plant compounds particularly concentrated in soybeans, like genistein, daidzein and glycitein), 120 veg capsules." Amazon. Retrieved November 24, 2020, from [https://www.amazon.com/s?k=soy+isoflavones&qid=1606349115&ref=sr\\_pg\\_1](https://www.amazon.com/s?k=soy+isoflavones&qid=1606349115&ref=sr_pg_1). Screenshot by author.
- 13) Results for "soy isoflavones." Amazon. Retrieved November 24, 2020, from [https://www.amazon.com/s?k=soy+isoflavones&i=hpc&rh=n%3A3760901%2Cp\\_72%3A1248906011&s=relevancerank&c&qid=1605657031&rnid=1248901011&ref=sr\\_st\\_relevancerank](https://www.amazon.com/s?k=soy+isoflavones&i=hpc&rh=n%3A3760901%2Cp_72%3A1248906011&s=relevancerank&c&qid=1605657031&rnid=1248901011&ref=sr_st_relevancerank)
- 14) Setchell, K. D. R., & Clerici, C. (2010). Equol: history, chemistry, and formation. *The Journal of Nutrition*, 140(7), 1355S-1362S. <https://doi.org/10.3945/jn.109.119776>
- 15) Taylor, S. [Steve Taylor]. (2016, March 26). Debatable outcome [Online forum post]. Amazon. [https://www.amazon.com/gp/customer-reviews/R14KTJZO26XFEX/ref=cm\\_cr\\_dp\\_d\\_rvw\\_ttl?ie=UTF8&ASIN=B00NB34GIU](https://www.amazon.com/gp/customer-reviews/R14KTJZO26XFEX/ref=cm_cr_dp_d_rvw_ttl?ie=UTF8&ASIN=B00NB34GIU)
- 16) Touden, Y., Abe, F., Ishida, T., Uehara, M., & Ishimi, Y. (2011). Resistant starch promotes equol production and inhibits tibial bone loss in ovariectomized mice treated with daidzein. *Metabolism*, 60(10), 1425-1432. <https://doi.org/10.1016/j.metabol.2011.02.009>



# A FLAVORFUL JOURNEY

BY RACHEL SMITH

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Sun kissed  
Sun crisped  
Released from the cage  
Free to roll to into the future  
A high dive to engage  
Fall deep into warm waters  
Into a long and peaceful sleep  
Submerged. Calm. Still.

Awaken!  
Come up for a breath  
The day is just beginning  
A brief, yet violent dismemberment and death  
In an instant all that was is gone  
You are nothing, no more  
Yet part of you still goes on

Newly transformed, reincarnated  
Hydrate and quench a century's thirst  
A water so pure and delicious  
To complement, honor and immerse  
A spiritual flow  
Into the mouth of the volcano  
Angry heat, leaves all alive behind  
Increasing tremors gift eruption divine

A blazing inferno must cool  
Into layer after layer of crushing refinement  
Oh your Koarse pARts Are for another day  
Shed the old skin, leave it behind  
YoU are Better Alone, they say

Though an unexpected bitter caress  
From the ocean goddess, Nigari  
Pulling you in closer for a tighter embrace  
Dare to give her too much or too little space  
She won't cuddle you ever closer

All tucked into bed  
Many blankets wrap over  
Too tight, too hot, too dry  
To squeeze your form  
To sweat you out  
To shape you up the final time

Enter the bath to unveil yourself  
Complete and nutty-sweet  
Obtain a slice right through  
Icebergs so you're cool to the touch  
The final masterpiece, handmade tofu



# Isoflavones & the Environment

AN INTERVIEW WITH DR. HANNAH LANDECKER  
BY KENNEDY MEYER & GRACE DANON

*We asked UCLA Professor, Dr. Hannah Landecker, for her insight into how soy and its phytoestrogenic properties have a role in the environment.*

**Instances have been noted of animals becoming infertile after eating large amounts of phytoestrogenic foods, for example sheep grazing on red clover [1]. If you had to guess, what do you think the ecological purpose of phytoestrogens is?**

- "One would have to ask what function these molecules serve in the plant itself--whether they have antioxidant properties....There's lots of things in organisms, like beta carotene, for example, is a pigment and plants have purposes for those molecules, but they also have these biological effects in the animals or plants that eat them.... So I don't know what purpose a phytoestrogen serves for red clover, but I would guess it serves some function in the plant itself. It has served probably as part of the evolutionary relationship between red clover and the animals. I know that the observations of eating phytoestrogens were at the root of the development of diethylstilbestrol, a synthetic estrogen which was used as a growth promoter for animals... so it's possible that in small amounts it's growth promoting for animals... Sheep grazing on red clover in huge quantities may just be an artificial artifact of humans planting whole fields of it. I'm pretty sure the infertility effect was probably at a scale that is not reflective of an original evolutionary relationship."

**If you had to guess, what do you think the ecological purpose of phytoestrogens is? Is it possible that proliferation of phytoestrogenic foods like soy could alter endocrine patterns in nature?**

- One would have to ask what function these molecules serve in the plant itself--whether they have antioxidant properties....There's lots of things in organisms, like beta carotene, for example, is a pigment and plants have purposes for those molecules, but they also have these biological effects in the animals or plants that eat them.... So I don't know what purpose a phytoestrogen serves for red clover, but I would guess it serves some function in the plant itself. It has served probably as part of the evolutionary relationship between red clover and the animals. I know that the observations of eating phytoestrogens were at the root of the development of diethylstilbestrol, a synthetic estrogen which was used as a growth promoter for animals... so it's possible that in small amounts it's growth promoting for animals... Sheep grazing on red clover in huge quantities may just be an artificial artifact of humans planting whole fields of it. I'm pretty sure the infertility effect was probably at a scale that is not reflective of an original evolutionary relationship.

**Are phytoestrogenic effects a valid reason for avoiding any plant food? If future findings on isoflavones skew towards the negative, how will this impact plant-based eating?**

- Absolutely. Insects and animals have likely evolved to use phytoestrogens in a variety of ways. In the field of epigenetics, one of the metabolites of soy shows epigenetic impact on gene expression in individuals



who eat a lot of it, and so people have been worried in particular about the inclusion of soy in components of formula because babies' of course are growing and patterns of gene expression are being established in that period. Humans tend to scale everything up and have lots of one ingredient, and so you get exposed to an amount that you might not have seen in a natural setting.

**Considering the profusion of soy products in the industrialized food system, how deeply embedded might phytoestrogens be in the environment? Do you think phytoestrogens are as ubiquitous or as dangerous as industrially produced endocrine disruptors?**

- I think I would need to know more about what happens to the isoflavones. Let's say you have soy protein as the basis of some other food, so that you don't even know that you're eating soy. I don't know if after all that processing, do they still contain the isoflavones? I don't think that you can equate soy ingredients with phytoestrogen content.

**Where does soy stand in the Planetary Health perspective, especially considering its commodity crop status in the U.S., genetic modification, and consumption in highly processed forms?**

- Soy is... definitely not something that is high on the list of sustainable practices at the moment. In part, because so much of the deforestation of the Amazon is taking place to produce soy.... It's not so much that the soy itself is genetically modified... it's [that] it's genetically modified to be resistant to glyphosate, and then glyphosate is put on the fields to kill everything else that's not soy but then the soy carries the burden of glyphosate. It's kind of anti-intuitive. People see the word "genetically modified," and they're like, "That must be the thing that's wrong with it," but it's this complex of using genetic modification to have a certain pesticide strategy. That kind of big agriculture intellectual property monopoly where you're selling the farmers the

technology as a whole like the seed, and the equipment, and the pesticide as this kind of package...that is totally antithetical to the idea of ecological intensification, to the ideas of sustainability. And then you add to that, the production of animals like chickens and pigs and so on, [which] is so dependent on this soy. We are creating this channel from monocropping soy to monocropping industrial animals which is also highly unsustainable, so all of those things are kind of linked together...there is a place for soy in agriculture... We should find a variety that we can enhance microbially and not use pesticides on and all of those things. It's not the soy in and of itself, it's the way it has historically come to have this place as a huge commodity, that does not have any environmental values at the center of its production.

**Considering the importance of soy foods in Asian cuisines, do you think they can have a place on the Planetary Health plate?**

- Absolutely. I don't know much about plant itself...but it cannot be that there is only one kind... There must be all kinds of subtypes of soybeans. So, in that sense--reintroducing variety and having it part of complex agricultural systems--then absolutely it has a place.

**What do you think about using food as medicine, like using soy isoflavones for menopause relief?**

- Well, I think it's interesting that there's such of culture of self-experimentation around it, and there's a lot of community knowledge sharing and a lot of self-treatment going into that because of the dissatisfaction with some of the alternatives, which is estrogen replacement therapy. Estrogen replacement therapy was pushed pretty hard by the pharmaceutical industry until the correlation between estrogen replacement therapy and breast cancer became apparent. So there's... a lot of interest in natural remedies there... I would want to see it thoroughly examined before seeing it as a therapy, but in many ways it already is for many women. But it's never just the soy. It's always exercise coupled with this diet or other kinds of components, and I have a very strong feeling that no substance is a magic wand against something like menopause.



**"EVERYTHING IN  
MODERATION  
AND WITH A  
GRAIN OF SALT."**

- DR. HANNAH LANDECKER