

Science supports the benefits and safety of soyfoods



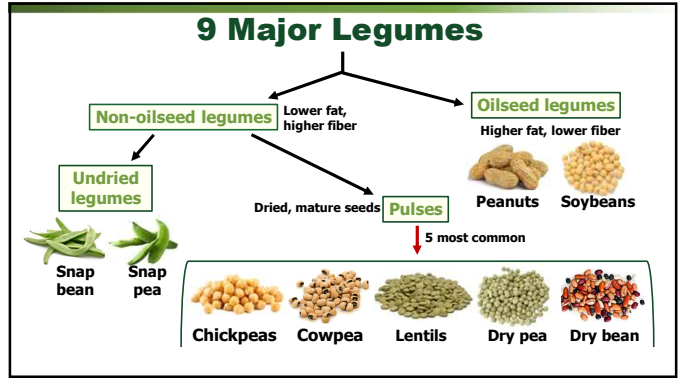

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 Director of Nutrition Science and Research
 Soy Nutrition Institute Global
<https://sniglobal.org/>





March 22, 2023


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Legume	Percent calories	
	Fat	Protein
Soybeans	47	42
Lentils	3	32
Great Northern	3	28
Kidney beans	4	27
Black beans	4	27
Mung beans	3	27
Peas (green)	2	26
Pinto beans	4	25
Navy beans	4	24
Adzuki beans	1	24
Lima beans	2	22
Garbanzo beans	14	22

Soybeans are higher in fat and protein than other legumes




More calorically dense

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Fatty Acid Composition of Soybean Oil

Fatty acid type	Percent
Saturated	16
Monounsaturated	22
Omega-6 polyunsaturated*	54
Omega-3 polyunsaturated**	8

*Linoleic acid, essential fatty acid
 **alpha-linolenic acid, essential fatty acid



Source of both essential fatty acids

Agronomy 2020, 10, 24; doi:10.3390/agronomy10010024

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FDA approved health claim – 2017
Soybean oil may lower risk of coronary artery disease

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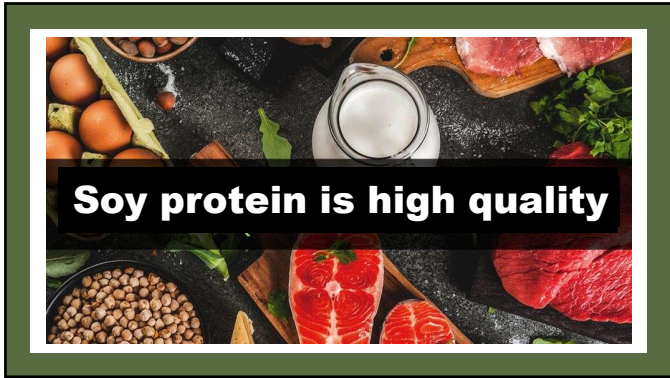
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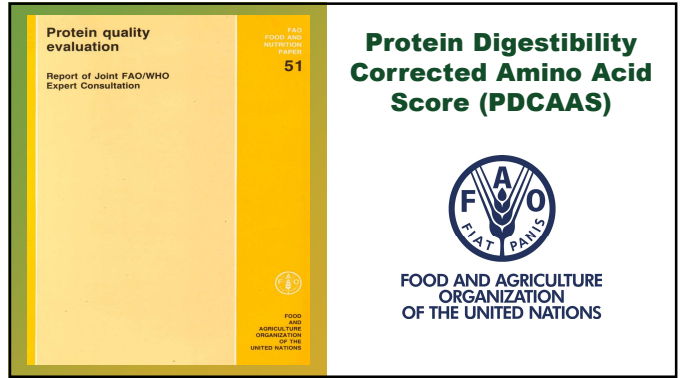


More calorically dense

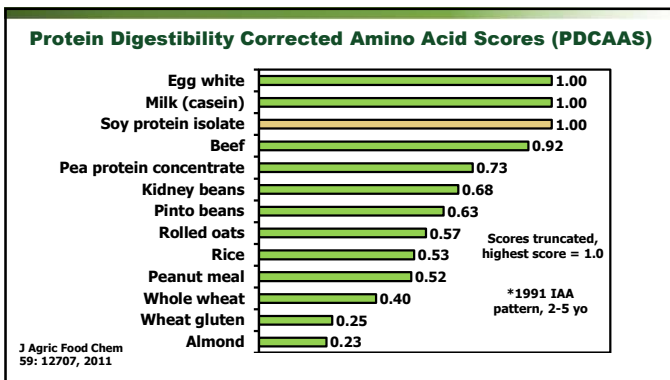
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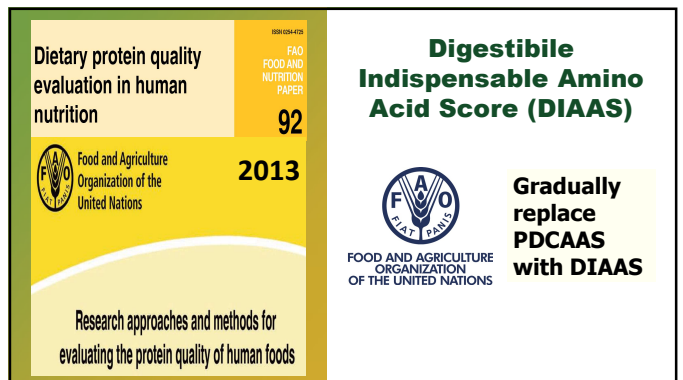
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Protein Quality Assessment

Differences between the DIAAS and the PDCAAS

1. Digestibility:
 - a. Ileal rather than fecal
 - b. Amino acids rather than protein
2. Truncation eliminated
3. 3 new amino acid scoring patterns
4. Reactive rather than total lysine
5. Antinutrients considered

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Health Claim

Twenty-five grams of soy protein per day, as part of a diet low in saturated fat and cholesterol, may reduce risk of heart disease

FDA
U.S. Food and Drug Administration

1999

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**Meta-analysis Results
(9 clinical studies)**

Soy protein supplementation leads to similar gains in muscle mass and strength in response to resistance exercise training as whey and animal protein supplementation.

No Difference Between the Effects of Supplementing With Soy Protein Versus Animal Protein on Gains in Muscle Mass and Strength in Response to Resistance Exercise

Mark S. Doering, Nathan A. Johnson, David L. Johnson, James M. Robinson, Andrew R. Lake, Katherine S. Reed

Int J Sport Nutr Exerc Metab 28: 674, 2018

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Soy protein may aid recovery from exercise

Asian J Sports Med 7: e33528, 2016

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Soy protein

- High quality
- Modestly lowers LDL-cholesterol
- Promotes muscle mass/strength
- May aid in exercise recovery
- May combat sarcopenia
- Sustainably produced

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More calorically dense

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Uniquely rich sources of isoflavones

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Approximate per capita adult isoflavone intake

Region	mg/d
Japan	30-40
United States	<3
Europe	<3
United Kingdom	5

**Traditional soyfoods: 3-4 mg/g protein
1 serving, ~25 mg**

Int J Food Sci Nutr 65: 9, 2014; Public Health Nutr 5: 1217, 2002; Nutr Cancer 55:1, 2006; J Nutr 149: 1208, 2019; AJCN 95: 147, 2012; Murai et al. EJN 2022

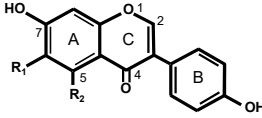
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What are isoflavones?




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What are isoflavones?



(Genistein > Daidzein >> Glycitein)



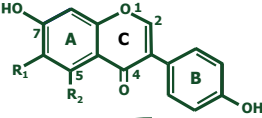
Uniquely rich sources

- Naturally occurring plant compounds
- Phytoestrogens (plant estrogens)
- Differ from the hormone estrogen clinically and at the cellular level

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Isoflavones

(Genistein, Daidzein, Glycitein)



- Cancer
 - Breast (early intake)
 - Prostate
- Skin health (wrinkle reduction)
- Arterial health (endothelial function)
- Menopausal symptoms (hot flashes)
- Cognitive function (memory)

Proposed benefits

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Hypothesis: Early soy intake reduces breast cancer risk later in life

Nutr Cancer 61: 792, 2009

Am J Clin Nutr 89: 1673, 2009

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Breast cancer prevention

- 1 oz Soybeans
- 1 cup Soy milk
- 1 cup Soy yogurt
- 1/2 cup Tofu
- 1/2 cup Soybeans



Good reason for girls to eat ≥1 serving of soy daily

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Skin Wrinkling

Natural phenomenon due to a variety of degenerative environmental, genetic, and hormonal influences

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Randomized Controlled Parallel Trial




2-year funding, \$400,000 (USD)

Raja Sivamani, M.D., M.S., C.A.T.
Integrative Skin Science and Research

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Randomized Controlled Parallel Trial

- 24 weeks duration
- US postmenopausal women
- Diets:
 - 25 g/day soy protein*
 - 25 g/day casein
- Outcomes: Wrinkle depth, collagen, pigmentation

*50 mg isoflavones

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Soy and Chronic Disease Risk

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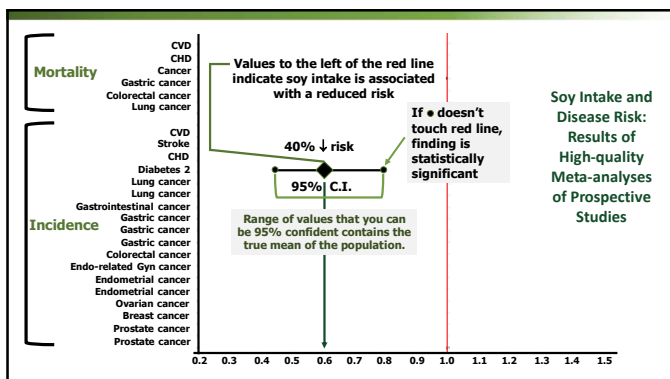
The associations of soy intakes with non-communicable diseases: a scoping review of meta-analyses

Br J Nutr 129: 135, 2023

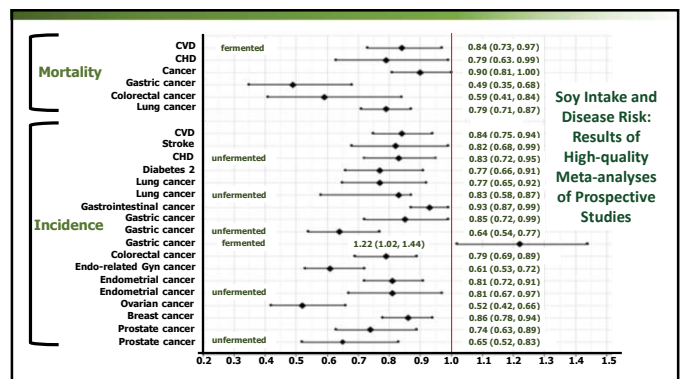
Scoping Review of Meta-analyses of Prospective Studies

“... soy intakes might potentially reduce cardiovascular, cancer and diabetes II diseases.”

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“Higher habitual soy food consumption was positively associated with HGS [handgrip strength] in general Chinese adults.”

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Relationship between Soy Intake & Handgrip Strength (HGS) among Chinese Men & Women

Intake (x/wk)	<1	1	2-3	≥4
N	5848	7220	10,354	6103
Age (y)	40.6	40.0	40.9	42.1
HGS (kg)	35.5	36.1	36.3	36.6

P for trend, <0.0001. Adjustments: age, sex, BMI, smoking, alcohol, edu., income, physical activity, hypertension, hyperlipidemia, family history of disease (including cardiovascular disease, hypertension, hyperlipidemia and diabetes), kcal and dietary pattern.

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Odds Ratios between Soy Intake and Low Handgrip Strength (<28 kg, men; <18 kg, women)

Intake (x/wk)	<1	1	2-3	≥4x
N	5848	7220	10,354	6103
Age (y)	40.6	40.0	40.9	42.1
ORs	1.00	0.944	0.819	0.638

P for trend, <0.01. Adjustments: age, sex, BMI, smoking, alcohol, edu., income, physical activity, hypertension, hyperlipidemia, family history of disease (including cardiovascular disease, hypertension, hyperlipidemia and diabetes), kcal and dietary pattern.

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1 kg increase in handgrip strength reduces functional status* by 5 percent

***Degree of dependence a person experiences in performing Activities of Daily Living and Instrumental ADL**

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Activities of Daily Living (ADL)	Instrumental ADL	Functional Status
<ul style="list-style-type: none"> Dressing Ambulating Bathing Eating Transferring Toileting 	<ul style="list-style-type: none"> Food preparation House keeping Doing laundry Shopping for groceries Using the telephone Managing medications Managing finances Using transportation 	

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Epidemiologic data strongly suggest soy consumption contributes to improved health

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Soy myths, misconceptions and misunderstandings

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Does Soy Feminize Men?

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Effect of soy on **Hormones**

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TESTOSTERONE

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Organizations that have reached one of the two following conclusions:

1. Soy is safe for breast cancer patients
2. Isoflavones do not adversely affect breast tissue

American Cancer Society
American Institute for Cancer Research
Canadian Cancer Society
Cancer Nutrition Consortium
Dana Farber Cancer Institute
German Research Foundation
European Food Safety Authority
Irish Society of Medical Oncology
MD Anderson Cancer Center
World Cancer Research Fund International

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Consuming soy after a diagnosis of breast cancer may reduce recurrence

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Isoflavones and the Prognosis of Breast Cancer Patients

Outcome	RR	95% CI
All cause mortality ¹	0.96	0.92, 1.02
BCa specific mortality ²	0.83	0.64, 1.07
BCa recurrence ²	0.75	0.61, 0.92

¹Per 2 mg/d ²High vs low intake. Findings based limited, suggestive evidence

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BREAST CANCER SURVIVAL

LATEST RESEARCH ON BREAST CANCER SURVIVAL
 By Rachel Clark, Health Promotion Consultant, WCRF

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Soy and Women with Breast Cancer

1990s

Possibly harmful

180°

Present

Possibly beneficial

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October 31, 2017

"... the use of soy protein at the levels necessary to justify a [health] claim has been demonstrated, to our satisfaction, to be safe ..."

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Intake Recommendations

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Intake Recommendations - Adults

2 servings daily (15-25 g soy protein)

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Intake Recommendations - Children

1-2 servings daily (7-15 g soy protein)

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Feeding the World

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HOW TO FEED THE WORLD 2050

The Economist
How to feed the world

IISD / SDG KNOWLEDGE HUB
6 August 2020
World Population to Reach 9.9 Billion by 2050

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"Meeting the demand for protein, within environmental limits, is one of the biggest challenges for the global food system in the 21st century."

Stockholm Resilience Centre
Stockholm University

SONEVA DIALOGUE
The Global Protein Challenge

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Perspective: Soybeans Can Help Address the Caloric and Protein Needs of a Growing Global Population

Mark Messina

OPEN ACCESS

Frontiers Nutr 9 (2022)

INTRODUCTION

"... soybeans are well positioned to meet future global needs for energy and protein."

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INTRODUCTION

Advantages of Soybeans

- Available*
- Affordable
- Versatile
- Higher in protein
- Higher in fat (essential fatty acids)
- Calorically dense
- Fix atmospheric nitrogen
- Sustainably produced

*4 times more soybeans grown worldwide than all pulses combined

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Thank you for your attention

mark.messina@sniglobal.org

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