



2019 NSCA PERSONAL TRAINERS VIRTUAL CONFERENCE

OCTOBER 7 – 11

#NSCAPT19

Optimizing Protein Intake for Exercising Vegetarians

Lonnie Lowery, PhD

CONFLICT OF INTEREST STATEMENT

I have one potential conflict of interest in relation to this presentation: The application for a non-provisional patent related to macronutrient-impregnated coffee filters.

Vegetarian Types

“I won’t eat anything that had a face.”

Lacto-ovo vegetarians consume dairy and eggs (more variety) while **vegans** consume only plants (less variety).

- Ethical reasons
- Weight management
- Chronic disease reduction
- Longevity
- Diet planning

At-risk Nutrients

Specific vitamins, minerals, complete proteins

Restricting intake by removing sections of the Food Guide (Pyramid, My Plate, etc.) calls for increased focus on...

- Vitamins D and B₁₂
- Iron and Calcium
- Zoochemicals (creatine)
- **Complete proteins**
- Diet planning

Protein Quality

How “good” are my choices?

Complete proteins (typically animals) contain all nine indispensable amino acids, **incomplete proteins** (most plants) do not. Quality scales get more granular, however.

- Meats, dairy, egg
- Grains, beans/ legumes
- Collagen, gelatin
- Fast vs. slow
- Leucine content
- PER, BV, NPU
- **PDCAAS**
- **DIAAS (newer)**

Protein Quality

How “good” are my choices?

Food	PDCAAS	DIAAS	Limiting AA
Milk Pro Conc	1.00	1.18	Met, Cys
Whey Pro Iso	1.00	1.09	Val
Soy Pro Iso	0.98	0.90	Met, Cys
Pea Pro Conc	0.89	0.82	Met, Cys
Whole milk	1.00	1.14	Met, Cys
Chic Breast	1.00	1.08	Trp
Boiled Egg	1.00	1.13	His
Almonds	0.39	0.40	Lys
Chic Peas	0.74	0.83	Met, Cys
Tofu	0.56	0.52	Met, Cys

From
Phillips,
2017.

Protein Quality

How “good” are my choices?

“The **digestibility** of plant-based protein appears to be markedly less than that of animal products, which might need to be accounted for when designing a vegan diet.”

-Rogerson, 2017

Complimentary Proteins

Combining foods with mutually-supportive AA profiles

Beans are higher-protein foods (7g/ serv.) but tend to lack **methionine**. Grains contain some methionine but lack **lysine**. Consuming them together may help solve the problem for vegetarians. (Same meal unnecessary?)

Food	Lys	Met
Legumes	High	Low
Grains	Low	High
Nuts, seeds	Low	High
Together	High	High

Complimentary Proteins

Combining foods with mutually-supportive AA profiles

Many regional foods are consumed in cultures around the world for both taste and protein quality of the meal.

- Beans and rice
- Beans and corn bread
- Corn and lima beans
- Bean burritos
- Peas and corn

Complimentary Proteins

Combining foods with mutually-supportive AA profiles

How should the timing be done? With other vegetables in the diet, beans, grains, nuts and seeds can be consumed at the same meal or simply across the day.

Same-meal intake is physiologically attractive but it's currently less advised than in the past.(Rogerson, 2017)

Another Consideration

A focus on protein synthesis

“...stimulation of MPS would require ingestion of a protein that is higher in leucine or fortification of a lower **leucine**-containing protein (i.e., lower quality or lower dose) with leucine.”

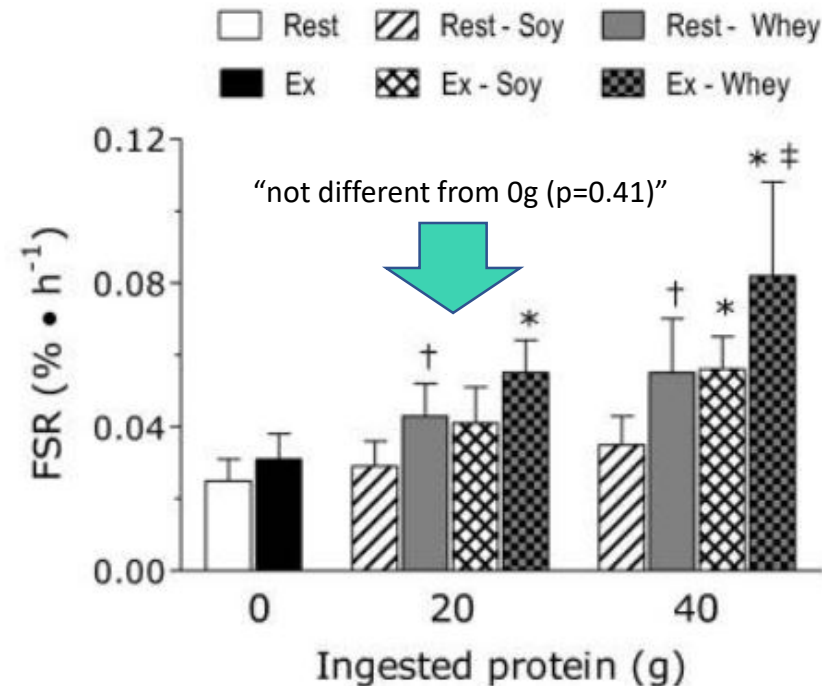
-Phillips, 2017

Not all training studies suggest leucine-rich whey or even protein supplementation itself is necessary for strength or hypertrophy development. Energy intake is also important. (Messina, 2018; Mobley, 2017)

In-training

Acute and chronic effects

Scientific literature varies regarding the usefulness of plant proteins such as peanut, pea or even soy (acute exercise, older men).



From Yang, Y., et al, 2012.

In-training

Acute and chronic effects

Scientific literature varies regarding the usefulness of plant proteins such as peanut, pea or even soy (meta analysis or 12-week training study).

“In addition to an appropriate training, the supplementation with pea protein promoted a greater increase of muscle thickness as compared to placebo... vegetable pea proteins could be used as an alternative to whey-based dietary products.”

-Babault, 2015

Practical Applications

- Veganism is more restrictive than lacto-ovo vegetarianism, and may bar access to higher-quality egg or dairy proteins.
- Combining various plant proteins throughout the day to exceed the Recommended Dietary Allowance or adding specific indispensable amino acids may increase anabolism.
- Soy and pea protein consumption combined with resistance exercise training do have support in the scientific literature for strength development or hypertrophy in younger participants. Older men may require higher doses.

References

1. Babault, N., et al., Pea proteins oral supplementation promotes muscle thickness gains during resistance training: a double-blind, randomized, Placebo-controlled clinical trial vs. Whey protein. *J Int Soc Sports Nutr.* 2015 Jan 21;12(1):3.
2. Messina, M., et al. No Difference Between the Effects of Supplementing With Soy Protein Versus Animal Protein on Gains in Muscle Mass and Strength in Response to Resistance Exercise. *Int J Sport Nutr Exerc Metab.* 2018 Nov 1;28(6):674-685.
3. Mobley, C., et al. Effects of Whey, Soy or Leucine Supplementation with 12 Weeks of Resistance Training on Strength, Body Composition, and Skeletal Muscle and Adipose Tissue Histological Attributes in College-Aged Males. *Nutrients.* 2017 Sep 4;9(9). pii: E972.
4. Phillips, S. Current Concepts and Unresolved Questions in Dietary Protein Requirements and Supplements in Adults. *Front Nutr.* 2017 May 8;4:13.
5. Rogerson, D. Vegan diets: practical advice for athletes and exercisers. *J Int Soc Sports Nutr.* 2017 Sep 13;14:36
6. Wilkinson S, et al. Consumption of fluid skim milk promotes greater muscle protein accretion after resistance exercise than does consumption of an isonitrogenous and isoenergetic soy- protein beverage. *Am J Clin Nutr.* 2007;85(4):1031.
7. Yang, Y., et al. Myofibrillar protein synthesis following ingestion of soy protein isolate at rest and after resistance exercise in elderly men. *Nutr Metab (Lond).* 2012 Jun 14;9(1):57.