

Protein Wars Part 2 of 4

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☀️ Plant-based protein

Some proponents of a plant-based diet, in which all or more protein is sourced directly from plants, claim that plant-sourced proteins are less detrimental to the environment than animal-sourced proteins. While there is no shortage of opinions on this topic, credible, objective, robust scientific findings are scarce. The independent, highly-respected [National Institutes of Health](#) published a study entitled "[Plant-Based Diets: Considerations for Environmental Impact, Protein Quality, and Exercise Performance](#)", and concluded that "Based on currently available literature, it is unlikely that plant-based diets provide advantages, but do not suffer from disadvantages, compared to omnivorous diets for strength, anaerobic, or aerobic exercise performance. However, plant-based diets typically reduce the risk of developing numerous chronic diseases over the lifespan and require fewer natural resources for production compared to meat-containing diets."

☀️ Fractionate to isolate

Isolated plant proteins are obtained from oilseeds (i.e. soya), pulses (i.e. mung beans), cereals (i.e. oats) and leaves (i.e. alfalfa), mostly for incorporation into simulated meat and poultry products. The peer-reviewed Food Technology published [Alt-Proteins: A Promising Future - IFT.org](#) - a summary of the four major (to date) alternative animal protein sources: plant-based and algal proteins; insects; precision fermentation and cellular agriculture. Both traditional wet and dry fractionation technologies, which require specialized equipment and skilled personnel, are used to isolate plant-based proteins. Yet, each has a trade-off. The wet approach involves "the use of organic solvents, acid and alkali [...] to remove non-protein fractions and increase purity", at a cost of high energy use, high water use and protein denaturation. The dry approach involves fine milling, separation and air classification, "a milder treatment that generally yields lower protein purities while retaining the functionalities of protein". Some manufacturers are experimenting with a hybrid approach, to maximize yield and minimize downsides: [Dry and wet fractionation of plant proteins: How a hybrid process increases yield.](#)

☀️ Emerging from the cutting edge

Riding the crest in protein extraction research is Sá et al in [Frontiers | Influence of Emerging Technologies on the Utilization of Plant Proteins \(frontiersin.org\)](#). The authors examine microwave non-ionizing radiation, ohmic heating (use of electrical currents), ultrasound, enzymatic processes, and the most popular to date with manufacturers, high pressure processing.

☀️ "Don't delay – invest today!"...so they say

The life science investment community recently (April 2023) gave plant-based stocks a thumbs up in "[How to Invest in Plant-based Foods \(Updated 2023\)](#)":

"The [global plant-based foods market](#) is projected to expand at a compound annual growth rate of 12.4 percent between 2022 and 2029 to reach more than US\$95.52 billion." Increasing consumer demand for meat and dairy alternatives is cited as the primary driver, while "key ingredients to success" to build repeat sales and satisfactory or better ROI remain the tried-and-true traditional pillars of taste, affordability and convenience.

☀️ Problems in paradise

Dr. Ziyet Boz, author of the Food Technology article provides a food scientist's professional, insider opinion: "Challenges in upstream and downstream processing, specifically related to obtaining the desired functionality, quality and composition of proteins, good performance of existing product formulations, and additional costs, pose major technological barriers. Despite the demonstrated benefits of environmental sustainability, several uncertainties exist around the emissions and added energy requirements associated with novel protein production methods".

☀️ Diversification of diets remains important

Plant-based proteins are, to date, the most popular and trending alternative to animal-sourced protein. Increasingly, all stakeholders, including those deeply rooted in animal-protein sourced businesses, agree that diversification of human dietary patterns has the potential to benefit consumers, industry and our planet. **FF**