


## Chapter 58

# Nutritional Benefits of Selected Plant–Based Proteins as Meat Alternatives

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### ABSTRACT

*Humans meet their nutritional requirements by consuming food, and our body uses naturally sufficient amounts of all necessary nutrients to maintain its functioning. Proteins form the basis of the human diet because they are necessary for immune responses, cell signals, muscle masses, and the repair of damaged cells. Animal and plant food products are the main protein sources in the human diet. Based on scientific evidence, proteins derived from animals recently started to be replaced by plant-based options as preferred proteins for a range of reasons. Consumption of non-meat protein sources being shown to be healthy and environmentally friendly is a major consideration. Plant-based protein is helping minimize high cholesterol, type 2 diabetes, high blood pressure, obesity, certain types of cancer, including colorectal, ovarian, and breast cancers, and a diet based on non-animal proteins could increase life expectancy and decrease greenhouse gases emissions from livestock as less resources are used for plant production. The chapter describes the nutritional benefits and current uses of nine non-animal protein sources and the health benefits arising from replacing animal protein.*

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## **INTRODUCTION**

Nutrients play a crucial role in maintaining overall human health. Protein is the most important nutrient required for growth and development (Besler, Rakıcıoglu, Ayaz, Demirel Büyüktuncer, Özel, Samur Eroğlu, ... & Yürük, 2015). The structure and function of our bodies, the regulations of cells, tissues and organs depend on proteins. Approximately 16% of the adult human body is composed of protein. As proteins in the body do not form storage depots, we need to get enough of them daily through a balanced diet. Proteins are long chains of amino acids, which are their building blocks created, formed and synthesised for our human body to function correctly. Although the properties of the amino acids vary between animal and plant sourced proteins, they both can supply the needed and recommended daily requirement for protein of 0.8 g/day, considered sufficient for almost all healthy adult individuals (Pasiakos, Agarwal, Lieberman, & Fulgoni, 2015).

Protein sources in a diet come from animal and vegetable sources (Lin, Lu, Kelly, Zhang, Zheng, & Miao, 2017). Common examples of animal protein sources are meat, poultry, fish and eggs, and common examples of plant-derived proteins are beans, lentil and soybean (Nehete, Bhambar, Narkhede, & Gawali, 2013). In the majority of industrialized countries, the main protein source of dietary protein is animal foods. However, increased consumption of red meat and processed meat along with other animal products has been shown to be associated with obesity, coronary heart disease, high blood pressure, cancer, elevated serum and urinary uric acid levels (Møller, Sluik, Ritz, Mikkilä, Raitakari, Hutri-Kähönen, ... Raben, 2017). Because of the adverse effects of animal protein on health, vegetable protein sources seem to be a wise alternative in meeting proteins needs. Vegetable protein sources are increasingly being recommended because of their positive effects on health (Chen, Song, Chen, Ding, Peng, & Mao, 2016; Comerford & Pasin, 2016; Wu, Zeng, Huang, Li, Zhang, Ho, & Zheng, 2016). In order to provide human protein requirements, it is necessary to support the production of plant proteins which can replace the sources of animal protein (Comerford & Pasin, 2016). Vegetable proteins can meet the essential amino acids that people need (López, Galante, Robson, Boeris, & Spelzini, 2018). Such sources are known to provide greater saturation than animal protein sources because of their low energy content and high fibre content (Nielsen, Kristensen, Klingenberg, Ritz, Belza, Astrup, & Raben, 2018). It is known that consuming foods with high fibre content enhances insulin sensitivity and provides glycemic control (Moorthi, Vorland, & Hill Gallant, 2017). There is also evidence that the risk of cardiovascular diseases can be reduced by a flexitarian dietary model which involves the consumption of more vegetative proteins rather than a meat-rich diet (Richter, Skulas-Ray, Champagne, & Kris-Etherton, 2015).

This chapter presents an evaluation of the nutritional properties and the many human health advantages of nine important plant-derived proteins obtained from beans, soybean, chickpea, lentil, quinoa, buckwheat, chia, teff and spirulina in term of their physiological benefits. Amino acid composition, nutritional aspects, functional properties and their role in promoting good human health are examined. Although these plants are well-known, only recently nutritionists started drawing attention to them as superfoods and alternatives in meat replacement.

## **HEALTH BENEFITS AND DRAWBACKS OF PLANT AND MEAT CONSUMPTION**

The health benefits and drawbacks of both plant and meat consumption are multifaceted and complicated. Evidentially meat production and overconsumption attract more negative health and environmental effects

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