

A Review on Plant Based Proteins that can be Included in Diet

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Abstract:- Dietary proteins fulfil all three functions of nutrition which is required for the growth, maintenance, and repair of bodily tissue; it regulates critical processes within the body; and any extra protein is used as an energy source. Plant-based diets, which here are considered to include both vegan and lacto-ovo-vegetarian diets, are becoming more popular for a variety of reasons, including environmental and public health concerns. Most of the plant based diets are more environmentally friendly than those based mostly on meat because they have a smaller environmental impact, including fewer greenhouse gas emissions. A plant-based (PB) diet has been linked to a lower incidence of type 2 diabetes, CVD and other cardiometabolic risk factors, several malignancies, and all-cause mortality. High in fibre and polyphenolics, plant-based diets are also linked to a diverse gut microbiota that produces compounds with anti-inflammatory properties that may aid in the management of disease processes. A variety of plant-based food products, including plant-based whole-eggs, plant-based beverages, and plant-based biscuits etc., are available on the market.

Keywords:- Plant Based Diet, Protein, Plant Based Protein Diet, Eco Friendly Food, Meat Alternative, Vegetarian Diet.

I. INTRODUCTION

Proteins are composed of amino acids that are essential for human health at all ages and are commonly employed in the food business to provide a variety of healthy diets to meet nutritional demands. Dietary proteins are the primary supply of nitrogen, and amino acids serve as building blocks for bodily tissue, requiring physiological enzymes to regulate chemical and biological reactions and keep the body working properly. The Protein Digestibility Corrected Amino Acid Score (PDCAAS) is a protein quality assessment tool based on essential amino acid levels and real faecal protein digestibility. Proteins are also commonly utilised as surface-active agents in the food sector due to their amphiphilic nature (Qin *et al.*, 2022). Vegetarianism, veganism, and the adoption of a plant-based diet are all emerging trends in Western countries. Although plant-based diets are frequently confused with vegetarian diets, they consist of distinct eating habits. Being "plant-based", which is a more inclusive term (fruit, vegetables, nuts, oil, whole grains, and legumes) refer to eating mostly plant-based

foods. There is no permanent ban on animal products for those who switch to a plant-based diet, but they are free to substitute vegetable foods for animal ones. Furthermore, according to some experts, the Mediterranean diet is mostly plant-based. Concern for animal welfare, the environment, health, and the rejection of meat are frequently cited justifications for switching to a plant-based diet (Paivarinta *et al.*, 2020).

II. PROTEIN

Protein, like lipids and carbohydrate, is required for tissue growth, maintenance, and repair in the human body. It is necessary for the proper functioning of numerous systems in your body, including muscle growth, hormone production, immune system support, and enzyme production. Proteins are formed by combining smaller molecules known as amino acids (Tuggle *et al.*, 2024). Proteins boost our immune system and aid in blood clotting after illness and injury. Protein is likely the cause if your body performs this action (Nadathur *et al.*, 2024).

III. PLANT BASED PROTEIN DIET

The term "plant-based diet" refers to a variety of dietary patterns that involve consuming fewer animal-based foods, such as meat and dairy products, while increasing intake of plant-based foods. A diet low in red meat and milk, and high in plant proteins from traditional and novel sources, may promote environmental sustainability by reducing greenhouse gas emissions, global water consumption, and land use. These include lower chances of mortality from cardiovascular illnesses and some malignancies. Overall, proposals to transition towards plant based proteins may provide solutions to feeding the world population a healthier diet (Wisniewska *et al.*, 2024). Lacto-vegetarians and vegans have been found to have greater total diet quality than non-vegetarians. Vegetarians are more likely to adhere to the requirements for total fruit, whole grain, and plant-based protein consumption. Because plant based diets are characterised by an overall greater quality, this fact may, to some part, explain the better health outcomes compared to omnivorous diets (Wisniewska *et al.*, 2024). Plants are the primary dietary sources of vegetarian diets, including fruits, vegetables, nuts, seeds, oils, grains, and legumes. Vegetarian diets that are well-planned and based on unprocessed or minimally processed foods are low

in calorie density, animal protein, cholesterol, and saturated fat, but rich in fibre, phytochemicals, vitamins, and some minerals like magnesium and potassium. Protein-rich plant foods include legumes, nuts, and seeds, which provide 17-40%, 8-26%, and 21-25% protein per dry mass, respectively (Luna *et al.*, 2024).

IV. HEALTH BENEFITS OF PLANT BASED PROTEINS

Aside from exercise, diet has a significant impact on exercise adaptation. Protein intake appears to be particularly important (Schalla *et al.*, 2024). Vegetarian diets resulted in significant reductions in blood pressure, total and LDL cholesterol, body weight, HbA1c, and other cardiovascular

risk factors. Vegetarian diets were linked to improved cognitive function and a lower risk of cognitive deterioration (Hu *et al.*, 2024). Improved blood pressure, glucose control, cholesterol levels, body mass index (BMI), and acid-base parameters are just a few of the health advantages associated with plant-based diets. Additionally, they lower the chance of complications including diabetes, heart disease, even death (Narasaki *et al* 2024). In many circumstances, instead of enhancing health, the vegetarian diet may raise morbidity and mortality risks (Luna *et al.*, 2024). Plant-based diets have emerged as a long-term option for both human health and the environment. This issue dives into the plant-based diets, looking at their health advantages and role in promoting a sustainable future (De morais *et al.*, 2024).

Table 1 Recommended Dietary Allowance

| Group | Protein g/day |
|-------------------------|---------------|
| 4 – 8 years | 19 |
| 9 – 13 years | 34 |
| Boys 14 – 17 years | 52 |
| Girls 14 – 17 years | 46 |
| Male 65 – 74 years | 80.4 – 100.5 |
| 75 + years | 78.12 – 97.65 |
| Female 65 – 74 years | 68.64 – 85.8 |
| 75 + years | 65.16 – 81.45 |

Sources: Garcia-Iborra *et al.*, 2024; Smith *et al.*, 2024

Table 2 Protein Content of Foods

| Plant sources | Protein g/100g |
|---------------|----------------|
| Common beans | 16.7 – 27.2 |
| Peas | 20.5 – 22.6 |
| Chickpeas | 20.47 |
| Cowpeas | 22.5 – 26.1 |
| Faba beans | 26.12 – 29.2 |
| Lentils | 20.6 -31.4 |

Source: Zhou *et al.*, 2024

V. PLANT BASED PRODUCTS

A. Plant based Biscuits

Due to their health advantages, legumes are being incorporated in a number of innovative plant-based product compositions to partially replace wheat flour. Compared to the most popular flour type, refined wheat flour, legumes flours have less rapidly absorbed starch and are higher in protein and fiber. Legumes can be added to wheat-based snacks, like biscuits, to assist reduce postprandial glycaemic level. Legumes, seeds, and wheat also increase the amount of certain amino acids, like L-arginine and Branched Chain Amino Acids (BCAA), which have an appetite-regulating impact (Kanata *et al.*, 2024).

➤ *Health Benefits:*

As part of a hypocaloric diet plan, eating a plant-based biscuit that is high in amino acids that regulate appetite promotes adherences, lowers energy intake, and aids in weight loss. Moreover, an increase in insulin sensitivity was explained by the group that consumed the enriched biscuit having lower fasting insulin and HOMA-IR reading. The dietary intervention that included the plant-based protein-enriched biscuit as a supplement during a Mixed Meal Tolerance Test (MMTT) led to noticeably higher levels of glicentin in the blood, a peptide that may be able to predict long-term weight loss and decreased food intake (Kanata *et al.*, 2024).

B. Plant based Beverages

According to where they come from, plant-based drinks can be categorized into five main groups. Nut beverages include almond, coconut, hazelnut, pistachio, walnut, and cashew; pea, lupin, cowpea, peanut, and soy beverages; cereal beverages include muesli, rice, maize, and spelt. The pseudo-cereal drinks are amaranth, quinoa and teff. Seed drinks consist of hemp, sunflower, and sesame. Fluids made from plant material using water extraction methods including breakdown (size reduction) and/or homogenization are known as plant-based drinks. With particles ranging in size from 5 to 20 μm , the water soluble plant extract have an appearance similar to that of bovine milk (Hidalgo *et al.*, 2024).

➤ Health Benefits

Fermentation improves the nutritional composition of plant-based beverages by increasing nutrient digestibility and availability while also creating nutritional elements such as vitamins. Furthermore, this metabolic activity can aid in the removal of antinutritional substances, which is advantageous for increased nutrient absorption. Enzymes and microorganisms in the plant matrix degrade complex macromolecules (such as proteins and carbohydrates) during the fermentation process (Hidalgo *et al.*, 2024).

C. Plant based Whole Eggs

Plant-based whole egg substitutes based on curcumin-loaded emulsion gels. Curcumin was utilised as a natural pigment to give the eggs their distinctive yellow-orange colour, while RuBisCO (a plant protein) served as both an emulsifier and a gelling agent. RuBisCO was able to produce and stabilise oil-in-water emulsions by adsorbing on the surfaces of the oil droplets during homogenisation and producing a protective covering around them (Zhou *et al.*, 2024).

VI. CONCLUSION

Diets centred on plants are becoming more and more popular. Dietary sustainability is a hot topic right now, and people are realising how important it is to consider both the health of the earth and human health when developing dietary recommendations. A plant-based diet that mostly consists of minimally processed foods can be nutritionally sufficient if it is planned properly. A major step towards reducing the environmental impact of the global food system is eating a greater amount of plant-based food. The market for plant-based meat alternatives is expected to rise, increasing demand for plant protein. This trend, notably in alternative meat, has piqued the interest of specialised brands and eco-friendly food firms, resulting in a surge in demand for plant-based alternatives. Overall, ideas to migrate to PB proteins may provide solutions for feeding the world population a healthy diet.

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