



MILLET IS AN ALTERNATIVE SOURCE OF PLANT PROTEIN

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INTRODUCTION

Millet is one of the essential foods for millions of people in arid regions of Asia and sub-Saharan Africa. It can help in solving the world's most pressing challenges at once: improper nutrition (from malnutrition to obesity); environmental issues (environmental deterioration, water dryness, and climate crisis) and rural poverty. As a result, millet grains are receiving special awareness about food use and for their potential bioethanol and biofilm production. To improve the nation's well-being, the Indian government designated the year 2018 as its "National Year of Millet.". India is the main producer of millet (47%) (FAOSTAT, 2020); it has recognized three major classes of millet: main, minor, and pseudo. The Food Safety Standards Authority of India (FSSAI) has categorized as primary millet (finger millet, pearl millet, and sorghum) and the subsidiary millet (Kodo, foxtail, proso, and little millet). Millet is proof against pests and sicknesses; in contrast to the primary grain, millet is useful for humans laid low with gluten-allergic reactions and celiac disease. They are neither acid-forming nor allergenic and, therefore, digestible without issue. They are the primary supply of nutrients, energy, protein, and minerals, along with iron, calcium, zinc, and magnesium. The Food and Agriculture Organization (FAO) has declared the year 2023 as the "International Year of Millet".

Pearl millet, finger millet, sorghum, foxtail millet, Kodo millet, proso millet, and barnyard millet are a broad group of plants. These are not only protein-rich, but they also give

other nutrients such as vitamins, fiber, and minerals, possible vital nutrients due to their protein-rich, such as pearl millet and foxtail millet contain about coarse protein -13.6% and finger millet -9.8% proteins substantially better with other cereals. Furthermore, the high concentration of threonine, lysine, and valine is present in finger millet when compared to other millet, the quantity of protein it contains is considered to be extremely high. Similarly, the proso millet and black finger millet have 8.5% & 11.5% of the protein, respectively, with a high percentage of leucine, isoleucine, leucine, and methionine. Likewise, little millet and Kodo millet are fiber-rich (~7 to 9%) and have 8% to 9.4% protein content.

MILLETS ARE SMART FOODS:

Nutritional composition of millet: When compared to other cereals in the same manner as wheat and rice, millet has a protein concentration that ranges from 10 to 12%, while foxtail has a protein value of around 12.3%. Compared with the other grains, the fiber content of millet is more than 10%-12%. In addition, the PUFA content of millet is greater than other grains. The amazing nutritional profile of millet considers that ragi, also known as finger millet, has a high calcium content (364 mg/100 g), ten times that of wheat or rice. Similarly, barnyard millet has an iron concentration of around (0.005g/100 g), and pearl millet has about (0.00642g/100 g).

GOOD FOR FARMER

- ✓ Millet helps smallholders with efficient crop rotation, as many millets only take 60 to 90 days to ripen, while fine grains take 100 to 140 days.
- ✓ Resource Efficiency: Millet makes efficient use of available nutrients and additionally responds nicely to advanced agricultural situations and further inputs, resulting in up to a 3-fold growth in yield.
- ✓ Climate Resilience: Millet is the most secure crop for small farmers as it is the most resilient and weather-adaptable crop in intense environments, temperatures (up to 64 °C), and arid environments. They are often the final crops to stand at some stage in a drought. Seasons, in addition to sustainable Food sources, are within the destiny in deteriorating climate conditions.

WHY PLANT-BASED PROTEINS ARE IMPORTANT:

A 2017 survey report shows that 73% of Indians are protein deficient, while more than 90% are unaware of their daily protein needs. The excitement comes as the plant protein food market is estimated to grow from Rs. 2000 Crore in 2022 to Rs. 40,000 Crore in 2032.

MILLETS COMPOSITION:

The nutrient composition includes a higher quantity of protein and minerals like magnesium, potassium, copper, iron, phosphorus, in contrast to wheat, sorghum, and corn. The main nutrients in millet are protein, fiber, starch, fats, minerals, and vitamins. Millets carry in complex carbohydrates 65-75%, protein 5.6-12%, fat 2-5%, crude fiber 15-20%, and minerals 2.5-3.5%.

UTILIZATION OF MILLET PROTEIN:

Proteins play a variety of roles in food. The functional properties include flexibility, solubility, foaming, oil binding, flavor binding, and coagulation. Protein with a better coagulation rate is required to manufacture meat substitutes. Plant-based proteins, such as millet proteins, are growing in scientific relevance to satisfy the increasing demand for protein diets. However, millet-based proteins are rarely utilized as culinary ingredients nowadays. Millet-based proteins are rarely utilized as culinary ingredients nowadays. In addition, millet protein is an ingredient in extract, isolated hydrolysate, etc. Numerous gluten-free consumables, including pasta, bread, beverages, and premixes, may be made using millet protein, which has been shown to increase the amount of protein in the final product.



EFFECTIVENESS OF MILLET PROTEIN FOR HUMAN HEALTH:

The millet protein performs a critical function in human metabolism. Millet protein could also be inspected to be used in toddler/weaning ingredients and healing formulas designed for disease management. The carbohydrates in the millet are digested slowly to maintain blood glucose levels in diabetic patients. Millets are rich in dietary fiber, lower the cholesterol level in the blood, prevent cardiovascular disease, and satiate hunger for a longer period. Millet protein helps hypoallergens with low gluten content that can prevent celiac disease and is recommended for people of all ages. Millet protein can be inspected for suitability and development of health-benefitting and promoting food products. Antioxidants rich in millet lessens radical damage and prevent early ageing and Alzheimer's disease.

FUTURE CHALLENGE FOR ENTREPRENEURSHIP:

The research community needs to solve several issues relating to knowledge gaps, customer actions, and the protein food manufacturing unit, among others, whether millet protein products

can be commercialized. Such factors consist of the availability of delving into the action of the protein/its product in vivo research done in human models, e.g., the influence of ingestion of a protein supplementation or its by-products on hunger, sufficiency, or certain illness states; acceptable product forms like powder, granule, bar, or liquid from protein foodstuffs, etc. The recommended daily protein intake, consumer understanding of adequate dietary protein intake, and the possible healthcare benefits of protein consumption are five other key factors. Furthermore, it is critical to understand if customers are willing to migrate from converting livestock proteins to more durable millet amino, as well as whether they have the culinary ability to include these proteins in adequate concentrations in proper nutritious media. As a result, the optimum method for achieving the consumer acceptability of these proteins must be chosen. Furthermore, the protein extract production unit must consider post-milling processing mechanism feature acting as high protein content, proportions, assimilation, biodegradability, pathogenicity, resulting to the chemical compounds/enzymes/ or microorganisms involved (if any), and performance characteristics just at the time of manufacture (capacity to be incorporated into food), manufacturing costs, individual dietary variables, sustainable development, and methods to integrate the necessary portion of protein into a food employing these proteins to treat malnutrition with therapeutic food. As a result, a paradigm for gradually replacing animal protein meals in daily nutrition with millet-based protein products will be established.

CONCLUSION:

Switching to millet and millet-based foods, which offer several health advantages, can lower the risk of cardiovascular diseases and diabetes, making it easier for individuals to lead healthier lives. This article emphasized that millet is a low-cost source of plant protein and that the notion of concentration has evolved through time. Functional millet flour and protein concentration which improved functionality, might be crucial elements in a functional food basket. The food industry is working to accommodate the expanding consumer demand for plant protein meals and hence millet protein could be one of the source for plant-based proteins. With the rise in people's health consciousness, millet will be a great option to consider due to its overall benefits.

