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Millets – The Magic Nutri-Cereals

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Abstract

Millets were among the oldest meals that our ancestors ate. It belongs to Gramineae grass family. Millets grains are as Millets are climate resilient staple food crops with nutrient dense grains that are rich in minerals, dietary fiber, phytochemicals as well as vitamins. Optimal consumption of millets- plant based diet was found to have preventive role against several degenerative illnesses, including cancer, Parkinson's disease, and cardiovascular disease (CVD), diabetes, metabolic syndrome. Hence, millets were considered as the most suitable alternative cereal grain for human consumption. Several studies have demonstrated that, millets are rich in antioxidants that combat the oxidative stress and reverse ageing process. Several animal experiments have also demonstrated that, regular intake of millet-based diet had resulted in treating Diabetes and Fatty liver. The Food and Agriculture Organization of the United Nations (FAO) designated 2023 as the International Year of Millets in an effort to raise awareness of the health advantages of millets. Numerous initiatives have been carried out to increase millets' accessibility to customers, increase their availability in markets, and promote consumption. Considering the dietary significance and health benefits, Cultivation and consumption of millets will go a long way in order to achieve sustainability in the agriculture production and maintenance of soil health.

Keywords: *Millets; Nutritional value; Glycaemic index; degenerative diseases.*

1. Introduction

The majority of India's millets are produced in semi-arid and desert regions, including Rajasthan, Maharashtra, Karnataka, Andhra Pradesh, and Madhya Pradesh [1]. Millets have a low glycemic index (GI), are high in micronutrients, dietary fibre, and proteins. Because millets are so full with nutrients, they are frequently referred to as "nutri cereals". The Food and Agriculture Organisation declared 2023 to be the "International Year of Millets". Both macronutrients like proteins and carbs as well as micronutrients are abundant in millets. Consumption of Nutri cereals helps in controlling the blood pressure (Bp), lowering of blood sugar levels (diabetes). Millets also contain plant protease inhibitors, bioactive peptides, and dietary fibres which have ability to interact with gut bacteria, stop cell growth, and cause apoptosis, all of which may have anti-cancer effects [1].

2. Types of Millets

There are seven varieties of millet. It was found that oleic and linoleic acids were the predominant unsaturated fatty acids in all millets. Kodo millet was found to have the highest amounts of bound and free phenolic [2]. The most popular and significant millets for human consumption include finger millet (Eleusine carocana), sorghum (Sorghum bicolor L.), kodo millet, pearl millet, proso millet (Panicum miliaceum), and teff (Eragrostis tef) (Pennisetum glaucum) (Paspalum scrobculatum), foxtail millet (Staria italic), Digitaris exilis, the small millet (Panicum suma trense), and fonio [3]. Analysis of millet production from different states of india in

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percentage in Figure 1.

3. Nutritional Values of Millets

Nutritional value including macronutrients namely, protein (713%), carbohydrates (60-70%), fat (1.5-5%), fiber (2-7%) and for micronutrients namely iron (1.8 mg/100 g), calcium (75mg/100g), phosphorus, magnesium. Since minor millets contain a large amount of starch (between 50 and 70 percent), application breadth is another quality that might be covered in vibrant food segments [4]. With comparatively high levels of protein, vitamins, minerals, fiber, and energy, finger millet is a nutrient-dense grain [5].

3.1. Carbohydrates

Pearl millet grains contain soluble sugars, dietary fibre, and starch as their carbs. The endosperm of pearl millet is thought to contain a significant amount of starch, which is composed of glucose in the forms of amylase and amylopectin [6].

3.2. Proteins

Millet's second significant component is protein. A protein content of 11.6% is estimated for pearl millet, compared to 10.4% for sorghum, 7.2% for rice, 11.5% for barley, 11.1% for maize, and 11.5% for barley [7].

3.3. Dietary Fiber

According to, fibre is crucial for gut health and can improve gut health when consumed in moderation. It also has a significant role in preventing diabetes, colon cancer, and heart disease [8]. Pearl millet's 8–9% dietary fibre content promotes better bowl movement. Furthermore, due to its low-digestibility characteristics, it lengthens the transit time, which lowers blood glucose levels and benefits diabetic patients who do not require insulin. Pearl millet's high fibre content also inhibits the release of bile acids, which further aggravates gallstones in the body, slowing down the movement of food from the stomach into the intestines [9].

3.4. Lipids

Compared to 3.21–7.71% for maize, the estimated fat content of pearl millet is 5-7%. Pearl millet has high levels various fatty acids, including stearic, palmitic, and linoleic acids, but low levels of oleic acid when compared to maize [10].

3.5. Macronutrients

The composition of pearl millet is influenced by the characteristics of the soil and includes both total and trace minerals. Ash ranges in concentration from 1.6-3.6% in pearl millet and 0.861.35% in maize, respectively. Pearl millet has a higher concentration of minerals than maize, including calcium, phosphorus, magnesium, manganese, zinc, iron, and copper [10].

3.6. Polyphenols

The primary polyphenols in millet, such as tannins and phenolic acids, are abundant in the grain and are thought to function as antioxidants and strengthen the immune system [11]. Additionally, Bacillus cereus is susceptible to the antibacterial properties of the phenol-containing finger millet seed coat [12]. Additionally, it has been shown that millet phenolics can partially block complex carbohydrate enzymatic hydrolysis, which in turn blocks pancreatic amylase, α-glucosidase, and malt amylase, all of which lower postprandial hyperglycemia [13].

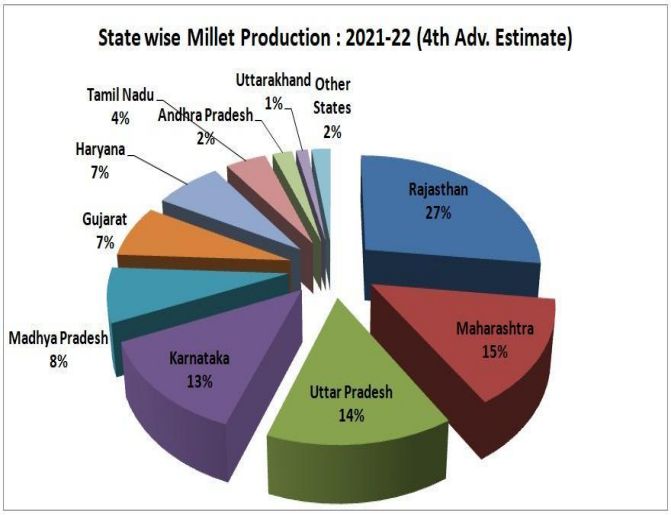

Figure 1 Analysis of Millet Production from Different States of India in Percentage

4. Antioxidant Properties of Millets

The naturally occurring phenolic components found in millet grains included tannins, flavonoids, and phenolic acids in addition to Xylo oligosaccharides, insoluble fibres, and peptides [14]. Figure 2 shows

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millets across India with their common names in three languages.

Figure 2 Millets Across India with Their Common Names in Three Languages (Telugu, Hindi, and English)

Conclusion

It has been demonstrated from the studied literature that pearl and finger millets have the potential to be used as an alternative source of energy in poultry diets. It has competitive nutrients equal to, or in some instances more than, conventional cereals such as maize, wheat and rice. In addition, the presence of nutraceuticals in the millets give them extra importance in terms of health benefits, especially for humans. The inclusion of up to 100% of millets can be added to broiler diets without having negative effects on the performance of chickens. Inclusion of millet in ruminants' animals' diets also had noticeable improvements on the performance parameters [11]. This inclusion may ultimately result in lower feed costs for animal production, which would lower the cost of livestock products for consumers who depend on them for their protein. The grain is regarded as one of the best options for those with celiac disease because it is free of gluten. Furthermore, the antinutrients found in millet grains may negatively affect the absorption of nutrients. Different processing techniques, however, have been shown to lessen the unfavourable effects of the antinutrients. It will need further research to determine the ideal amount of millets to include in animal diets. Furthermore, raising awareness of the significance of these millets for human health is strongly advised.

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