AgriCos e-Newsletter
ISSN: 2582-7049
Volume: 02 Issue: 04 April 2021 Article No: 12

Pearl Millet – a Minor Millet with Many Benefits

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SUMMARY

Pearl millet is one of the major coarse grain crops and is considered as poor man's food. It provides staple food for the poor in a short period in the relatively dry tracts of the country. It is the most drought tolerant crop among cereals and millets. Pearl millet is endowed with greater ability to withstand harsh climatic factors and still yield substantially.

INTRODUCTION

Pearl millet (*Pennisetum glaucum*) belongs to the family of Poaceae. It is native to Sahel zone of West Africa. It is also called as Cat tail millet, Candle millet, Spiked millet, Bulrush millet, Dark millet, etc. and in India *Bajra* (Hindi, Urdu and Punjabi), *Bajri* (Marathi, Gujarati and Rajasthani) and *Sajjalu* (Telugu), etc. It is one of the most important drought-tolerant crops of the tropical and subtropical regions of the world; and a highly cross-pollinated crop with 70 to 80 % out crossing (Burton, 1974).It grows in a harsh environment where other crops do not grow well. It is a multipurpose crop, which is grown for food, feed and forage. As a coarse grain cereal for human foods, pearl millet is sustaining the lives of many millions of people, particularly those of low-income groups in several African and South Asian countries hence it is considered as poor man's food. Over 95 % of pearl millet is used as food, made into porridge, or ground to make flatbread. After the grain has been harvested, the straw is fed to livestock. In North India, pearl millet is grown for forage. It is also used as fuel and as a building material (Kumar and Chauhan, 1993).

Area, Production and Productivity

Pearl millet accounts for about 50 % of the total global production of millets. It covers an estimated 31 million hectares worldwide i.e. an area about the size of Poland and is grown in more than 30 countries located in the arid and semi-arid tropical and subtropical regions of Asia, Africa and Latin America. India is the largest producer of pearl millet in Asia (ICRISAT, 2016). In India during 2018-19, about 7.10 million hectares were sown and produced about 8.66 million tones with a productivity of 1.20 tonne per hectare. The area under pearl millet in India has fallen since the early 1980s but production has increased by 45 % because yields have risen from 469 kilograms per hectare in 1981-1983 to 1219 kilograms per hectare in 2018-2019, with 138 % increase in productivity. Pearl millet accounts for 15- 62% of the cereals consumed in a major pearl millet growing states such as Maharashtra, Gujarat, Uttar Pradesh and Rajasthan. During 2018-19, Rajasthan ranked first in area (4.18 million hectares) and production (3.8 million tonnes) in India, with a productivity of 911 kilograms per hectare (India Agristat, 2021).

Nutritional Values

Pearl millet is nutritionally superior to major cereals with respect to energy value, proteins, fat and minerals. It makes an important contribution to human diet due to high levels of carbohydrate, protein, lipids, potassium, phosphorus, calcium, magnesium and a rich source of dietary fibre, B-vitamins and micro-nutrients such as iron, zinc, copper and manganese. It also provides more energy than wheat, as the oil content, at 4.2%, is higher (Sehgal and Kawatra, 2006).

Food Uses

These millets are gluten-free, and they are suitable for celiac. The major categories of traditional foods where pearl millet can be effectively used like fermented and unfermented flatbreads, fermented and unfermented thin and thick porridges, steamed and boiled products, snack foods, alcoholic and non-alcoholic beverages. Cakes, cookies, pasta, a parboiled rice-like product and snack foods have been successfully produced (Schober *et al.*, 2005).

Medicinal Values

Pearl millet has been recommended for several therapeutic purposes, as it has been found to inhibit tumour development (Huang M. T. and Ferraro T., 1982), control blood pressure and plasma low-density lipoprotein cholesterol levels (Asp NG., 1996) and possesses anti-allergenic characteristics. Due to its high fibre content, pearl millet is also recommended for the treatment of severe constipation, stomach ulcers, and weight loss. Its nutrient and non-nutrient particularly photochemical database underlying mechanism of these nutraceutical effects need to be established (Vanisha *et al.*, 2012).

Rich in Micro Nutrients

Currently, over 60% and 30% of the world's population are deficient in iron and zinc, respectively. Affecting more than two billion people worldwide, mostly in the low and middle-income countries. Deficiency of these micronutrients will cause major risk factors in human health. Plants play a vital role in human nutrition by providing all the essential nutrients required for human health. Despite its impressive economic growth, India ranks poorly in this respect with alarmingly high levels of deficiencies of these two micronutrients, especially in the rural populations and urban poor. About 80% of the pregnant women, 52% of the non-pregnant women, and 74% of the children in the 6-35 months age group in India suffer from iron deficiency-induced anaemia. About 52% of the children below 5 years are zinc deficient. 'Fe' deficiency causes varying degrees of impairment in cognitive performance, lowered work capacity, lowered immunity to infections, and pregnancy complications (e.g., babies with low birth weight and poor learning capacity). Iron deficiency-induced severe anaemia is a direct cause of maternal and child mortality. Zinc deficiency in children makes them vulnerable to diarrhoea, pneumonia, mortality and causes stunting. Such adverse health effects of the deficiencies of these micronutrients lead to huge economic losses (Ramegowda *et al.*, 2016). Considering the widespread micronutrient malnutrition and its associated adverse health consequences, especially arising from iron and zinc deficiencies and the role that pearl millet can play in addressing this issue, selection for high Fe and Zn concentrations has added another dimension to genetic improvement of this crop. It contains higher (by 6–8 fold) levels of nutrients including Fe and Zn than rice and wheat (Govindaraj *et al.*, 2014) but due to the presence of the fibrous seed coat, the flour of pearl millet is coarse and has a grey to yellow colour which imparts bitter taste and the products prepared from whole flour have low consumer appeal (Olatungi *et al.*, 1982). It has been shown that, unlike grain yield, performance per set of lines is highly significantly and positively correlated with general combining ability for Fe and Zn concentrations in pearl millet, implying that the lines selected for high Fe and Zn concentrations will also be high general combiners for these micronutrients (Kanatti *et al.*, 2014).

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