

Biofortified Pearl Millet Cultivars to Fight Against Diseases

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Introduction

In order to increase the bio absorbable concentration of micronutrients in the edible portion of staple food crops, bio-fortification is an intervention method that has been explored and developed. It is a technique for breeding crops to improve their nutritional value, to put it simply. Iron, zinc, and pro vitamin A are the micronutrients that the bio-fortification initiative is now focusing on. For example, it has been stated that iron (Fe) and zinc (Zn) deficiencies are the most common, affecting more than two billion people worldwide, primarily in low- and middle-income nations. India ranks poorly in this regard despite its strong economic progress due to frighteningly high levels of these two micronutrient deficiencies, particularly among rural populations and the impoverished in urban areas.

Pearl millet, variously known as bajra, bajri, sajjja and cumbu in different states of India, is a highly nutritious cereal grain. It is the third-largest crop after rice and wheat and is grown on 8–9 million acres. It is a significant source of dietary energy and nutritional security. Compared to other major grains like rice, wheat, and maize, it has higher protein content and a better amino acid balance. Additionally, it contains significant amounts of fat, dietary fibre, and various minerals, such as iron and zinc. Fe deficiency results in varied degrees of pregnancy difficulties, decreased work ability, infection resistance, and cognitive impairment (e.g., babies with low birth weight and poor learning capacity). Severe anaemia brought on by iron deficiency is a major contributor to maternal and infant deaths. Children who don't get enough zinc are more susceptible to pneumonia, death, diarrhoea, and stunting. Deficiencies in certain micronutrients have detrimental health impacts that result in significant economic costs.

Three studies have done on Bioavailability (absorption) of iron that covered different age groups in different countries. These are:

- young women in Benin (study in Benin, 2013),
- teenagers in Maharashtra (reported in the Journal of Nutrition and funded by Harvest Plus, India)
- very young children (study in India, 2013) in Karnataka, India

According to studies, both conventional pearl millet and biofortified high-iron pearl millet had a bioavailability of 7.4%. The ICRISAT-created high-iron biofortified pearl millet variety ICTP 8203 Fe, which was made available as Dhanashakti in Maharashtra, India, in 2013 and for cultivation throughout all of India in 2014, was utilised in all three investigations. Dhanashakti was quickly embraced by farmers as a better variant of ICTP 8203 (a commercial variety currently grown), reaching 65,000 households in 2014. It is anticipated that Dhanashakti would totally replace ICTP 8203 on more than 200 000 ha by 2017 or 2018. In the 2014-launched Nutri-Farm Pilot Program of the Government of India, Dhanashakti and the four hybrids (Ajeet 38, Proagro XL 51, PAC 903 and 86M86) found for high iron content were included. Similar to this, the biofortified varieties ICMV 221 Fe 11-2 and ICMH 1201 and ICMH 1301 will aid in the fight against iron and zinc deficiency.

Another study found that hybrids had an iron level ranging from 31 to 61 mg/kg and that varieties' iron contents ranged from 42 to 67 mg/kg. Zinc concentrations in hybrids were from 32 to 52 mg/kg and in varieties from 37 to 52 mg/kg. These pearl millet cultivars all have iron contents that were significantly greater than the best rice types (less than 20 mg/kg).

Therefore, biofortified pearl millet can help to keep away to anaemia infections, pregnancy complications, diarrhoea, pneumonia, mortality, and stunting. These results have led researchers to believe that an intake of millet could have a positive effect on human health.