



Constraints in Millets Production

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Millets are usually a small seeded grains with nutrient dense in comparison to rice, wheat and maize. They are compatible to cultivate even on less fertile soils having low water requirement and short maturity time. Most of the millet produced is mainly for human consumption and a lesser percentage is used for livestock and bird feed and beer production. Millets as food security has been a target in India since Independence; which aimed to ensure enough staple food for the entire population.

The season-specific crops such as wheat and rice provide only food security, whereas Millets are all-season crops which ensures not only food security but also fodder, nutrition, health and sustained livelihood. Among the millets, Pearl millet grains have a high potential as a food source for humans because they are gluten-free and higher in dietary fibre content than rice. They also have the same amount of lipid as found in maize cereal, and they have higher essential amino acids such as leucine, isoleucine and lysine than found in traditional cereals such as wheat and rye. In India, where millet is often used, it is made into dosa, which is a fat bread made of mixture of millet and other grains. It is also made into couscous, cookies, sushi, no yeast pizza and roti. Madua which is a popular finger millet-based beverage in India, is another product made using millet.

Nutritional composition of millet grains

Millets are unique among the cereals because of their richness in calcium, dietary fibre, polyphenols and protein (Devi *et al.*, 2011). Millets generally contain significant amounts of essential amino acids particularly the sulphur containing amino acids (methionine and cysteine); they are also higher in fat content than maize, rice and sorghum (Obilana and Manyasa, 2002). In general, cereal proteins including millets are limited in lysine and tryptophan content and vary with cultivar. However, most cereals contain the essential amino acids as well as vitamins and minerals (Devi *et al.*, 2011; FAO, 2009). Plant nutrients are largely used in the food industry and cereal grains constitute a major source of dietary nutrients worldwide (Amadou *et al.*, 2011; Izadi *et al.*, 2012). Modification of a protein is usually realized by physical, chemical, biological such as fermentation or an enzymatic treatment, which changes its structure and consequently its physicochemical and functional properties (Lestienne *et al.*, 2007; Amadou *et al.*, 2011).

Potential health benefits of millets

Millet is more than just an interesting alternative to the more common grains. The grain is also rich in phytochemicals, including phytic acid, which is believed to lower cholesterol, and phytate, which is associated with reduced cancer risk (Coulibaly *et al.*, 2011). Millet is gluten-free, therefore an excellent option for people suffering from celiac diseases often irritated by the gluten content of wheat and other more common cereal grains. It is also useful

for people who are suffering from atherosclerosis and diabetic heart disease (Gélinas *et al.*, 2008). Choi *et al.* (2005) and Park *et al.* (2008) reported that protein concentrate of Korean foxtail millet and proso millet significantly elevated plasma adiponectin and HDL cholesterol levels and caused major decreases in insulin levels relative to a casein diet in type 2 diabetic mice. Furthermore, proso millet also improved glycemic responses and plasma levels (Park *et al.*, 2008). In addition, proso millet protein concentrate has protective effects against D-galactosamin-induced liver injury in rats (Ito *et al.*, 2008). Choi *et al.* (2005) and Park *et al.* (2008) concluded that proso millet protein could be a potential therapeutic intervention in type 2 diabetes.

Problems

- Poor prices, low productivity, low procurement (due to less demand), processing difficulties (Rs.5-6 lakhs for processing machinery) and above all, insufficient demand.
- Non-availability of labour
- High cost of labour
- High cost of fertilizer
- Lack of proper marketing channel
- Involvement of middle men is more in marketing
- Yield loss due to inconsistent climatic condition
- Lack of adequate trainings

Recommendations

- Research on hybrids is expected to lift yields.
- Raising rural demand through awareness campaigns & Urban demand through promotional campaigns.
- Distributing millet-based meals through mid-day meal programmes in schools and Anganwadis, welfare schools & hostels, universities to raise demand.
- High MSP must be backed by proper procurement.
- Ready to cook millets can work for the young in particular.
- Millet foods are served on trains and flights & other public transport systems.
- Promotion of value-added millet products in schools, hospitals as they are rich in Iron, Zinc, Ca, Mg, K, dietary fibre & gluten free.
- Encouraging and promoting the millet start-ups at a large scale such that it reaches the unreached.

Conclusion

The increased per hectare production of cereal grains has resulted in the loss of nutritional value of food grains. This is the time when we should reduce burden on our fertile soils and should try to make our drylands productive. Millets can play a major role in the food as well as nutritional security. In addition to this we need to develop novel methods for the food utilization of the millets.

It was realized that millets have substantial potential to contribute toward food and nutritional security in India. At the same time, focused marketing strategies and product development of new and better millet-based products are needed. Further, it is necessary to establish the optimum inclusion level of millets in animal diets along with human diet. In addition, creation of awareness to stress on the importance of these millets for human health is highly encouraged from primary levels by educating at school level.

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