A short review on millets: A potential nutricereals

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Abstract

Millets are important crop in relation to health/nutritional security and climate change and are well adopted in the farming system of most of farmers with small land holdings. The higher water use efficiency and lesser input requirements of millets for its cultivation again make them a wonderful crop for ecological balance/sustainability as compared to other cereals. The health benefits of millets are one of the reasons for increasing demand of millets in today’s scenario. Being as short duration crop (Most millets), they also act as a contingent crop in the situation of natural calamities like drought and flood and are also one of the important climate resilient crops.

Keywords: Nutritional, efficiency, contingent, resilient

Introduction

Realizing the importance and potential of millets in food and nutritional security of the country the Government of India notified millets as ‘Nutri Cereals’ which includes major millets viz. Sorghum, Pearl Millet, Finger Millet; Minor Millets i.e. Foxtail Millet, Proso Millet, Kodo Millet, Barnyard Millet, Little Millet and two Pseudo Millets/pseudo cereals (Buckwheat and Amaranthus). Buckwheat and Amaranthus are known as pseudo cereals because of high carbohydrate concentration in grain as in case of cereals. Millets are known for their potential health benefit which includes anti-diabetic properties and low Glycemic Index in millet based food product which may be helpful in reducing the postprandial blood glucose level and glycosylated hemoglobin. Millet(s) also have antioxidant and antimicrobial properties and protein content of Pearl millet (14.5%), Foxtail millet (11.7), Proso millet (11%), Kodo millet (8.3%) and little millet (7.7%) is more than that present in Rice (7.5%). Also millets are generally rich in total dietary fibre and total phenol content as compared to cereals (Chandra et al., 2016) [3]. Globally millets are known locally by different names (Table 1) and were the major source of food for most of the population before the success of green revolution in India. Before green revolution, wheat was to be consumed by economically stronger people and millets were supplied to India; also sorghum and bajra (Buckwheat and Amaranthus) were confined to economically poor population. Also barnyard millet was considered as a substitute for paddy in hills of Northern India. However at the present, the situation is just opposite. Now people are becoming health conscious and they are demanding for millet based products. Although Public Laws schemes (PL180, PL480) of USA in which surplus agricultural commodities (wheat, rice corn) were supplied to India; also resulted in access of wheat to poor people but the quality of wheat was questionable; that’s why the imported wheat was also known as red wheat due to red colour of its endosperm. However that was the need of the hour to meet the food demand of country.

Description

With the introduction of new technologies under Green Revolution, the trend of food consumption shifted from coarse millets to paddy and wheat. However still in semi-arid regions of world millets (Finger millet) ranks third in cereal production after sorghum and bajra. The high dietary fiber and phenolic content in millets makes them a boon for diabetic patients. Millets are also a good source of feed/fodder for poultry/livestock and a potential biomass/bioenergy crop. Beside this, there are many industrial and medicinal uses of millets which needs to be commercialized and utilize properly to boost up the income of millet growers. At global level now scientist are focusing on nutritional security especially for developing countries like India. Many international agencies including Harvest Plus are working to remove hidden hunger and malnutrition caused by deficiency of micronutrients, minerals and vitamins through bio-fortification (Breeding/Agronomic/biotechnology) process.
However this malnutrition can be minimized if we take nutricereals in sufficient amount in our diet. The images of some of the millets are given in Figure 1-4. Millets are popular among the farmers owing to their capability to grow under variable and adverse agro - climatic conditions (Table 1). Millets provides a reasonable output from the lands where most of the cereals does not perform well in terms of sustainable yields. Not only this, millets also perform as an excellent fodder crop, industrial crop and important contingent crop under aberrant weather conditions. Millets being a C 4 plant requires less water as compares to paddy contingent crop under aberrant weather conditions. Millets are also efficient user of fertilizer/nutrients applied to them. The total amount of nitrogen, Phosphorus and Potassium fertilizer used (in kg/ha) in some of the crops and millets are as follow: Paddy (145-195 kg/ha)>Maize (175-280 kg/ha)> Sorghum (125-225 kg/ha)> Sorgo (100-215 kg/ha)> Finger millet (100-175 kg/ha) > Pearl millet (115-200 kg/ha) and other millets (55 kg/ha). The short duration of most of these crops makes them fit for contingent crop during the event of drought and flood. Millets also posses traits viz. high temperature tolerance, low water requirement, drought/heat tolerance and salinity tolerance that fits them to be considered as climate resilient crops (Anonymous (2018) [2].

Table 1: Millets with some of their traits

<table>
<thead>
<tr>
<th>S. No</th>
<th>Crop</th>
<th>Scientific name</th>
<th>Vernacular name</th>
<th>Origin place</th>
<th>Traits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Finger millet</td>
<td><em>Eleusine coracana</em> (L.) Gaertn.</td>
<td>Ragi, Mandua, Nagli, Kapai, Marua, Nachni, African bird’s foot, rapoko, Hunsa, wimbi, bulo, telebun, koracan, kurakkan</td>
<td>East African highlands</td>
<td>Moderately resistant to heat, drought and humidity, adapted to wide altitude range (Up to 2100 m amsl), rich source of calcium.</td>
</tr>
<tr>
<td>2</td>
<td>Barn yard millet</td>
<td><em>Echinochloa crus-galli</em> (L.) P. Beauv. (syn. <em>E. esculenta</em> (A. Braun))</td>
<td>Japanese, Jhingora, Kudraiivali, Oodalu, sanwa, sawan, Korean, kweichou</td>
<td>Japan</td>
<td>Very short duration (Fastest growing), voluminous fodder, not limited by moisture, high altitude adapted (Up to 2700 m amsl)</td>
</tr>
<tr>
<td>3</td>
<td>Sawa millet</td>
<td><em>Echinochloa colona</em> (L.) Link ssp. <em>frumentacea</em> (Link) (= <em>E. frumentacea</em> Link),</td>
<td>-</td>
<td>Peninsular India</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Foxtail</td>
<td><em>Setaria italica</em> (L.) P. Beauv ssp. <em>italica</em></td>
<td>Kauni, KAngni, Korra, Tenai, Rala, Italian, German, Hungarian, Siberian, navane, thanahal</td>
<td>China</td>
<td>Adapted to low rainfall, high altitude (Up to 2000 m amsl), short duration, tolerant to low fertility and drought</td>
</tr>
<tr>
<td>5</td>
<td>Bristley foxtail millet</td>
<td><em>Setaria verticillata</em> (L.) P. Beauv</td>
<td>Bristley foxtail millet</td>
<td>South India</td>
<td></td>
</tr>
</tbody>
</table>
### Conclusion

Millets can be considered as the potential crop to cope up with the climate change and decreasing water availability and for better environmental sustainability. However, proper location specific research and extension works needs to be more enhanced to meet out growers and consumers demand. Also there is a potential scope for improving the productivity of millets through their germplasm collection/characterization and breeding technique. Awareness among the consumers in relation to millets uses needs to be strengthen and more emphasis on post harvesting operations/ processing of millets and marketing of its product is need of the hour.

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