Cosmos Multidisciplinary Research E-Journal
Online Available at www.cmrj.in
Recognized International Peer Reviewed Journal
Impact Factor 5.98
ISSN No. 2456-1665

Finger Millets: Need for Food Security

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Abstract

Climate change and population growth pose challenges to food security. Major crops such as maize, wheat, and rice are expected to face yield reductions due to warming in the coming years, highlighting the need for incorporating climate-resilient crops in agricultural production systems. Finger millet (Eleusine coracana (L.) Gaertn) is a nutritious cereal crop adapted to arid regions that could serve as an alternative crop for sustaining the food supply in low rainfall environments where other crops routinely fail. Despite finger millet's nutritional qualities and climate resilience, it is deemed an "orphan crop," neglected by researchers compared to major crops, which has hampered breeding efforts. Finger millet (Eleusine coracana) plays a crucial role in global food security, particularly in Africa and Asia, by providing a highly nutritious, drought-tolerant, and climate-resilient staple for vulnerable populations. It acts as a safety net crop during environmental stresses and is rich in calcium, iron, and fiber.

Introduction :

Over the years there has been rapid decline both in production and consumption of millets. Chemical composition of finger millet revealed that total carbohydrate content of finger millet has been reported to be in the range of 72 to 79.5%. Finger millet has nearly 7% protein but large variations in protein content from 5.6 to 12.70% have been reported by various studies. Total ash content is higher in finger millet than in commonly consumed cereal grains. The ash content has been found to be nearly 1.7 to 4.13% in finger millet. Calcium content of 36 genotypes of finger millet ranged from 162 to 487 mg %. Singh and Srivastava (2006) reported the iron content of 16 finger millet varieties ranged from 3.61 mg/100g to 5.42 mg%. Finger millet is the richest source of calcium and iron. Calcium deficiency leading to bone and teeth disorder, iron deficiency leading to anemia can be overcome by introducing finger millet in our daily diet. Maximum

utilization of the nutrient potential of the millet is limited by the presence of phytates, phenols, tannins and enzyme inhibitors but their effect can be reduced by using processing techniques like popping, roasting, malting and fermentation. The use of these techniques not only decreases the content of antinutrients but increases the bioavailability of certain minerals like calcium and iron. Composite flours made by using finger millet can be used for preparation of various nutrient dense recepies which can be effectively used for supplementary feeding programs.

Climate change poses a threat to our agricultural systems, especially the production of major crops that currently dominate our food supply, and hence to food security. Crop models for mid- and end-of-century predictions of yields for maize, wheat, rice, and soybean forecast decreases for all four crops caused by warming temperatures, with losses offset to varying extents by yield gains under increased CO2 concentrations. Nutritional well being is a sustainable force for health and development and maximization of human genetic poten-tial. The nutritional status of a community has therefore been recognized as an important indicator of national development. In other words, malnutrition is an impediment in national development and hence assumes the status of national problem. For solving the problem of deep-rooted food insecurity and malnutrition, dietary quality should be taken into consideration. Diversification of food production must be encouraged both at national and household level in tandem with increasing yields. Growing of traditional food crops suitable for the area is one of the possible potential successful approaches for improving household food security. Nutritional well being is a sustainable force for health and development and maximization of human genetic poten-tial.

The nutritional status of a community has therefore been recognized as an important indicator of national development. In other words, malnutrition is an impediment in national development and hence assumes the status of national problem. For solving the problem of deep-rooted food insecurity and malnutrition, dietary quality should be taken into consideration. Diversification of food production must be encouraged both at national and household level in tandem with increasing yields. Growing of traditional food crops suitable for the area is one of the possible potential successful approaches for improving household food security. With climate change threatening major crops like rice and wheat, finger millet is increasingly recognized as a vital component for

global food systems, supported by initiatives like the National Food Security Mission in India. It is a vital food source for millions in countries like India, Ethiopia, Kenya, Uganda, and Nepal. Deficits in the world's food production can also result from the delicate balance between agriculture and climate. In developing countries, where nutritional security is a massive challenge for the growing population, for sustainable development of agriculture, there is a need to diversify cropping patterns and increase the area under millet production. Millets, being a short-duration and climate-resilient crop it can be grown even in harsh, hot and dry environments and respond well to available nutrients, can be preferred for crop rotation and mixed cropping.

Key Reasons for the Need of Finger Millet:

Exceptional Nutritional Value: It is a powerhouse of nutrients, providing essential amino acids (methionine, tryptophan), iron, and phosphorus.

Health Benefits:

Diabetes Control: Lowers blood sugar levels due to high fiber and slow digestibility.

Bone Health: High calcium levels prevent osteoporosis and are crucial for strengthening bones in children and the elderly.

Anemia Management: Acts as a natural source of iron to improve hemoglobin levels.

Weight Management: Low-fat content and high satiety index aid in reducing obesity.

Nutrient-Rich Food: Used as an ideal weaning food for infants, for pregnant women, and to treat malnutrition.

Sustainable Agriculture: It is a climate-resilient crop that requires minimal resources, thrives in drought conditions, and is suitable for sustainable farming.

Dietary Flexibility: It is a gluten-free, versatile grain (often called ragi) used for porridge, roti, and baked products.

Conclusion :

Cereals and millets constitute a major component of diet consumed in developing countries like India. Finger millet is an important staple food in parts of eastern and central Africa and India. It is non acid forming food and easy to digest. It is considered to be one of the least allergic and most digestible grains available and is a warming grain so it helps to heat the body in cold or rainy season. However, the use of finger millet is limited due to coarse nature of the grain. It has high fibre content and outer cover of

the grain is thick, which makes its processing difficult and gives a poor sensory quality. Lack of adequate marketing avenues of these crops has also led to their rapid decline both in production and consumption. Also, an increasing taste for mill-polished rice is out competing these mountain crops. It is remarkable that despite the grain being an ancient food, research on millet and its food value is in its infancy and its potential vastly untrapped. Finger millet grain is highly nutritious, being richer in protein, fat and minerals especially calcium and iron compared to rice. Composite flour technology holds excellent promise for developing countries. Although actual consumer trials have been rare, products made with composite flours have been well accepted in Colombia, Kenya, Nigeria, Senegal, Sri Lanka and Sudan. The products made from composite flours are nutritionally superior to their respective controls and can be successfully used for supplementary feeding programmers. Efforts should be made to educate people about nutritive value and health benefits of finger millet and its food products.

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