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7. Kodo Millet

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Abstract:

Kodo millet (Paspalum scrobiculatum L.) is indigenous to India and is believed to have been domesticated around 3,000 years ago. It is well-adapted to tropical and subtropical regions. It is primarily grown as a grain in India, while in Africa they are either cultivated or harvested from the wild (Yadav et al., 2016). Kodo millet (Paspalum scrobiculatum L.) is an ancient grain, predominantly cultivated in India and other parts of Asia, known for its resilience to adverse environmental conditions.

*This chapter delves into the significance of Kodo millet in promoting food security and nutritional health, /*particularly in arid and semi-arid regions. Rich in protein, fiber, and essential minerals, Kodo millet is a powerhouse of nutrition, playing a crucial role in combating malnutrition and supporting balanced diets. Its remarkable drought tolerance and ability to thrive in marginal soils make it an invaluable crop for sustainable agriculture. Kodo millet's culinary versatility is showcased in traditional dishes and modern health foods, reflecting its cultural and economic relevance. Emerging research highlights its potential in managing diabetes and cardiovascular diseases. This chapter emphasizes the growing recognition of Kodo millet as a vital crop in addressing global food security and nutrition challenges in the context of climate change.*

Keywords:

Kodo millet, Nutrition and food security.

7.1 Introduction and Importance of Foxtail Millet:

Kodo millet is an ancient, nutrient-dense cereal that offers numerous health benefits and plays a significant role in food security, especially for marginalized communities in parts of Asia and Africa where it is traditionally cultivated. The major protein fraction in kodo millet is gluten (Sudharshana, et al., 1988).

The Kodo seed is rich in phytochemical compounds and dietary fibers with remarkable storage properties (Shikha *et al.,* 2024). As per study by Sharma *et al.,* (2017) kodo millet is a highly nutritious grain with potential health benefits, making it a valuable addition to a balanced diet.

Kodo millet is a good source of starch, with larger, mostly polygonal starch granules compared to other millets (Kumari *et al.,*2024). The antioxidant activity of kodo millet decreases when the whole grain is dehulled and cooked (Chandrasekara et al., 2012).

These anti nutrients form complexes with micronutrients such as iron, calcium and zinc and reduce their solubility and bio availability (Balasubramanian, 2013). Some key points about its importance:

7.1.1 Nutritional Profile:

- Kodo millet is packed with essential nutrients like protein, fiber, vitamins, minerals, and antioxidants.
- It is gluten-free, making it suitable for those with gluten intolerance.

7.1.2 Health Benefits:

- The high fiber and antioxidant content helps manage cholesterol levels and reduces the risk of heart disease.
- The low glycemic index makes it beneficial for managing blood sugar levels in diabetics.
- The fiber aids digestion and prevents constipation, gas and bloating.
- Antioxidants may help prevent certain cancers.

7.1.3 Cultivation Advantages:

- Kodo millet is drought-tolerant and can grow with minimal water, making it suitable for arid regions.
- It has a short growing season and can be grown as a catch crop.
- Kodo millet is well-adapted to the Deccan Plateau region of India where it has been cultivated for over 3000 years.

7.1.4 Economic and Food Security Importance:

- Kodo millet provides food security for marginalized communities in parts of Asia and Africa where it is a staple crop.
- It plays a significant role in the agricultural economy of these regions.

In summary, kodo millet's nutritional density, health benefits, and adaptability to challenging growing conditions make it an important cereal crop that contributes to food security, health, and the economy in parts of Asia and Africa.

Value Addition:

Value addition is crucial to increase the consumption and market potential of kodo millet. Some key aspects of value addition:

Processing Methods:

Contemporary processing methods include refining, malting, fermentation, popping, flaking, extrusion cooking, and baking.

Value-Added Products:

Refined flour, malted flour, popped products, extruded products, and health foods are some value-added options. Kodo millet can be used to make roti, porridge, cooked grains, bakery products, noodles, and beverages.

Nutritional Benefits:

Kodo millet is rich in protein, fiber, vitamins, and minerals. Processing can enhance nutrient bioavailability.

Challenges:

Lack of awareness, non-availability of ready-to-use products, and low shelf stability due to high fat content.

Opportunities:

Developing gluten-free products, promoting traditional foods, and improving processing technologies.

In summary, value addition through innovative processing and product development can increase kodo millet's consumption, enhance nutrition security, and provide livelihood opportunities. Overcoming processing challenges and promoting awareness are key to realizing its full potential.

7.2 Cultivation Practices:

the cultivation practices of kodo millet:

Soil and Climate:

Kodo millet is well-adapted to arid and semi-arid regions, exhibiting resilience to drought, high temperatures, and poor soil conditions. It can grow in a range of soils from gravelly and stony uplands to fertile loamy soils.

Sowing and Spacing:

- Kodo millet is a kharif (monsoon) season crop, with sowing typically done in early June.
- The recommended row-to-row spacing is 20-25 cm and plant-to-plant spacing is 8-10 cm.
- The seed rate is 10 kg/ha for line sowing and 15 kg/ha for broadcasting.
- Treat seeds with Azospirillumbrasilense (nitrogen-fixing bacteria) and Aspergillus awamori (phosphate-solubilizing fungus) at 25 g/kg seed.

Irrigation and Weed Management:

- Kodo millet is mostly grown as a rainfed crop, not requiring any irrigation during the kharif season. One or two irrigations may be provided in the absence of rains.
- Weeding is done 2-3 times, either manually or using a wheel hoe.
- Apply pre-emergence Isoproturon at 0.5 kg a.i./ha

Nutrient Management:

Kodo millet responds well to the application of nitrogen and phosphorus fertilizers. Organic manures like farmyard manure can also be applied before sowing.

Pests and Diseases:

The main pest is shooting fly, which can be managed through early planting, lower planting densities, and intercropping.

The main disease is head smut caused by Sorosporiumpaspali-thunbergi.

Treat seeds with Chlorothalonil or Mancozeb at 2 g/kg. The variety GPUK 3 is tolerant. Kodo millet is relatively resistant to most pests and diseases compared to other millets.

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