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Moringa as a Nutritional and Livelihood Opportunity for Rural Women

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ABSTRACT

Moringa (*Moringa oleifera*), commonly known as drumstick or sahjan, is a multipurpose plant with considerable nutritional and economic potential. Its leaves, pods and flowers are edible and can be utilized in a variety of food preparations. Moringa leaves contain protein, dietary fibre, calcium, iron, vitamin C, provitamin A carotenoids and several bioactive compounds. Incorporating locally available nutrient-rich foods such as moringa into regular diets can contribute to dietary diversity and overall nutritional adequacy among women. Besides its nutritional significance, moringa has considerable potential for food processing, value addition and small-scale entrepreneurship. Products such as moringa leaf powder, chapati, biscuits, laddoo, chutney, soup, namkeen and fortified flour can be prepared at household or community level. These activities can provide opportunities for skill development, entrepreneurship and additional income generation, particularly among rural women and Self-Help Groups (SHGs). Krishi Vigyan Kendras can facilitate this process through nutrition education, processing demonstrations, entrepreneurship training and market linkage. Thus, systematic promotion of moringa can simultaneously address women's nutrition, household food security, value addition and livelihood development.

Keywords: Moringa; Sahjan; Women nutrition; Food processing; Value addition; Entrepreneurship; Livelihood

INTRODUCTION

Women have an important role in household food management, meal preparation, nutrition and family health. However, inadequate dietary diversity, increased nutrient requirements during different life stages and limited access to nutritious foods may contribute to nutritional inadequacies among women. Promotion of locally available, affordable and nutrient-rich foods is therefore an important component of nutrition education and community development.

Moringa (*Moringa oleifera*) is widely cultivated in India and is commonly known as drumstick or sahjan. The plant is valued for its edible leaves, pods and flowers. Among its different parts, the leaves are particularly useful for food and nutritional purposes because they contain several essential nutrients and bioactive compounds. Moringa can be cultivated in kitchen gardens, farms and community spaces, making it a potentially accessible food resource for rural households.

The nutritional and economic potential of moringa provides an opportunity to integrate nutrition education with food processing, value addition and livelihood promotion. Reviews have documented its nutritional composition, phytochemical profile and potential applications in food products (Fahey 2005; Gopalakrishnan *et al.,* 2016; Saini *et al.,* 2016; Chhikara *et al.,* 2020). More recent reviews have also highlighted its use as a food ingredient and in value-added products (Trigo *et al.,* 2023; Gull *et al.,* 2025).

Nutritional Importance of Moringa for Women

Moringa leaves contain a range of nutrients and bioactive compounds that can complement a balanced diet. Important nutritional components include protein, dietary fibre, calcium, iron, vitamin C, provitamin A

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carotenoids, potassium and other minerals. The leaves also contain polyphenols, flavonoids and other phytochemicals with antioxidant activity (Leone *et al.,* 2015; Chhikara *et al.,* 2020).

Regular incorporation of moringa leaves into meals can contribute to dietary diversity. However, moringa should be considered as one component of a diversified diet rather than as a replacement for medically prescribed nutritional supplements or treatment.

Table 1 : Nutritional and functional components of moringa leaves

Component	Potential nutritional significance
Protein	Contributes to dietary protein intake
Dietary fibre	Supports a fibre-rich diet
Calcium	Contributes to maintenance of bones and teeth
Iron	Contributes to dietary iron intake
Vitamin C	Supports normal immune function and antioxidant defense
Provitamin A carotenoids	Contribute to vitamin A nutrition
Potassium and minerals	Contribute to overall mineral intake
Polyphenols and flavonoids	Possess antioxidant activity

Moringa and Women's Nutrition

Contribution to dietary diversity

Moringa leaves can be incorporated into commonly consumed foods such as dal, vegetables, chutney, soup, chapati and other preparations. Such incorporation provides an easy way of increasing the variety of plant foods consumed by households.

Contribution to iron intake

Iron is an important nutrient for women, particularly during adolescence and the reproductive years. Moringa leaves contain iron and may contribute to overall dietary iron intake. However, consumption of moringa should not be considered a substitute for iron-folic acid supplementation where such supplementation has been recommended by health professionals.

Contribution to bone health

Calcium is essential for healthy bones and teeth. Moringa leaves contain calcium and can therefore be included as part of a diversified calcium-rich diet.

Antioxidant potential

Moringa contains several phytochemicals, including flavonoids, carotenoids and phenolic compounds. These compounds have antioxidant properties and contribute to the functional food potential of moringa (Stohs and Hartman, 2015; Saini *et al.,* 2016).

Relevance during different life stages

Women's nutritional requirements vary during adolescence, pregnancy, lactation and later adulthood. Moringa can be incorporated into a diversified diet during these stages. Pregnant and lactating women should obtain professional guidance before consuming concentrated moringa supplements or large quantities of moringa powder.

Moringa for Food Processing and Value Addition

Fresh moringa leaves are perishable and therefore require appropriate post-harvest handling. Drying the leaves under hygienic conditions and converting them into powder provides an opportunity for improved storage and utilization. Recent reviews have reported applications of moringa leaf powder in bakery products, beverages and other food matrices, while also noting that formulation level can influence colour, flavour, texture and consumer acceptability (Trigo *et al.,* 2023; Gull *et al.,* 2025).

Table 2 : Potential value-added products from moringa

Product	Possible application/use
Moringa leaf powder	Chapati, dal, vegetables and other foods
Moringa-fortified flour	Household and commercial food preparation
Moringa biscuits	Snack product
Moringa laddoo	Traditional value-added food
Moringa chutney	Meal accompaniment
Moringa soup	Nutritious food preparation
Moringa namkeen	Snack product
Moringa beverage	Value-added drink

Development of such products can provide opportunities for women to utilize locally available raw material and convert it into products with greater shelf life and potential market value. Product formulation should be standardized through sensory evaluation, nutritional assessment, shelf-life studies and appropriate food-safety practices before commercialisation.

Moringa as a Livelihood Opportunity for Women

Moringa has potential to support small-scale women-led enterprises, particularly where raw material is locally available. Women and SHGs can participate in

different stages of the value chain, including:

1. Moringa cultivation and maintenance.
2. Harvesting and hygienic handling of leaves.
3. Cleaning and appropriate drying of leaves.
4. Preparation of moringa leaf powder.
5. Development of value-added food products.
6. Packaging and labelling.
7. Storage and quality management.
8. Local marketing through SHGs, fairs and farmer markets.
9. Institutional and online marketing after meeting applicable food-safety and regulatory requirements.

Value addition can increase the utility and shelf life of moringa products while creating opportunities for skill development and supplementary income. However, profitability will depend on factors such as raw material availability, processing cost, packaging, product quality, market demand and marketing channels. For packaged food products, applicable Food Safety and Standards Authority of India requirements for labelling and display should be followed (FSSAI, 2020, as amended).

Role of KVKs in Promoting Moringa among Rural Women

Krishi Vigyan Kendras can play an important role in integrating nutrition education with livelihood promotion. KVKs can undertake the following activities:

- Conduct awareness programmes on the nutritional importance of moringa.
- Demonstrate improved moringa cultivation practices.
- Provide training on hygienic harvesting, drying and processing.
- Conduct hands-on demonstrations on preparation of value-added products.
- Train women on packaging, labelling and storage.
- Develop entrepreneurial and business-management skills.
- Provide information on cost calculation and pricing.
- Facilitate formation and strengthening of women's SHGs.
- Promote product standardization and quality management.
- Facilitate market linkage with suitable local institutions and markets.
- Encourage nutrition education along with food-processing training.

An integrated approach involving cultivation, nutrition education, processing, entrepreneurship and marketing can improve the sustainability of women-led moringa enterprises. KVK-led demonstrations can also help women assess product acceptability, production costs and local market opportunities before investing in enterprise development.

Recommendations

1. Encourage moringa cultivation in kitchen gardens, farms and community spaces.
2. Promote appropriate inclusion of moringa in regular family meals.
3. Provide practical training on hygienic processing and drying.
4. Encourage women's SHGs to develop standardized moringa-based products.
5. Promote appropriate packaging, labelling and storage practices.
6. Provide training on cost calculation, pricing and basic entrepreneurship.
7. Establish linkages between trained women, SHGs and local markets.
8. Integrate nutrition education with food-processing and livelihood programmes.
9. Encourage demonstrations and exposure visits to successful food-processing enterprises.
10. Promote further research on product development, acceptability, shelf life and economic feasibility of moringa-based foods.

Conclusion

Moringa is a promising nutrition and livelihood resource for rural women. Its nutritional composition, local availability and potential for food processing make it relevant for improving dietary diversity and creating opportunities for women-led value addition. Moringa-based products such as leaf powder, fortified flour, biscuits, laddoo, chutney and soup can be developed at household or community level with appropriate processing and hygiene practices. KVKs can contribute by providing technical training, nutrition education, entrepreneurship development and market-linkage support. An integrated approach to moringa promotion can contribute to women's nutrition, household food security, skill development and livelihood opportunities. Nevertheless, moringa should be promoted as part of a balanced and diversified diet and

not as a cure for diseases or a replacement for medically prescribed treatment.

Declaration

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