



Farm women empowerment and entrepreneurship through processing and marketing of minor millet value added products

Dr. PG Thenmozhi^{1*}, Dr. S Alagudurai², Dr. K Velmurugan³

¹ Professor, Department of Food science & Nutrition, Krishi Vigyan Kendra, VC & RI Campus, Namakkal, Directorate of Extension Education, Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu, India

² Professor, Department of Agronomy, Krishi Vigyan Kendra, VC & RI Campus, Namakkal, Directorate of Extension Education, Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu, India

³ Professor and Head, Department of Horticulture, Krishi Vigyan Kendra, VC & RI Campus, Namakkal, Directorate of Extension Education, Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu, India

Abstract

Millets are traditionally grown by resource poor farmers in various regions of the country which include sorghum, pearl millet, finger millet and small millets. They are nutri-cereals, which are highly nutritious and are known to have high fiber content which includes protein, essential fatty acids, B-vitamins, minerals such as calcium, iron, zinc, potassium and magnesium Anagha KK (2023) ^[1] In the present scenario, demand for millets for direct consumption has been declining due to change in food habits and inconvenience attached with food preparation as compared with fine cereals. Further, lack of processing technologies and also the government policies of disincentives towards millets and favoring of supply of fine cereals at subsidized prices. The consumption of these food items has also been traditionally restricted mainly to growing areas. Hence developing technology that makes millet value added products available as convenient to make and easy access at reasonable prices may create great demand and have market particularly in urban places, where there is growing conscious for intake of nutritive food. To uplift the livelihood and financial conditions of the rural women value addition of minor millets can offer tremendous opportunity not only to income rather it increase national productivity and generates employment but also helps to develop economic independence and personal and social upliftment.

Keywords: Millet, millet processing, value addition and traditional food, nutri cereals

Introduction

Millet crop primarily constitute a diverse group of small grains. These are categorized under Coarse Cereals in India. Millets are classified into major millets and minor millets or small millets. India is the leading producer of small millets namely, finger millet (ragi), kodo millet (kodo), foxtail millet (kangni), barnyard millet (sawan), proso millet (cheema) and little millet (kutki). Cereals form a major portion of human diet and are an important source of starch and other dietary carbohydrates (dietary fibre), which play an important role in the energy requirement and nutrient intake of human. The Finger millet is with higher fibre content, and their protein quality and mineral composition contribute significantly to nutritional security of a large section of population residing in the millet growing areas, considered to be the most disadvantaged groups (Yenagi, *et al*) ^[5]. Millets are most recognized nutritionally for being a good source of minerals like magnesium, manganese and phosphorus. Research has linked magnesium to reduce risk for heart attack and phosphorus is important for the development of body tissue and energy metabolism. Millets are also rich in phytochemicals, including phytic acid, which is believed to lower cholesterol, and phytate, which is associated with reduced cancer risk. Thus, millets are strategic in terms of their food, nutritional and livelihood security and their role in local agro-ecosystems. They are highly nutritious and are a climate compliant crop. But due to drudgery in preparation, overall millet consumption in India has declined over the years. In order to revive the demand of millets in India, there is need to bring all the stakeholders in production to

consumption system value chain. Food uses of millets have, however, been confined only to traditional consumers; limited especially to areas of their cultivation, and still have remained underutilized. Their exploitation for preparation of ready-to-use or ready-to cook and eat products would help in increasing the consumption of millets among non-millet consumers. The processing requirement and some avenue for its value addition and food uses (Patel *et al.*, 2014) ^[4] Finger millet (ragi) is rich in protein, iron, calcium, phosphorus, fibre and vitamin content. The calcium content is higher than all the cereals and iodine content is said to be highest among all the food grains has best quality protein along with the presence of essential amino acids, vitamin A, vitamin B and phosphorus (Gopalan *et al.*, 2004) ^[2]. millet provides highest of level of calcium, antioxidants properties, phytochemicals, which make it easily and slowly digestible. Their exploitation to ready to prepare and ready to eat products would help in increasing the consumption pattern of finger millet among non-millet consumers. The enhanced consumption of finger millet will open up an avenue for the generation of employment and additional income for the stakeholders. The present paper describes the efforts made by Krishi Vigyan Kendra Namakkal to establish village level enterprise on processing and value addition to millet with the objective of additional employment and income generation for the farming family.

Materials and Methods

Study area and methodology

An attempt has been made to increase the income source of farm women, for this purpose two KVK farm women

Groups from different villages of block Namagiripettai were selected for the study. The villages namely, Naraikinaru and Mettupatty were purposively selected keeping in view the biophysical diversities, *i.e.*, distance from block headquarter, market growth centers, and, road to bus points. The particulars of villages are as follows from these selected villages study was conducted in two targeted groups as mentioned.

Table 1: Problems identified in utilization of millets by farmers
N=100

S. No	Problems	No. of farmers
1.	Lack of millet processing techniques	85 (85%)
2.	Problem in marketing of millet product	95 (95%)
3.	Lack of nutritional knowledge and health benefits	74 (74%)
4.	Lack of Acceptance	89 (89%)
5	Economic Returns	45 (45%)

Capacity building training

An advanced training was given to farm women group by the experts designated at the Krishi Vigyan Kendra, Namakkal working in the area of these aspects for crop cultivation, processing, value addition and quality control of minor millets. Besides providing processing and production technology the farm women were also trained for development of production plan, packing, financial management and negotiation skill.

Processing and value addition

Minor millets hold immense nutritional importance and health promoting properties. They offer a range of nutrients and bioactive compounds, making them superior to rice and wheat in terms of nutritional value. The gluten-free nature of millets positions them as a favorable choice for individuals with gluten sensitivity or those seeking gluten-free food options. Moreover, the potential health benefits of millets, such as their impact on heart health, diabetes management, and digestive well-being, make them a valuable addition to the diet. Encouraging the consumption of millets, both in traditional dishes and modern food products, can contribute to improved overall health and nutrition, benefiting communities across the globe. Embracing millets as a staple food source can pave the way for a healthier and more sustainable future for individuals and societies worldwide. They are an important ingredient of household food, health security and nutrient particularly in drought years. Value addition in millet has great potential in increasing the profitability of farmers (Mishra *et al.*, 2011)^[3]. The method of processing of various value-added products like multigrain flour and millet malt, nutritive laddu, millet idli, millet cakes and millet beverage.

Multi grain flour

The concept of multi-grain flour/composite flour is not new to the mankind. Mixing of two three types of grains or grain and pulses has been in practice since long ago depending upon the availability of such commodities locally or the food habits, but in such cases, the understanding of nutritional security is not necessarily linked. Multigrain flour by combining wheat and finger millet in the ratio of 7:3 (wheat: finger millet) is one of the simple semi-finished products suitable for making chapatti (roti), as no Indian meal is complete without Indian style bread or roti. In the

proposed blend, though the gluten content is reduced significantly the making of chapatti while flatter is not affected. However, the colour of the chapatti turns to slightly dark. Fortification of finger millet in chapattis not only improves the taste but also helpful in controlling glucose levels in diabetic patients very efficiently the bulkiness of the fibres and the slower digestion rate makes us feel fuller on, fewer calories and therefore may help to prevent from eating excess calories. Its high fiber content is further helpful to the individuals having the problem of constipation. A proportion of different grains and pulses mixed together to prepare a nutritive Multigrain flour suitable for chapatti making.

Ingredients for Multigrain flour

Wheat -75 kg, Ragi -5kg, Bajra -5kg, Soyabean-5kg, Maize-5kg, Bangal gam dal-5kg

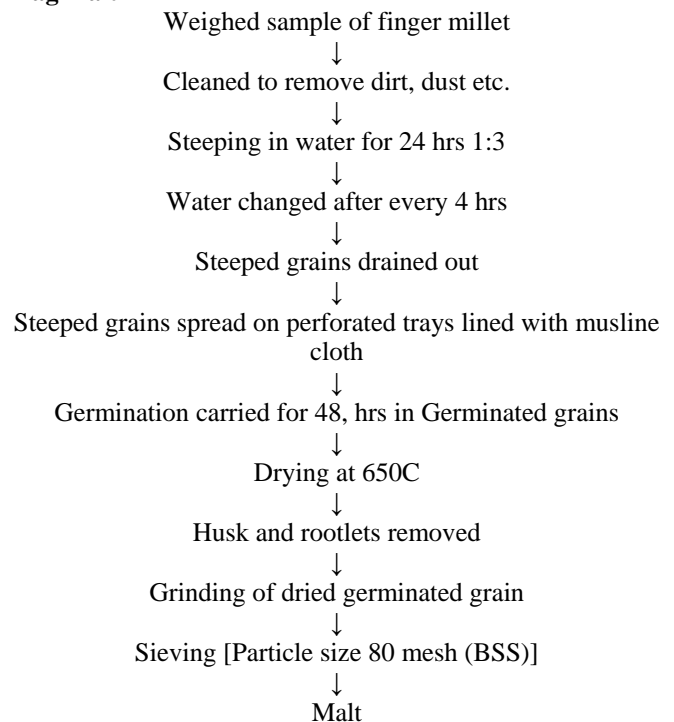
Method of Preparation

Cleaning the grains, washing properly by rubbing with hand, drying in sunlight, pulverizing for getting fine flour, Packaging for marketing/

Financial Analysis

Fixed cost inclusive of depreciation and investment on fixed capita 100000/- Monthly operational expenses for an output of - 25000/-, Total cost of production -Rs. 45/ kg, expected price-Rs70 / kg, Expected net profit- Rs. 12,500 / month.

Ragimalt



Nutritive Laddu

It may be prepared by using millets with other nutritive ingredients. Technology have been developed at KVK Namakkal in convergence with CSC and RI, Madurai, TNAU, CBE, with the objective of providing multi nutrients in low cost for the tribal communities. It comprises ingredients from almost all-important food group *i.e.* cereal (millets), pulses, nuts and fats with sweeteners it is nutritionally dense with protein, minerals, vitamins and antioxidants which make it as healthy substitute of

traditional or conventional laddus. It has good flavor and long shelf life. It contains no artificial flavor or preservatives. It is easy to make and can be stored without much packaging. Selection of raw materials roasting millet, almonds and nuts. Grind them in to fine powder Cutting of jaggery mixing in Grinder preparation of balls

Millet Idli

Fermented foods may also be prepared by mixing finger millet/pearl millet in equal amount with other grains and dal. Among fermented foods Idli and Dosa are very common as Breakfast food and even as main cafeteria food in some parts of country. Finger millet/pearl millet is widely used as one of the ingredients in such food in south India. It not only improves the taste but at the same time enriches the food in terms of protein, calcium and fiber.

Ingredients

Finger millet/pearl millet – 1.5 bowl Rice – 0.5 bowl Urad dal – 1 bowl Salt - taste based Methods of preparation Soak ragi, Rice and dal separately for 6-8 hours Grind each soaked ingredient separately and mix properly. The mixture should be covered and left undisturbed for fermentation. After mixing salt in fermented ingredients. The mixture is poured in idly stand for steaming. Cook idlis in steam for 10 minutes. The Ready to serve Idly are soft and fluffy having pleasant taste and flavor.

Ragi Cakes

Ragi cakes are a favorable dish for children. It is very tasty as well as have exhalent nutritive values.

It is very easy to prepare and had a good shelf life.

Ingredients

Ragi flour - 50 gms, Maida - 50 gms, Ghee – 100 gms, Sugar – 100 gms, Egg – 4, Baking powder – 1 teaspoon, Vanilla essence -1/2 teaspoons.

Method of Preparation

Mix the ragi flour Maida and Baking powder properly and sieve it 3-4 times, mix powdered sugar and ghee together and with the mix sieved flour mixture and the it should be mixed properly. Egg should be whipped and mixed in the mixture. Vanilla essence should be added to mixture. Baking of cake should be done at 200°c in oven.

Millet Beverage

Ingredient

Kodo millet /foxtail millet /barnyard millet /proso millet/and little millet/ finger millet/pearl millet – 80 gms, Moong dal– 20 gms, Elaichi - 1 gms, Milk powder – 50 gms,

Method of Preparation

Soak Kodo millet /foxtail millet /barnyard millet /proso millet/and little millet/ finger millet/pearl millet and Moong dal separately overnight, Next day put it for germination. Dry the germinated grains in sunlight and roast till aroma comes. Grind the roasted mixture so properly to get highly refined powder. Mix the milk powder and elaichi powder. Packed it in air tight jar. Mixed with hot water or milk and sugar to make a nutritive drink.

Table 2: Cost analysis of Millet products

Types of Cost	Particulars	Quantity (Kg)	Amount (Rs.)
1. Fixed Cost	Land	-	100000.00
Building	-		100000.00
Equipment - Pulverizer	-		50000.00
Flour spreading trays	-		2000.00
Sealing machine	-		2000.00
Vessels	-		1000.00
Total Fixed Cost			25500.00
2. Variable Cost	Raw materials	50kgs	5611.00
	Labour @ 300 / day / person	2	600.00
	Electricity and fuel	One day	400.00
	Packaging materials - box @ 5	200 Nos	1000.00
	- Pouches @ 1	200 Nos	200.00
Total Variable Cost			7811.00
3. Interest @ 12.5%	12.5 /100 x2,55,000x1/ 365		87.50
4. Depreciation @ 10%	10 / 100 x 2,55,000x 1/ 300		85.00
5. Profit 20%	20/100 x 7811		1562.00
6. Total Cost	Total variable cost + Interest + Depreciation + Profit 7811+87.50 + 85+ 1562		9546.00
7. GST 5%	(CGST 2.5% and SGST-2.5%) (9546/100x5)		477.00
Total Cost + GST (9546+ 477)			10023.00
8. Total Unit Cost	For 50 kg		10023.00
	For 1 kg (10023/50)		200.46
	For 100 g (200/10)		20.00

Results and Discussion

Majority of the beneficiaries are middle aged, educated at least up to primary level, having medium land holding with medium annual income and on the basis of one-year data results are being discussed. The invest of initial cost for raw material procurement and processing of millet value added products among the farm women groups was self-arranged by the group. The quality products were successfully

prepared by the groups and sold in local market to whole sale merchants. The consolidated initiation of farm women groups on value added products like multigrain flour and millet malt, nutritive laddu, millet idli, millet cakes and millrt beverage, was new ways of self-reliance practices. The Krishi Vigyan Kendra, Namakkalr also provides the marketing and promotion facility of products through linking up the farm women group by Farmers Produces

Organization–Namakkal Araikkal Farmer Producer Company Limited, Namakkal to motivate the involved people for production, processing and value-addition. Table 2 provides the cost-economics involved in the preparation of millet based value-added products. The impact of improving the farm women group giving support *viz.* financially and technologically boosted the enthusiasm of farmers. Although it is like a deep in ocean yet steps toward self-reliance on own produces.

Conclusion

It can be concluded from the study done at various villages of Namakkal that processing and preparing of multigrain flour and millet malt, millet laddu, millet idli, millet cakes and millet beverage, have shown a way for enhancing the economic potential of Fam women and farmers. Further processing and value addition increased the income of the farm women in many folds. The above-discussed method is very helpful to the farmers by adopting and applying these simple techniques for millet-based products processing and thereby increasing the income and improving the livelihood. The large-scale processing unit can also be established in the production catchments with budget availability on a community basis. The interventions of Krishi Vigyan Kendra Nmakkal played a strategic role in increasing self-confidence among farm women in undertaking small scale food processing and value addition unit at their village level and reaching the market in urban area. The consolidated initiation of farm women on processing and preparation of value addition to finger millet is a new way of self-reliance practice. The entrepreneurship activity focusing the millet products has not only generated the additional employment and enhanced income of the families but also saved the farm families from hunting of work to earn livelihood. Further availability of finger millet products help in enhancing its consumption which in turn improve the nutritional intake of the consumers.

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