International Journal of Applied Agricultural Research
ISSN 0973-2683 Volume 15, Number 2 (2020) pp. 91-99

http://www.ripublication.com

Innovative Solutions and Technological Interventions for Employment Generation and Sustainable Livelihood in Kerala, through integrated coconut processing and value addition of products

Menon, A.R.R.[1]*; Gopalakrishnan, A.[2]; Anjaly Annie George[3] and Rijo[3]

[1] Scientist (Rtd.), Kerala Forest Research Institute (KFRI) and Adjunc Professor, School of Environmental Studies, Cochin University of Science and Technology (CUSAT), Cochin-682 022, Kerala.

[2.] Executive Director (Rtd.), Fisheries Resource Management Society, Department of Fisheries, Trivandrum, Kerala.

[3.] Swadeshi Science Movement (SSM), Mather Building, Kacheripady, Kochi-682018, Kerala.

Abstract

Innovative technologies developed in Research Institutions and Universities of India are yet to be commercially exploited. Most of the innovative technologies are lying idle in different organizations. Transfer of new technologies for employment generation and sustainable development is the only remedial measure for poverty alleviation and sustainable development. Livelihoods of farmers are getting affected due to price fluctuations of agricultural products. Farming communities are to be empowered with income augmenting activities. Establishing small scale industries by the farmers in Kerala will boost the per capita income of the farming community, and an attempt is made by implementing this project by mobilizing unskilled farmers to become small scaled entrepreneurs in the field of coconut processing to produce virgin coconut oil from coconut milk and developing value added consumer products from byproducts.

Keywords: Virgin coconut oil production, Technology transfer, Value addition, Sustainable income.

INTRODUCTION

Farmers are the backbone of India, but the per capita income of the farming community are very meager, and as a result farmers are leaving their traditional job of agriculture. They are always at the mercy of middleman, and there is no role for the farmer to fix the prize of their products. Again, they are at the mercy of climatic conditions and various agricultural problems like pest and disease outbreak. Even though there are number Government policies/ subsidies *etc*. to protect the farming community, in effect these are insufficient to safeguard the interest of the agriculturist. Since we are poor in value addition aspects of agric products, especially in fruit products, the wastage is more than 40% annually.

Department of Science and Technology, Government of India, has sanctioned an *i-STED* (Integrated Science Technology and Entrepreneurship Development) project entitled "Innovative Solutions and Technological Interventions in Industries and Clusters to create Science and Technology based Entrepreneurship Development and employment in Kerala" under the research activities of Swadeshi Science Movement, Kerala. The project envisages the implementation of three schemes namely production of 1) Virgin Coconut Oil and coconut by products 2) Papaya cultivation, extraction of Papain and production of value added by-products 3) Handmade paper production through clusters/entrepreneurs and its value addition. The project is being implemented initially in 6 districts of Kerala *viz*. Kasargod, Wayanad, Malappuram, Idukki, Quilon , Trichur and latter extended to Palakkad district. The sanction for the project was obtained in January 2017 and the project period is 5 years.

Coconut farming is a great source of income for the people of Kerala from time imemmorial, though the people are not aware of the value added products like Neera, Virgin Coconut Oil, Tender Coconut, Coconut Chips etc. Coconut oil is effective in reducing oral microbial load and decreasing plaque and gingival indices (Varsha Salian and Pushparaja Shetty, 2018). Some media vehicles and health specialists assure that this fat is capable of promoting health benefits, such as weight reduction, cholesterol lowering, prevention of cardiovascular diseases, and anti-inflammatory effect, among others (Renan da Silva Lima, Jane Mara Block, 2019). Hence awareness programmes and skill imparting training in the above, can lead to formation of integrated units for processing coconut for value added products.

Virgin coconut oil contains more antioxidants than regular coconut oil. VCO samples had water-like appearance and contained medium chain fatty acid (MCFA), especially lauric acid (C12:0) as a major fatty acid, (49.74-51.18 g/100g (Umesh Patel *et.al 2016).* Unlike the regular coconut oil, it is not put through bleaching (which occurs during the refining process for the regular coconut oil), nor is it exposed to any chemicals. Since the virgin coconut oil is unrefined, it also packs a more intense taste of coconut than the regular coconut oil. It also contains polyunsaturated fatty acids: *linoleic acid* and monounsaturated fatty acids: *oleic acid*. Virgin coconut oil is a great source of *polyphenols*. Poly-phenols in coconut oil contain *gallic acid*, which is liable for the staggering fragrance and has a unique taste.

OBJECTIVES

The Project envisages the following objectives *viz.*i) Development of entrepreneurial skills for optimum utilization of local resources, ii) Popularization of identified innovative technologies among entrepreneurs, iii) Scaling up of viable technologies in agriculture, and engineering for sustainable development through formation of "clusters and small-scale industrial units" and iv) Creating a business eco-system by establishing effective forward and backward linkages and marketing strategies.

STUDY AREA

Six districts *viz.* Kasaragod, Wayanad, Malappuram, Thrissur, Idukki and Kollam, in Kerala State were selected initially, and later Palakkad district was also added for the study based on the initial field survey regarding the availability of resources (Fig.1).

Fig.1. Study area

METHODOLOGY

As the first step, protocol development for virgin coconut oil production was done with the technical support of Krishi Vigyan Kendra (KVK) of Kerala Agricultural University. Sensitization by organizing workshops and meetings, in local Panchayats was the initial process. Since virgin coconut oil production is not common, a number of entrepreneur awareness programmes were organized in selected district, to convince the entrepreneurs regarding the scope of this new venture (Fig.2).

Fig.2. Awareness programme for general public

In total 55 meetings were conducted with the participation of potential entrepreneurs, Panchayat officials, agricultural officers and resource persons from various organization. On the whole 2636 villagers were participated in the meetings conducted in different districts. Again, based on the initial response, 50 entrepreneur development programmes were organized for the selected farmers/villagers for giving training in VCO production

About 1500 farmers got training from all the selected districts initially. The programme in Palakkad district was started only in the 3rd year. As a part of entrepreneurship development program, technological intervention and assistance to potential entrepreneurs are taken care off. Developing a marketing strategy, for sale of

virgin coconut oil and value-added products was also envisaged in the programme. Protocol for value-addition of by-products was formulated and communicated to the entrepreneurs. Assistance to entrepreneurs for getting Government subsidies and availing bank loans for establishing industries was also extended. Training and technical assistance for oil extraction was provided to the entrepreneurs.

Fig.3. Training programme for potential entrepreneurs.

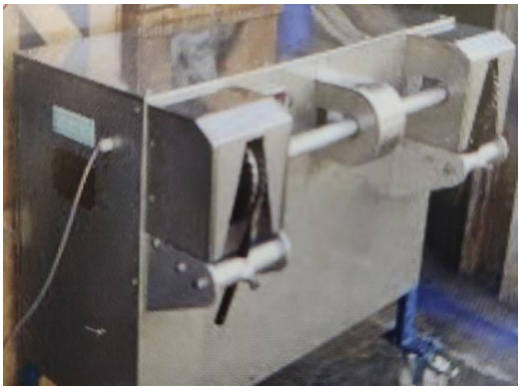
Equipments required:

The essential equipments required for the production of virgin coconut oil by hot processes are: 1). Coconut de-husker for removal of spongy husk from coconut, 2). Coconut de-sheller for removal on hard external shell, 3). Coconut pulveriser for grating coconut kernel, 4). Coconut milk extractor and 5). Sortner, for cooking purpose (Fig.4).

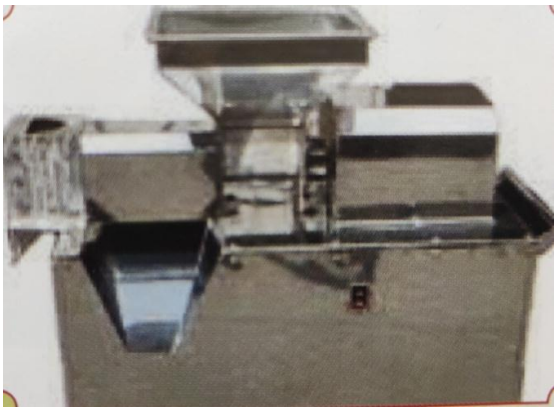
Value added products generation from bye-products of virgin coconut oil production, was yet another phase of the project, for boosting the income of entrepreneurs (Fig.5). Formation of marketing society for sales of value-added products was also done for steady flow of income.

Coconut de-huskar

Coconut de-sheller



Coconut milk extractor



Coconut pulverizar

Sortner

Fig.4. *Equipments for virgin coconut production*

The project field officers in each district conducted a very detailed survey of resources and also held discussion with agricultural officers of respective districts regarding the implementation of project activities. Accordingly, detailed resource mapping of the districts, where the project is being implemented was done and identified the potential Panchayats in each district for project implementation.

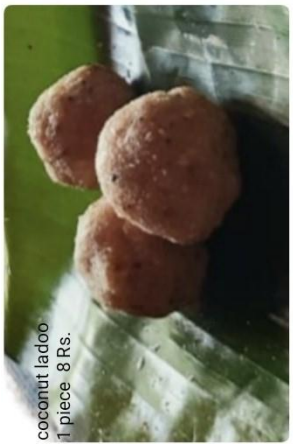
Virgin coconut oil is taken from the fresh milk of the coconut, and it does not undergo any refining process like the regular coconut oil does. Virgin coconut oil is left unrefined. The main distinction between regular and virgin coconut oil lies in the making and extraction. Virgin oil is extracted from coconut milk got from fresh coconuts. Extract the coconut milk is by pressing it with hand using a muslin cloth, or by using mechanical devise like screw press. By adding little hot water makes it easy to press out all the milk. Filter the coconut milk using a muslin cloth to remove any impurities. Three to four coconuts will give you 1 litre of coconut milk, from which 50 grams of oil can be extracted. In a heavy bottom vessel pour the coconut milk and put it on fire. Cooking will be done on low-flame for about 1-2 hours. Keep stirring until the milk turns to brownish colour, be cautious not to burn the coconut milk. As the milk thickens remove from fire and allow it cool down. Pour the thickened milk in a muslin cloth and squeeze out the pure oil and store it in a can or bottle. Homemade coconut oil has a shelf life of one year, don't leave it open as it may get spoiled and lose it nutrients.

Table: 1. Details of functional VCO units in selected districts.

District/Place name	**3rd Year (1917-20)**
Kasaragod	5
Wayanad	3
Malappuram	3
Kottayam	3
Thrissur	7
Idukki	2

Choklate

Sweet (Laddu)



Coconut milk jam

Coconut peda

Coconut chutny

Virgin coconut oil

Oil and chips

Fig.5. Value added products

RESULTS AND DISCUSSION

Virgin Coconut Oil prepared from fresh coconut milk by traditional method is used both for consumption and for bodily use. It has been home-made oil in Kerala used for massaging babies and also as hair care oil. This oil is considered to be superior for its use as hair oil and baby oil because it contains *lauric acid* and also due to its pleasing aroma and purity. It is applied on the body of babies to protect from skin troubles. It is also used in ayurvedic formulations for different diseases. Currently, 28 units are functional creating 250 direct employment opportunities and about 100 indirect employment opportunities. A sum of Rs 30 lakhs as bank loan was initially expended for establishing the units. Direct marketing system is currently followed by the units. Formation of marketing co-operative society is under consideration. An amount of Rs 15000-20000 is the present net income of individuals of the units.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the financial support from Department of Science and Technology, Government of India. The technical support from Central Plantation Crop Research Institute (CPCRI), Kerala Agricultural University, Kerala State Agricultural Department including different Agricultural Offices in different Districts, and the financial support to farmers from various Banks are appreciated.

REFERENCES

[1] Renan da Silva Lima, Jane Mara Block, 2019. Coconut oil: what do we really know about it so far? *Food Quality and Safety*, *Volume 3(2):*61-72.

[2] Umesh Patil, Soottwat Benjakul, Thummanoon Prodpran and Theraphol Senphan, 2016. Characteristics and quality of virgin coconut oil as influenced by maturity stages. *Carpathian Journal of Food Science and Technology.Vol. 3(4):*103-115.

[3] Varsha Salian and Pushparaja Shetty, 2018. Coconut Oil and Virgin Coconut Oil: An Insight into its Oral and Overall Health Benefits. *Journal of Clinical and Diagnostic Research*. Jan, *Vol-12(1):* 1-3.