International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2018; 6(6): 717-720

Received: 04-09-2018
Accepted: 08-10-2018

Prangya Paramita Sahoo
Department of Agricultural Economics, OUAT, Bhubaneswar, Odisha, India

KK Sarangi
Department of Agricultural Economics, OUAT, Bhubaneswar, Odisha, India

Sanghamitra Pradhan
Department of Agricultural Economics, OUAT, Bhubaneswar, Odisha, India

KSS Chandana
Department of Agricultural Economics, OUAT, Bhubaneswar, Odisha, India

Correspondence
Prangya Paramita Sahoo
Department of Agricultural Economics, OUAT, Bhubaneswar, Odisha, India

Promotion of food processing/Pharmaceutical Industry by assessing the potential of organic Turmeric produced in Kandhamal district of Odisha

Prangya Paramita Sahoo, KK Sarangi, Sanghamitra Pradhan and KSS Chandana

Abstract
This paper seeks to promote establishment of food/pharmaceutical industry in the study district through assessing of the potentials of the organic turmeric cultivated through ages. Kandhamal can take the lead in organic turmeric production in the state of Odisha but this potential has not been fully tapped as the techniques needed for its production have not been properly understood by the farmers which have led to low production potential of processing of turmeric as highlighted in this paper. This is because it has variety of uses and it is highly valued at the international market. Turmeric is used as a spice and is the major component of curry powder. Besides its use as a spice, turmeric finds a place in the cosmetics and pharmaceutical industry for its brilliant characteristics. It is also being used as a dye for colouring fabrics. It is medically used for the prevention and treatment of diverse kinds of diseases as also highlighted in the paper. It is thus recommended that there should be adequate awareness on the potentials of organic turmeric especially in the study district, for the promotion of pharmaceutical industry. There is also need to develop improved varieties of the turmeric to boost production. Farmers should be provided with inputs technology like application of manure, FYM and irrigation in order to increase their production.

Keywords: food processing, organic turmeric, value addition spices, enterpreurship

1. Introduction
Agriculture is an important sector in the economy of the district. But it fail to flourish due to limited utilization of technology. The district observed a very good production of vegetable, spices mainly organic turmeric, ginger, black pepper etc, but couldn't fetch suitable market price because of some limitations. Though the climate is very suitable, man power is also so strong and the district is by default organic but due to limited utilization of modern inputs, and improved verity, the ability of the district to link with national and international market go down. The resource poor farmer does not get the appropriate price for their produce due to information asymmetry. There is wastage of produce due to lack of scientific storage facilities and proper processing structures. To overcome the problem of wastage, and to get the actual return from the labour there is need to find out other sustainable ways, which will make proper use of the surplus produce, also generate income and employment along the process. The food processing industry provides a way out for this problem. Despite the growth of food processing sector in Odisha to some extent, the processing activity in Kandhamal district is at a premature state with very low so to say no penetration. To some extent the culture and mentality of the resource poor farmers is also responsible for not developing agro food processing structures that can provide better value addition to their produce.
Turmeric (*Curcuma longa* L), the ancient and sacred spice of India known as 'Indian saffron' is an important commercial spice crop grown in India. Turmeric is the dried rhizome of *Curcuma longa* L., an herbaceous perennial belonging to the family Zingiberceae. The rhizomes are ready for harvesting in about 8 to 10 months after planting. The rhizomes are carefully harvested with a spade after loosening the soil with a small digger. Rhizomes are cleaned up by soaking them in water, as well as removal of long roots and leaf scales. Rhizomes are then further cured and processed, or stored for the next year's planting. Rhizomes for next year's planting should be stored in well-ventilated rooms and covered with dry leaves to prevent dehydration; or stored in pits covered with sawdust, sand. Among the several spices, turmeric

ranks second with regard to its foreign exchange earning being next only to chilli. Besides its use as a spice; turmeric finds a place in the cosmetics industry for its brilliant colour and characteristic perfume. On account of its flavour and medicinal properties, turmeric is also used in the preparation of cosmetics, soaps, ointments, face creams toothpastes etc. It is also being used as a dye for colouring fabrics. It is medically used for the prevention and treatment of different kinds of diseases.

The district is endowed with a agro-friendly climate for cultivation along with it has the potential to be a sunrise zone for food processing and other agri businesses. The weather and availability of water are conducive for food cultivation and is especially suitable for growing horticultural products like vegetable and spices. A very good share of organic turmeric production along with man power, transport, support extended by the Government, are the factors present for making food/pharmaceutical processing a lucrative option in the district.

2. Objective

- To encourage local entrepreneurs to set up Food/pharmaceutical processing enterprises.
- To assess the potential of district to produce organic turmeric of standard quality.
- To improve the standard of living of the local farmers and unemployed youth.
- To enhance competitiveness of the organic turmeric for both domestic and international markets.

3. Turmeric and its potentials

Turmeric is one of most essential spices all over the world with a long and distinguished human uses. This spice with the flavour is obtained from the dried and grounded rhizomes of the plant. Apart from being a major ingredient in culinary, turmeric powder is used as food-colouring agent and also as natural dye. It is very rich source of many essential vitamins such as pyridoxine (vitamin B6), choline, niacin, and riboflavin, etc. Turmeric contains good amounts of minerals like calcium, iron, potassium, manganese, copper, zinc, and magnesium. Turmeric has various properties like anti-inflammatory (painkiller), carminative, anti-flatulent and anti-microbial properties. The main compound present in turmeric i.e. cur cumin have anti-tumour, antioxidant, anti-arthritic, anti-amyloid, anti-ischemic, and anti-inflammatory properties. Apart from the above turmeric has also one promising potential of used as natural pesticides.

3.1 Primary Products

There are mainly two primary products of turmeric which are as follows:

3.1.1 Turmeric finger

The turmeric finger is the purest form of turmeric and is used in medicines, food and dyeing processes. The product is sourced from the farmers who grow the crop. Rhizomes appear as fingers, bulbs and splits. Rhizome quality is judged by a clean and smooth skin, uniform skin and flesh colours.

3.1.2 Turmeric Powder

Turmeric powder, a bright yellow spice from the rhizome of the Curcuma it has a warm, bitter, pepper-like flavour and earthy, mustard-like aroma it is mostly used to colour and flavour food in the food industry. Turmeric powder is a bright yellow powder made by dry grinding of mature turmeric rhizomes (underground stems).

3.2 Secondary and Derived Product

3.2.1 Curry Powder

Turmeric is an important ingredient in curry powder. The turmeric content in curry powder blends ranges from 10-15% to 30%. Typical Indian curry powder for meat and fish dishes contains 20-30% turmeric while curry mixes for vegetarian dishes contain less turmeric, in the range of 5 to 10%, because of the bitter flavour.

3.2.2 Oleoresins

Oleoresins from turmeric are obtained by solvent extraction of the powdered or comminutated rhizome. This process yields about 12 % of an orange/red viscous liquid, which, depending on the solvent used for extraction and on the turmeric type and cultivar, contains various proportions of the colouring matter, i.e. the curcuminoids, the volatile oils which impart the flavour to the product, and non-volatile fatty and resinous materials.

3.2.3 Essential Oil

Turmeric essential oil has little interest in the Western food industry but it has a very good use for skin disease, as opposed to oleoresin Turmeric essential oil is obtained by distillation or by supercritical fluid extraction of the powdered rhizome. Kandhamal turmeric has an advantage of yielding better quality of essential turmeric oil.

3.2.4 Cur cumin

Cur cumin is the main active ingredient in turmeric. It has powerful anti-inflammatory effects and is a very strong antioxidant. It helps your body fight foreign invaders and also has a role in repairing damage. Cur cumin has beneficial effects on several factors known to play a role in heart disease. It improves the function of the endothelium and is a potent anti-inflammatory agent and antioxidant. Cur cumin leads to several changes on the molecular level that may help prevent and perhaps even treat cancer.

4. Medicinal Uses of Turmeric

Turmeric has the following medicinal uses:

The wide range of health benefit come mainly from its ingredient, cur cumin. Curcuma is now gaining importance all over the world as a mighty cure to combat a variety of ailments, like anti-inflammatory, hypocholestremic, cholera tic, antimicrobial, ant rheumatic, ant fibrotic, anti-venomous, antiviral antidiabetic, antihepatoxic and anticancerous properties as well as insect repellent activity.

- Cur cumin, inhibit the multiplication of tumour cells, including multiple myeloma, pancreatic cancer, and colon cancer.
- It contains health benefiting essential oils such as termerone which is used in cosmetic industry.
- Cur cumin, along with other antioxidants, has been found to have anti-amyloid and anti-inflammatory properties. Thus; it is effective in preventing or at least delaying the onset of Alzheimer's disease.
- The root herb contains no cholesterol; and it help to control blood cholesterol levels, offer protection from coronary artery disease and stroke risk.
- Turmeric protects against Certain Liver Diseases.
- Turmeric helps control development of type 2 diabetes.

- Turmeric powder is an effective home remedy for chronic cough, cold and throat irritations.

5. Problems faced by the organic turmeric growers of the district

According to the study some of the challenges faced by turmeric growers in the study area are:

- High cost of labour is an important problem faced by the turmeric growers. Turmeric harvesting is a labour intensive job which needs more number of labours.
- The financial weakness of the small and marginal farmers forces them to sell their produce to the traders for the sake of Personal obligation.
- The resource poor farmers are cultivating organic turmeric with the age old practices they are unaware of modern technical knowledge which can boost their production and productivity.
- Lack of storage facilities is a serious problem faced by them, which ultimately leads to selling of produce even though the rate is not suitable.
- Turmeric is one of the most important spice crops grown in Kandhamal district; however the productivity is continuously decreasing year by year due to lack of technological interventions like rhizome treatment, soil application of bio control agent, crop rotation, mulching etc.
- Turmeric cultivation is capital intensive and needs more investment. The tribal farmers of the study area are incapable to invest the required inputs and unable to bear more risks.
- With the application of irrigation, yield increased by 20-30 per cent, but the farmers are not applying irrigation to the crop. To enhance the productivity, eco-friendly production technologies among the farming community are the need of the hour. The indigenous technical knowledge acquired by the farmers need to be tested and refined with the modern techniques of crop cultivation.
- Apart from using as an important ingredient in curry powder, turmeric is a wonderful spice has various medicinal properties. It has a wide national and international market, but the poor farmers are lack of market information.
- The farmers of the study area use seeds of the previous year by storing them in a pit under the ground for three to four months till plantation.no improved variety of seeds are available to the grower.

6. Suggestions and policy implications

The following suggestions were made based on the study

- There is a need to create awareness in the farmers about the use of organic manures.
- The farmers were using excess of human labour resulting in increased cost of cultivation. So labour saving technologies and devices such as mechanised farm implements needs to be made available to farmers.
- Recent technologies like IPM, bio fertilizer and improved varieties, need to be introduced.
- Farmers need to be encouraged to take up processing.
- Establishment of community storage house for the farmers by the government.
- Government should help the farmers to establish small scale mini processing plant, so that farmer will get maximum share in consumer rupee.
- Government should facilitate for direct marketing of the produce from farmers to the processing industries.
- There is a need to establish the e-tendering system for marketing of turmeric, since it is more transparent. Electronic weighing should be expanded to entire market so that malpractices in weighing can be reduced.

7. Opportunity for establishment of food /pharmaceutical industry in the study area

Promoting processing of agricultural product could strengthen the link between agriculture and industry and help in generating farm income and employment as also in reducing wastage of agricultural products.

The district observes the following scope for setting up of food/pharmaceutical industry:

1	Availability of land for building of industry.
2	Availability of dedicated human resources
3	Government support to encouraging of establishment of processing industry
4	Good share of vegetable and spice production in the state
5	Transportation facilities.
6	Potential of the district to produce organic turmeric
7	vast untapped potential for food processing industry

8. Agro-processing as a way to develop Kandhamal Agriculture

Agriculture and forestry remain the key source of livelihood in the study area supporting large sections of resource poor people. The district endowed with a suitable agro climatic condition for cultivation of vegetables and spices (turmeric, ginger, pepper) which ultimately play a significant role in the promotion of food/pharmaceutical industry. This may act as a link between agriculture and industry sector. The emerging vegetable and spice products require suitable preservation and processing and appropriate marketing channels to reach the target market. Processing is a means of value addition to farm produced products and a link between the field and the plate. However, the proposed food/pharmaceutical-processing can became a major source of livelihood for the unemployed people of the district. The establishment of food/pharmaceutical processing industries is profound and deep with several institutions like farmer producer organisation, retail organizations, small and medium enterprises, machine manufacturers and other agencies like small traders, transporters and women's collectives having some roles. An improvement in one sector is likely to spill over into the other sector also.

The value addition for fresh turmeric is sorting, washing, cleaning, drying and packaging and value added products can be turmeric powder, curry powder, turmeric oil, cur cumin, turmeric juice, turmeric root powder etc. value addition to the crops will generate more employment, increase income of self-employed people.

1. Industrial Scenario of Kandhamal District

Type of Industry	No of Units
Agro based	888
Textile based	241
Wood/wooden based furniture	153
Leather based	24
Electrical machinery andelectronics	7
Large Scale Industries / Public Sector undertakings	Nil
Turmeric processing food/pharma industry	1

Source: Directorate of Industries, Odisha

In the district only one turmeric processing plant is there at Bandhagada by KASAM (Kandhamal Apex Spices Association for Marketing), which is not sufficient. The plant undertaken only turmeric powder preparation and to some extent turmeric oil, no other value addition were carried out.

2. Distribution of respondents' views on need for food/pharmaceutical industry

Opinion of respondent	Farmer	Young people	Trader	Govt. officer	Middleman
Strongly agree	6(10)	11(45.83)	3(25)	4(66.66)	2(25)
Agree	28(46.66)	8(33.33)	5(41.66)	1(16.66)	3(37.5)
Indifferent	15(25)	2(8.33)	2(16.66)	1(16.66)	2(25)
Disagree	8(13.33)	2(8.33)	1(8.33)	0(0)	1(12.5)
Strongly disagree	3(5)	1(4.16)	1(8.33)	0(0)	0(0)
Total	60	24	12	6	8

Source: Focus group discussion in the district 2017-18

9. Conclusion

Turmeric is an important spice with verity of uses. Turmeric production should thus be encouraged and streamlined by sensitizing the farmers of the district about the potentials of turmeric. There is also need to introduce modern input utilization technologies and develop improved varieties of the organic turmeric to boost production. There is also need to provide market information like price of turmeric products in the national and international markets to the farmers.

Despite indicating the potential of the district, the ground reality is that the processing activity is at a premature stage, hence it is necessary to diagnose the problems of the district and providing an improved production and marketing environment and value added economic benefits to the farmer and entrepreneur trough appropriate science and technological policies for various post-harvest functions in food processing industries.

10. References

1. Babu V. Physiological studies on weed control efficiency in turmeric (*Curcuma Longa* L.). M Sc. (Agri.) Thesis, Univ. Agric. Sci., Dharwad, Karnataka, India, 2008.
2. Christos A. Damalas, Potential uses of turmeric (*Curcuma longa*) products as alternative means of pest management in crop production, POJ. 2011; 4(3):136-141.
3. Karthik V, Amarnath JS. An economic analysis of turmeric production in Tamil.
4. Mohammad Rais, *et al*. Food Processing Industry: Opportunities in North East Region of India, The NEHU Journal. 2014; 12(1):37-51.
5. Nadu India. Direct Research Journal of Agriculture and Food Science. 2014; 2(6):66-76.
6. Nilabja Ghosh. An assessment of the extent of food processing in various food sub-sectors, Institute of Economic Growth, November, 2014.
7. Nwaekpe *et al.* Promotion of Turmeric for the Food/Pharmaceutical Industry in Nigeria, American Journal of Experimental Agriculture. 2015; 8(6):335-341.
8. Sahoo PP. Value Chain Analysis of Organic Turmeric in Kandhamal District of Odisha. M.Sc (Agri) Thesis, Orissa University of Agriculture and Technology (India), 2017.
9. Turmeric nutrition facts. Available: www.nutrition-and-you.com
10. Uchenna Ijoma *et al*. Effect of Promotional Strategies of Pharmaceutical Companies on Doctors' Prescription Pattern in South East Nigeria, TAF Preventive Medicine Bulletin, 2010: 9(1).
11. www.healthline.com/nutrition/top-10-evidence-based-health-benefits-of-turmeric.