A STUDY ON EXTRACTION OF CASHEW NUT SHELL LIQUID OIL (CNSL) FROM CASHEW PROCESSING WASTE (SHELLS) IN CUDDALORE DISTRICT OF TAMILNADU

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Abstract

India processed about 11,38,000 tones of raw cashew nut seeds through 3650 cashew processing mills and it was is 26,274 tonnes in Tamil Nadu. The cutting and shelling operation performed in the mill generates huge quantity of the cashew nut shell that is about 67% of total weight of raw cashew nut seeds which were considered as solid waste in previous days but now it is processed to extract Cashew Nut Shell Liquid (CNSL) oil which has innumerable applications,such as friction linings, paints, laminating resins,,etc.At this junction, this study of extraction of Cashew Nut Shell Liquid oil (CNSL) from cashew processing waste(shells) in Cuddalore district of Tamilnadu was undertaken with the following objectives.(i)To Study the physical and financial Performance of CNSL units in the study area.(ii)To find out constraints in CNSL production and marketing and to offer policy implications. From the selected block of Panruti, 15 cashew processors who were engaged in cashewnut processing and CNSL extraction were selected at random. In order to assess the physical and financial performance breakeven and margin of safety analysis were carried out and to study the constraints in CNSL oil processing, Garrett's ranking technique was employed . The results from the analysis showed that margin of safety at actual production,actual quantity of sales and actual value of sales were in comfortable position. But their average capacity utilisation(63.8 percent) were low due to many constraints associated with this industry. The identified constraints were ranked by Garrett scoring technique and from the results, it was found that seasonal availability was ranked first followed by heavy competition. This study suggested that all the stake holders in CNSL oil production and marketing should be properly trained for current events at national and global level which would in-turn enable the Panruti CNSL oil sector to compete in global environment.

Index Terms: **CNSL, Capacity Utilisation, Breakeven Quantity**

I. INTRODUCTION

India is the largest producer and processor of cashews (*Anacardium occidentale L.*) in the world. Total area in India under cashew cultivation is about 8,68,000 ha with annual production of 6,65,000 tons giving average productivity 860 kg per hectare. India processed about 11,38,000 tones of raw cashew nut seeds through 3650 cashew processing mills scattered in many states of country . The cashew mill in India employed different unit operations/methodology for processing and depending on variety of raw material, location, technological mechanization, and availability of secured energy supply. The most energy and time intensive unit operations in cashew processing are drying of raw seed in open sun, steaming of raw nut and kernel drying with electrical energy . The steaming of raw cashew nut seed prior to cutting and shelling operation is widely adopted method in small-scale cashew nut processing mills. The cutting and shelling operation performed in the mill generates huge quantity of the cashew nut shell that is, about 67% of total weight of raw cashew nut seeds.

The main by product of cashew nut shell, Cashew Nut Shell Liquid (CNSL) has innumerable applications, such as friction linings, paints, laminating resins, rubber compounding resins, cashew resins, foundry chemicals, and intermediates for chemical industry. It offers much scope cements; polyurethane based polymers, surfactants and varied opportunities for the development of other tailor-made polymers. CNSL and its derivatives are also used as demulsifying agents for water in oil type petroleum emulsions. It is also used for manufacturing of CNSL based Resins, Cardanol (card-phenol) Anti corrosive hiring chemicals, Acid resitant paints and varnishes,Insecti cides and Fungicides, cashew lacquers bakelite and enamels. Cashew Nut Shell Liquid (CNSL) is a versatile by-product of the cashew industry. The nut has a shell of about 1/8 inch thickness inside which is a soft honey comb structure containing a dark reddish brown viscous liquid. It is called cashew nut shell liquid, which is the pericarp fluid of the cashew nut. It is oft en considered as the better and cheaper material for unsaturated phenols.The production potential for the product is very high. The total production of raw cashew nut in the country could be as much as 0.76 million tons and at 15% recovery by weight, the production potential for CNSL is as much as 108 thousand tons.The main markets for CNSL are the United States and the European Union .

1.1.Problem Focus

Tamil Nadu is one of the largest producer of cashew nut in India. The total cultivated area under cashew nut is 92,138 hectares. The Cuddalore district has the highest estimated production followed by Ariyalur and Villupuram accounting to 12,021 tonnes, 6,600 tonnes and 2,409 tonnes respectively. The total estimated production in Tamil Nadu is 26,274 tonnes in Tamil Nadu, Panruti taluk of Cuddalore district is the heaven of cashew nuts, where they processing the nuts around the year. The industry in Panruti has developed over several decades mainly due to the availability of cashew in the region and also the inherent skills of the women in that region in processing. The cashew industry in Panruti is recognized as an important cashew processing cluster in the country. The area is a home to many cashew cultivators and processors and but also poor and even landless people reap benefits from primary production and processing. Cashew is widely grown, raw nuts are processed, raw nuts are imported within and outside the cashew clusters at Panruti is organized in such as way to allow not only major processors the country and processed nuts are sold directly or indirectly to the international market as well as in the domestic market. Raw nut availability, market dominated by few players, structured/network absent among small, medium processors, information asymmetry, lack of support for warehousing, regulated market are the major problems for small and medium cashew processing industries.

Due to price hike of raw nuts in recent years at global level, processors are severely suffered because of unavailability of sufficient quantity of raw materials to meet break even quantity. Processors in Panruti region already worst affected due to shortage of availability of local raw nuts due to devastation of cashewnut trees because of THANE Storm (2011) which causes huge loss for both farmers and processors in this region. In this situation,extraction of CSNL oil giving more remuneration for processors and save them from loss. At this junction, this study of extraction of Cashew Nut Shell Liquid oil (CNSL) from cashew processing waste in Cuddalore district of Tamilnadu can provide integrated, efficient and functional farmer-industry-trading-policy interface. This study was undertaken with the following objectives.(i)To Study the physical and financial Performance of CNSL units in the study area.(ii)To find out constraints in CNSL production and marketing and to offer policy implications.

II.MATERIALS AND METHODS

The present study was conducted in Cuddalore district of Tamil Nadu. With regard to selection of block, Panruti was purposively selected since, production and marketing wise, it occupied the first position in Cuddalore district. From the selected block of Panruti,15 cashew processors who were engaged in cashewnut processing and CNSL extraction were selected at random. In order to assess the physical and financial performance breakeven analysis were carried out with the help of following formula:

$$Q = \frac{FC}{P-VC}$$

Where,

Q = Quantity at breakeven point

FC = Total annual fixed cost.

P = Price per unit of output.

VC = Variable cost per unit of output

To study the constraints in CNSL oil processing, Garrett's ranking technique was employed by using the formula,

$$\text{Percentage Position} = \frac{100 \text{ X } (Rij-0.5)}{Nj}$$

R_{ij} = Rank given for i^{th} factor by j^{th} individual

N_j = Number of factors ranked by j^{th} individual

III.RESULTS AND DISCUSSION

3.1.Break-Even Analysis:

The Break – Even Analysis would indicate the level of output at which the total cost and the total revenue are the same. The Break Even Point (B.E.P.) in terms of physical quantity, would help to understand the behaviour of profits in relation to output of the processing units and the optimal utilization of their installed capacity. Hence with the help of break even and margin of safety analysis, the cost volume profit sensitivity of the units were worked out and the results are presented in Table.1.

Table.1

Break Even Analysis

Sl.No.	Particulars	Units of Measurement	Quantity
1.	Actual quantity of CNSL oil produced	Quintals	645.55
5.	Break Even Quantity of finished production to be produced	Quintals	405.22
6.	Margin of safety at actual production	Percentage	59.30
7.	Actual quantity of finished products sold	Quintals	585.75
8.	Break even quantity of finished production to be sold	Quintals	405.22
9.	Margin of safety at actual quantity of sales	Percentage	44.55
10.	Actual value of finished products sold	Rupees	1763250
11.	Break even value of finished products to be sold	Rupees	1215660
12.	Margin of Safety at actual value of sales	Percentage	45.04

It could be seen from the table.1 that the actual quantity of CNSL oil produced was 645.55 quintals while break even quantity to be produced were 405.22 quintals per annum, Where as the break even quantity of CNSL oil to be sold was 405.22 quintals and actual quantity of CNSL oil sold was 585.75 quintals per annum respectively. Therefore, the margin of safety at actual quantity of production ,actual quantity of sales and actual value of sales were 59.30 per cent ,44.55 percent and 45.04 percent respectively. This indicated that margin of safety at actual production, actual quantity of sales and actual value of sales were low.Due to high demand of CNSL oil in domestic as well as in export market they were producing continuously whenever raw material available .But their average capacity utilisation(63.8 percent) were low due to many constraints associated with this industry.

3.2.Garrett Scoring Technique

Garrett scoring technique was employed to analyze constraints in CSNL industry. The following five constraints were identified as very important. They were,(i)Heavy Competition,(ii)Poor Quality of Shell,(iii)Seasonal Availability,(iv)Lack of Skilled Labour and(v) Lack of Market Information.The identified constraints were ranked by Garrett scoring technique. From the results, it was found that seasonal availability was ranked first (Garrett score:76.3) followed by heavy competition (Garrett score:70.5). Uneven poor quality of shells ranked third (Garrett score:64.6) followed by lack of market information(Garrett score:58.0) and lack of skilled labourers (Garrett score 56.2). The details were given in Table.2.

Table.2 Garrett ranking

Factors	Factors	Average score	Rank
F_1	Heavy Competition	70.5	2
F_2	Poor Quality of Shells	64.6	3
F_3	Seasonal Availability	76.3	1
F_4	Lack of Skilled Labourers	56.2	5
F_5	Lack of Market Information	58.0	4

IV.CONCLUSIONS AND POLICY IMPLICATIONS

Both production and marketing of CNSL oil are highly competitive in this area. The opportunity of overseas market utilized only by large scale processors and exporters. The scope of overseas market can be extended to the small scale processors by giving proper training and infrastructural facilities. Most of the small scale entrepreneurs are less educated and proper training and extension work may be compensated to empower them. Most of the entrepreneurs don't have storage facilities. This problem can be solved by creating common rural godowns in a collective manner. Lack of market information is also one of the problem for these small entrepreneurs. This problem can be solved by utilizing e-information. The processing technology has to be upgraded to compete with large scale companies. Flexible finance and investment in developing new processing technologies with the consideration of small scale processing sector is essential at this juncture. All the stake holders in CNSL oil production and marketing should be educated about government policies and programmes and current events at national and global level through proper training facilities which would in-turn enable the Panruti CNSL oil sector to compete in global environment.The development of CNSL oil sector not only increase economic development in this region it also increase sustainability of the cashew sector through effective waste mananagent.

V.REFERENCES

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