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Economics of tamarind concentration and juice processing unit in Karnataka

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Abstract

Tamarind concentrate is made from fresh tamarind pulp pureed with water, salt and sugar. One teaspoon serving contains around 4 calories. Tamarind concentrate is low in fat, protein and high in carbohydrates. Tamarind juice is made from the tamarind fruit and is the best way to beat the heat in summers. In this perspective an analysis has been made to know the cost and returns of tamarind concentration and juice processing unit. The analytical tools such as NPV, IRR, Payback period and BC ratio were used to analyze the data. The study was based on the primary source and it was used to analyze the financial feasibility of tamarind processing units in study area. Results showed that processing of 1 metric tons tamarind dried will give 659.20kg of tamarind concentration with cost of 1 kg of tamarind concentration was ₹ 131 and tamarind juice ₹ 1,149.60 and total cost of tamarind concentration was ₹ 86,355.20 and tamarind juice was ₹ 59,515.34. The net present worth of tamarind concentration and tamarind juice processing units, It was observed that the tamarind concentration processing unit was found to be financially sound and economically feasibility in terms of net present value has been shown the end of the economic life of the project viz., 15 years was found to be ₹ 46, 62, 000 and ₹ 40, 85,000, tamarind concentration processing unit IRR was 31.00 per cent, tamarind juice processing unit was 35.32 per cent. Tamarind concentration processing unit of BC ratio was 2.00 per cent and tamarind juice processing unit was 1.60 per cent and payback period was tamarind concentration processing unit 2.50 and tamarind juice processing unit was 2.70 year. The derived tamarind concentration processing unit of gross return was ₹ 86,355.20 and tamarind juice processing unit of ₹ 99,267.96. The derived tamarind concentration processing unit of net return was ₹ 25,392.81 and tamarind juice processing unit of net return was ₹ 39,752.62.

Keywords: Tamarind, tamarind juice, tamarind dried, tamarind seed, financial feasibility, Processing unit, value addition and capacity utilization

Introduction

A tamarind is the brown, pod-shaped fruit of the native African and also known as a tamarind or an Indian date, tamarind can be used fresh or dried, but most often available in the United States as a canned concentrated pulp or processed into tamarind concentrate. Tamarind concentrate sometimes called tamarind paste has a mildly sweet flavor combined with an acidity that is similar lemon juice. Typical commercial brand of tamarind concentrate is made from fresh tamarind pulp pureed with water, salt and sugar. One teaspoon serving contains around 4 calories. Tamarind concentrate is low in fat, protein and high in carbohydrates, the majority of which are supplied by simple sugars from the fruit and the added sweetener. Tamarind is naturally high in B vitamins such as thiamine, minerals, magnesium and iron. Commercial tamarind concentrate, however, is high in sodium, with each teaspoon containing as much as 200 milligrams of sodium, or more than 8 per cent of the amount of sodium a healthy adult should limit himself to each day. Tamarind concentrate is traditionally used as a way to add a slightly sour bite to Middle Eastern, Thai and Indian dishes. Tamarind juice is made from the tamarind fruit and is the best way to beat the heat in summers. Tamarind juice concentrates were more viscous than sucrose solutions especially at higher concentrations. Whereas the activation energy of sucrose solutions varies with concentration, it does not vary with concentration in the case of tamarind concentrates. The juice does not only have a great tangy taste, but also has a great nutritive and medicinal value. It is so much better than drinking soft drinks, which unnecessarily increase your calorie intake and also adds no nutritive value. Follow the above given recipe and treat yourself with a healthy chilled glass of tamarind juice. Objective of investigation to study the economics of tamarind concentration and juice processing units in Karnataka.

Material and Methods

To fulfill the specific objectives of Karnataka was selected for the study. The state is having dry land area and having highest production of tamarind.

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In Karnataka, four districts namely Bengaluru, Kolar, Tumkur and Chikkabalapura were selected. From each district one processing unit was selected. For collection of primary data, the respondents were selected by random sampling method. In Karnataka four processing units were selected and 25 farmers, 10 traders, 10 wholesalers, 10 retailers were selected in each district. Thus the total sample size is 224. For this particular objective, total cost and returns were computed for a year of 2018-19 based on primary data that was collected from processing units. For evaluating the present objective tamarind concentration and juice processing units were selected from Bengaluru and Tumkur district in Karnataka. However, for understanding the financial feasibility of tamarind concentration and juice processing unit, the statistical tools like NPV, IRR, BC ratio and payback period were used to analysis the data and to arrive at valid conclusion.

Results and Discussion

1. Procurement of tamarind dried by Indira foods processing unit

Over the years from the Table 1, it shows that procurement management of tamarind dried from 2003-04 to 2017-18. The quantity of raw material has been increasing over the year from 410 metric tons to 600 metric tons, with the compound annual growth rate of 2.69 per cent and the value it means the purchasing of raw material also has been increase 3.48 per cent. Because procurement of raw material quantity and value range were increased year by year. The compound annual growth in quantity of raw material was 2.69 per cent and growth of value was 3.48 per cent. Performance of tamarind concentration processing unit was good. Because year by year the procuring quantity of raw material was increased and the prices of procuring raw material (tamarind dried) was increased and pre-planted trees were come for yielding, this processing units product spreading by domestic and export marketing of processed products and has good demand in consumers. Tamarind concentration was very use full instead of tamarind dried by adding directly for culinary purpose. These tamarind products have now a day's available in (organized markets) super market. So, the tamarind concentration processing has been showing good performance over the years. (Agrawal, 2014)^[1].

Table 1: Procurement management of tamarind dried in Indira foods processing unit

SL. No.	Years	Quantity of raw material (MT)	Value of raw material cost (₹/MT)
1	2003-04	410	21,200
2	2004-05	455	23,000
3	2005-06	462	25,500
4	2006-07	470	27,400
5	2007-08	495	29,730
6	2008-09	525	31,200
7	2009-10	530	35,950
8	2010-11	541	37,000
9	2011-12	565	39,100
10	2012-13	570	41,500
11	2013-14	584	43,300
12	2014-15	592	44,200
13	2015-16	600	45,700
14	2016-17	615	47,600
15	2017-18	600	48,100
	CAGR (%)	2.69	3.48

2. Capacity utilization in Indira foods processing unit

From Table 2 represents the capacity utilization in Indira foods processing unit. It was clear that the plant processing capacity was higher in tamarind concentration processing unit of 800 MT. It determined the capacity of the processing unit and further, the annual installed capacity in tamarind concentration processing unit was 600 metric ton. But the actual processed capacity utilization was 75 per cent. It determines the practically plant production capacity and the actual quantity processed means how much extend actually used its installed production capacity of the unit (Dinesh and Ramasamy 2016)^[3].

Table 2: Capacity utilization in Indira foods processing unit

S. No.	Particulars	Units	Utilization
1	Installed capacity	MT/ day	3.2
2	Quantity processed	day (MT)	1.2
3	Number of working days	days/ annum	250
4	Number of shift	per day	2
5	Duration of shift	hour	8
6	Annual installed capacity	MT	800
7	Annual quantity processed	MT	600
8	Capacity utilization	%	75.00

3. Capital investment in Indira foods processing unit

From the Table 3, the purchasing land value of Rs. 21.81 lakhs, land development with the cost 4.30 lakhs, civil work 3,845 sqft area worth of 31.50 lakhs and total plant and machinery cost was 13.76 Lakhs and working capital with the worth of 9.60 Lakhs and total capital investment was 80.97 Lakhs. Capital budgeting role in the company was not only reduces the cost but also increases the revenue in long-term and will bring significant changes in the profit of the company by avoiding under investment. So making investment, it is required carefully by planning and analyzing of the company thoroughly. Hence, the working capital was concerned with short-term finance of the business which is a closely related trade between profitability, liquidity and efficient working capital management in the company was leads to improve the operating performance of the business concern and it helps to meet the company's short-term liquidity. (Kakade, 2004)^[4].

Table 3: Capital investment in Indira foods processing unit

S. No.	Investment particulars	Units	(₹ Lakhs)
1	Land (1 acre)	₹	21.81
2	Land development	₹	4.30
3	Civil work (₹ 900*3,845 sqft)	₹	31.50
4	Plant and Machinery	₹	13.76
5	Working capital	₹	9.60
	Total		80.97

4. Procurement of tamarind dried by Avinash foods

In Table 4 it shows that procurement management of tamarind dried from 2003-04 to 2017-18. The quantity of raw material has been increasing growth of 280 metric tons to 520 metric tons with the compound annual growth rate of 3.42 per cent and purchasing of raw material has been more growth of 6.14 per cent. The procurement quantity range was increased year by year. The annual compound growth rate of Tamarind dried was estimated by using exponential growth function for the period from 2003-04 to 2017-18. There was a positive growth in the procurement quantity and value of sales in the tamarind dried with an impressive performance at an annual compound growth rate of 3.42per cent, 6.14 per cent respectively. The reasons attributed for impressive growth was ever increasing

demand for processed tamarind by the traders and industrial uses of tamarind. This led the firms to procure over a period of time and the purchase price of tamarind increased over a period of time. The procurement prices of raw material (tamarind fresh) have been increased because sales were more

in other countries due to daily drinking. So, this processing unit product has been spreading by exporting and transporting to other countries. Hence, growth in purchase value of tamarind dried was more than quantity sold. (Buyinza, 2010)^[2].

Table 4: Procurement management of tamarind dried in Avinash foods

S. No.	Years	Quantity of raw material (MT)	Value of raw material cost (₹/MT)
1	2003-04	280	21,250
2	2004-05	340	23100
3	2005-06	362	25,520
4	2006-07	381	27,450
5	2007-08	388	29,750
6	2008-09	397	31,300
7	2009-10	434	36,000
8	2010-11	442	37,100
9	2011-12	455	39,250
10	2012-13	465	41,500
11	2013-14	470	43,410
12	2014-15	475	44,247
13	2015-16	478	45,700
14	2016-17	483	47,655
15	2017-18	520	48,223
	CAGR (%)	3.42	6.14

5. Capacity utilization in Avinash foods processing unit

The capacity utilization of Avinash foods processing unit described the particulars in Table 5. The plant processing capacity was higher in tamarind juice processing unit of 600 metric tons. The annual actual capacity processed in tamarind juice processing unit was 502 metric tons. But the actual

processed capacity utilization was 83.67 per cent. These capacity utilization and actual quantity processed were work out by analyzing of 15 years average. The related observations have been finding in Malhotra and Vashishtha, 2007^[7].

Table 5: Capacity utilization in Avinash foods processing unit

SL. No.	Particulars	Utilization
1	Installed capacity(MT/ day)	3.00
2	Quantity processed / day (MT)	2.51
3	Number of working days / annum	200
4	Number of shift/ day	2.00
5	Duration of shift(hours)	8.00
6	Annual installed capacity (MT)	600
7	Annual quantity processed (MT)	502
8	Capacity utilization (%)	83.67

6. Capital investment of Avinash foods private limited

From the Table 6, the 0.50 acre purchasing land value of Rs. 9.70 lakhs, land development cost with the ₹ 4.25 lakhs, civil work 6,152 sqft area with the worth of ₹ 36.91 lakhs, plant and machinery cost was 11.37 Lakhs and working capital with the worth of 4.00 Lakhs. The total capital investment was 66.23 Lakhs. The company has need of huge investments of

funds, but the accessible funds are limited, before establishing the company plan and control its investment outlay. The company may make a capital investment in the form of an equity stake in another company's complementary operations for the same purposes. In Singh, 2007^[10] similar finding was observed. (Pokharkar *et al*, 2017)^[9].

Table 6: Capital investment of Avinash foods private limited

Sl. No.	Investment particulars	Units	Total cost (₹ Lakhs)
1	Land (0.5 acre)	₹	9.70
2	Land development	₹	4.25
3	Civil work (₹ 600*6,152 sqft)	₹	36.91
4	Plant and Machinery	₹	11.37
5	Working capital	₹	4.00
	Total		66.23

7. Economics of tamarind concentration processing in Indira food private limited.

The processing cost of tamarind concentration was reckoned that the raw material (Tamarind fresh) has been incurred ₹ 48,100 with the portion of 78.90 percentage worked out for

one ton. The costs are computed with the combination and summation of all variable cost and marketing cost. Then the total variable cost was deliberate ₹ 57,695.47 (94.64%). Which was deliberated with the combination of total working capital was ₹ 3,774.47 amount shared in the total processing

cost that occupied 6.19 per cent and interest on working capital was ₹ 53,921, having the portion of 88.45 percentage, Hence, the total working capital was computed that the summation of variable cost and marketing cost incurred

values of ₹ 52,525 (86.16%), ₹ 1396 (2.29%) respectively. These all costs were computed for one ton processing of tamarind concentration from Table 7.

Table 7: Economics of tamarind concentration processing in Indira foods private limited (₹/MT)

SL. No.	Particulars	Units	Quantity	Price (₹)	Total cost	% Total
1	Variable cost					
a	Tamarind fresh (Raw material)	MT	1	48,100	48,100	78.90
b	Repairs and maintenance	₹	40	40	40	0.07
c	Labor charges	No's	3	470	1,410	2.31
d	Telephone charges	₹		50	50	0.08
e	Electric power charge	Units	350	6.5	2,275	3.73
f	Water charges	lits	200	3	600	0.98
g	Miscellaneous cost	₹	-	-	50	0.08
I	Total Cost	₹	-	-	52,525	86.16
2	Marketing cost					0.00
a	Packing Material cost (30kg)	bags	32	3	96	0.16
c	Loading and unloading charges	No's	2	450	900	1.48
d	Weighing charges	₹			100	0.16
e	Transportation cost	MT	1	300	300	0.49
II	Total marketing cost	₹			1396	2.29
A	Total working capital (I+II)	₹	-	-	53,921	88.45
B	Interest on working capital @ 7% pa	₹	-	-	3,774.47	6.19
III	Total variable cost (A+B)	₹	-	-	57,695.47	94.64
3	Fixed cost					0.00
a	Rental value on land and building	₹		-	176.07	0.29
b	Depreciation on machinery at 10%	₹			225.47	0.37
c	Salaries to permanent employees	No's	2	500	1,000	1.64
d	Insurance premium	₹	-	-	135.6	0.22
e	License fee	₹	-	-	3.86	0.01
f	Interest on fixed capital @ 12%pa	₹	-	-	184.92	0.30
	Total cost				1541	2.53
IV	Total fixed cost	₹	-	-	3,266.92	5.36
	Total processing Cost (III-IV)	₹	-	-	60,962.39	100.00
	Value of main product	kg	659.2	-	-	-
	Sale price	kg	659.2	131	86,355.20	-
	Gross returns	₹	-	-	86,355.20	-
	Net returns	₹	-	-	25,392.81	-

Out of total processing cost of 60,962.3, which was summated the both variable cost and fixed cost. The raw material (tamarind fresh) was occupied higher winning of 78.90 per cent. The gross returns were worked out with the value of 86,355.20 by combination of main product and byproduct. The main product was processed tamarind concentration which was obtained from processing of tamarind fresh (raw material).

Total variable cost also indicated that the trend with a contribution of ₹ 57,695.47 per ton with 94.64 per cent. Among processing cost, raw material cost was a major contributing factor with ₹ 48,100 (78.90%), followed by total cost of variables was ₹ 52,525 (86.16%) and labour charges were 1,410 (2.31%); Total marketing cost was ₹ 1,396 (2.29%) Fixed cost formed the major concern for selected unit to the extent of ₹ 3,266.92 (5.36%) in the total processing unit because of less under-utilization of capacity. The gross returns of ₹ 86,355.20 (per 659.2 MT), net returns ₹ 25,392.81 were found good. Total returns obtained from the sales of 659.2 kg of tamarind concentration were ₹ 86,355.20 with the sale price of one kg ₹ 131 and here no by-product because raw material was tamarind dried, it is going directly to processes the tamarind concentration. In this analysis total variable cost was more and labour charges were also high, because to remove shell, fiber, seed and also for maintaining the consistency while processing. So, labour charges were

more in this process. To reduce this labour charges the industry should replace with upgraded machinery and use new technologies to remove seed, fiber and shell. The sale price was high that is ₹ 131. The net profit was more, because instead of tamarind dried or pulp in other state and countries there is more demand for tamarind concentration. Now a days in India also using direct tamarind concentration in many restaurants, panipuri, using 20 percent of tamarind concentration in cool drinks like coco cola, sprite, thumbs up etc., but 50 percent of tamarind concentration using in jeera cool drink (brand name Bindu) and also more demand due to busy life style in many houses using tamarind concentration directly for culinary purpose to do instant dishes. So, tamarind concentration has been more demand and more cost. (Singh *et al.* 2007)^[10]

8. Tamarind juice processing in Avinash foods private limited

Table 8, total variable cost also indicated that the trend with a contribution of ₹ 57,377.70 per ton with 96.41 per cent. Among processing cost, raw material cost was a major contributing factor with ₹ 48,223 (81.03%), followed by total cost of variables was ₹ 52,578.00 (88.34%) and labour charges were 2,000 (3.36%); Total marketing cost was ₹ 1,046.00 (1.76%) Fixed cost formed the major concern for selected unit to the extent of ₹ 2,137.64 (3.59%) in the total

processing unit because of less under-utilization of capacity. The tamarind juice incurred total cost of ₹ 59,515.34 of which total variable cost was ₹ 57,377.70 with the per cent of 96.41 with a total returns of ₹ 99,267.96, net returns ₹

39,752.62 were found good. Total returns obtained from the sales of 1,149.60 kg of tamarind juice were ₹ 99,267.96 with the sale price of one kg ₹ 86.35.

Table 8: Economics of tamarind juice processing in Avinash foods private limited (₹/MT)

S. No.	Particulars	Units	Quantity	Price (₹)	Total cost	% Total
I	Variable cost					
a	Tamarind dried (Raw material)	MT	1	48,223	48,223.00	81.03
b	Repairs and maintenance	₹		50	50	0.08
c	Labour charges	No's	4	500	2,000.00	3.36
d	Telephone charges	₹		55	55	0.09
e	Electric power charge	units	300	6.5	1,950.00	3.28
f	Water charges	lits	200	1.25	250	0.42
g	Miscellaneous cost	₹	-	50	50	0.08
I	Total cost	₹	-	-	52,578.00	88.34
a	Packing Material cost	Bags	32	3	96	0.16
c	Loading and unloading charges	₹			200	0.34
d	Transportation cost	₹			250	0.42
e	Cold storage charges (1 month)	kg	1000	0.50	500	0.84
II	Total Marketing cost		-	-	1,046.00	1.76
A	Total working capital (I+II)	₹	-	-	53,624.00	90.10
B	Interest on working capital @ 7% pa	₹	-	-	3,753.68	6.31
III	Total variable cost (A+B)	₹	-	-	57,377.70	96.41
2	Fixed cost		-	-		0.00
a	Rental value of land and building	₹	-	-	47.35	0.08
b	Depreciation on machinery at 10%	₹	-	-	44.75	0.08
c	Salaries to permanent employees	No's	2	400	800	1.34
d	Insurance premium	₹	-	-	113	0.19
e	License fee	₹	-	-	3.22	0.01
f	Interest on fixed capital @ 12% pa	₹	-	-	121	0.20
					1,008.32	1.69
IV	Total fixed cost	₹	-	-	2,137.64	3.59
	Total processing Cost (III+IV)	₹	--	-	59,515.34	100.00
	Value of main product	kg	1,149.60	-	-	
	Sale price	kg	1,149.60	86.35	99,267.96	
	Gross returns	₹	-	-	99,267.96	
	Net returns	₹	-	-	39,752.62	

When it comes to the cost of processing it was remarked, that the total cost of processing for one ton of tamarind juice was ₹ 59,515.34. The working capital or variable costs constituted 96.41 per cent of the total cost. It can be discerned that the share of raw material to the total cost was to the extent of 81.03 per cent as the raw material viz., tamarind dried was abundantly available. The raw material cost is not very burdening on the total cost. It was also observed that the labour cost contributed to a considerable extent (3.36%) to the total cost as the labour requirement in tamarind juice processing unit was high. Hence, the availability of labour and wage rates has the capacity to affect the total cost. It was also observed that cost of packing, loading and unloading charges, transportation charges, cold storage charges and marketing costs all contributed to the total cost in almost similar proportion in the range of 0.16 to 0.84 per cent which meant the factors influencing the total cost of tamarind juice production and marketing. Among fixed cost salaries for permanent employees were bit more compare to rental value of land and building, depreciation on machinery at 10 per cent, Insurance premium, License fee, Interest on fixed capital @ 12% pa, Hence, there is a need to take equal care of multiple factors like raw materials, labour, power, salaries etc. for better management of the tamarind juice unit and minimizing costs (Malik and Saraf, 2013)^[8].

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