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Value addition of tamarind products in Karnataka

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Abstract
Tamarind (*Tamarindus indica* L.) is an economically important fruit/spice of India. It is also termed as "Indian Date" from the date like appearance of dried pulp. The preservation of tamarind and processing of value added products in the effective way and to preserve the contents of fruits. If the long period of tamarind were storage it becomes a problem and many physicochemical changes (Kakade, 2004). In this perspective an analysis has been made to know the cost incurred on value addition of tamarind pickle, tamarind sauce and tamarind rasam paste in processing units. These products were analyzed through collection of primary data. The tamarind production is relatively greater size in India. As stated by the spice board of India, the tamarind area was 74.20 (000' ha), production was 309.44 (000' MT) and the productivity was 4.0 (MT/ha) in 2017-18. About 258.70 (000'MT) to 272.85 (000'MT) of tamarind is allotted for value addition products to processed and lot of labor is engaged in this processing in India. Even though, traditional processing is widespread, its commercial uses are unknown and underdeveloped. The study was used to analyze the financial feasibility of tamarind processing units in study area. Results showed that processing of one quintal of tamarind dried process for three products like tamarind pickle (131 kg), tamarind sauce (242.90 kg) and tamarind rasam paste (185.20 kg). Tamarind pickle, tamarind sauce and tamarind rasam paste of value addition cost was ₹15,421, ₹ 27,921.40 and ₹ 24,206.75 respectively. The total processing cost of tamarind pickle, tamarind sauce and tamarind rasam paste was ₹12,478, ₹14,453.00 and ₹ 14,453.00 respectively. The tamarind pickles of marketing efficiency ratio were 1.23, tamarind sauce was 1.04 and tamarind rasam paste was 1.17.

Keywords: Tamarind, tamarind dried, tamarind pickle, tamarind sauce, tamarind rasampaste, processing unit, net profit, market efficiency and value addition

Introduction

Tamarind (*Tamarindus indica* L.) grows especially in parts of sub-continent and it is a significant indigenous fruit tree. The tamarind fruit is a seed vessel like fruit which consist of edible mush used in different methods of cooking in over the entire world. The tamarind fruit was well known to the bygone Egyptians and Greeks during 4th century B.C. The origin of tamarind is from Eastern Africa in the place of Madagascar. But now it is grown in all over the world and extensively cultivated in India and also having a commercial scale production of tamarind. A larger part of India's production of tamarind is exported to west Asia, Europe and America, where it is used for food specialties like Worcestershire sauce. This spice also comes in the forms of pulp and juice concentrates which mainly preparation of cool drinks, sea foods and a range of sophisticated cuisine. The tamarind production is relatively greater size in India. As stated by the spice board of India, the tamarind area was 74.20 (000' ha), production was 309.44 (000' MT) and the productivity was 4.0 (MT/ha) in 2017-18. Kolar, Tumkur, Benguluru, Chikkabballapura and Mysore are the major producing districts in Karnataka. In Andhra Pradesh and Karnataka there are several tamarind crop growers available, because these states having more dry land area and the land is more suitable for tamarind tree, but soil type is different in Andhra Pradesh but in case of Karnataka states soil fertility more suitable and the quality of fruits are good. About 258.70 (000'MT) to 272.85 (000'MT) of tamarind is allotted for value addition products to processed and lot of labor is engaged in this processing in India. Even though, traditional processing is widespread, its commercial uses are unknown and underdeveloped.

Tamarind fruit can be processed in to different value added products were namely Tamarind concentration, Tamarind paste, Tamarind juice, Tamarind rasam paste, Tamarind sauce, Tamarind pickles and Tamarind chocolates *etc*. From these processing products, the by-product will come as tamarind seed, fiber and shell. Hence, main by-product is tamarind seed and major portion of utilized product is tamarind seed kernel and it has good commercial value. Tamarind seed oil can extracted from tamarind seed. Seed kernel powder is used in medicine preparation, cosmetics and major portion of tamarind kernel seed powder is using in

textile industry all around the world. It is also widely used in textile industries, jute industries, gum industries for colour stabilization and aroma for the products.

Tamarind paste has many culinary uses including a flavoring for chutnies, curries and the traditional sharbat syrup drink. Tamarind sweet chutney is popular in India as a dressing for many snacks. In the Philippines, the whole fruit is used as an ingredient in the traditional dish called sinigang to add a unique sour taste, unlike that of dishes are use vinegar instead. Indonesia also has a similarly sour, tamarind-based soup dish called sayur asem. Tamarind fruit used to make different value added products, such as tamarind powder, tamarind juice, tamarind concentrate, tamarind paste, tamarind kernel powder, tamarind pickle, tamarind sauce, tartaric acid, pectin, tartrates and alcohol (Siddig *et al*., 2006). Tamarind may also be used for delicious raw or cooked chutneys, its fruit acidity combining well with sugar, chilli and other flavours. Moreover tamarind concentrates are extensively used as an ingredient and an effective substitute for vinegar, tomatoes and lemon juice. Tamarind juice has had been export from Tamil Naduto Netherlands with the quantity of 6,480 kg. Processed spices demand is directly linked with its consumption in the food processing industry and is set to grow in India in coming period with growth of population and fast changing food habits as well as increase in spending power of the middle and upper class in India.

Results and Discussion

Economics of tamarind pickle processing in Karnataka

Table 1 shows that, out of total tamarind pickle processing cost of ₹ 1,25,716.50, the processing cost of tamarind pickle was computed that the raw material (Tamarind dried) has been incurred ₹1,14,000 computed with the portion of 90.68 percentage worked out for one ton. The costs are computed with the combination and summation of all variable cost. Then the total variable cost was deliberate ₹ 124,780.19. Which was deliberated with the combination of total working capital was ₹1,16,617 amount shared in the total processing cost that occupied 92.76 per cent and interest on working capital was ₹8163.19, having the portion of 6.49 percentage, Hence, the total variable cost was computed cost incurred value of ₹124780.2 (99.25%) and fixed cost was ₹ 936.34 (7.44%). These costs were computed for one metric tonne and similar analysis procedure was found in Karthick *et al*., 2013. The raw material was procuring directly from same unit of tamarind dried and total variable cost was incurred more because of high electric power charge of ₹ 1300 with the contribution of 1.03 per cent. Hence, raw material cost was more due to karapuli variety which was procuring from tamarind dried processing unit in the study area.

Table 1: Economics of tamarind pickle processing in Karnataka (₹/ton)

SL. No.	Particulars	Units	Quantity	Price (₹)	Total cost	% Total
1	Variable cost					
a.	Tamarind dried (Raw material)	MT	1	114	1,14,000	90.68
b	Repairs and maintenance	₹	-	100	100	0.07
c	Labour wages	No's	3	370	1110	0.88
d	Telephone charges	₹	-	27	27	0.02
e	Electric power charge	units	200	6.5	1300	1.03
f	Miscellaneous cost	₹	-	80	80	0.06
A	Total working capital	₹	-	-	1,16,617	92.76
B	Interest on working capital @ 7% pa	₹	-	-	8163.19	6.49
I	Total variable cost (A+B)	₹	-	-	124780.2	99.25
2	Fixed cost		-	-	-	
a	Depreciation on machinery	₹	-	-	10	
b	Rental value on land and building	₹	-	-	12	
c	Salaries to permanent employees	No's	2	400	800	0.63
d	Insurance premium	₹	-	-	1.24	9.86
e	License fee	₹	-	-	2.2	
f	Interest on fixed capital @ 12% pa	₹	-	-	112.38	0.08
II	Total fixed cost	₹	-	-	936.34	7.44
	Total processing Cost (I+II)	₹	-	-	125716.5	100

Cost incurred on value addition of tamarind pickle

Tamarind pickle is common pickle prepared in southern part of India especially in the rural areas but, now due to fast busy life style there is no time to prepare. So, few tamarind pickle processing units come up in the India. Based on the study tamarind pickle was producing in the company of tamarind dried processing unit in Chikkaballpura. In different areas of the country, many traditional products are prepared from tamarind in that tamarind pickle is one of the products. In the preparation of tamarind pickle, raw material cost (tamarind dried) accounted a major share of 73.93 per cent of the total value addition cost, which could be seen in Table 2. value addition cost included two components *viz*., raw material and ingredients. The cost of value addition of main product (tamarind pickle) was found to be the highest compare to total processing cost and raw material cost (tamarind dried). By considering one quintal of tamarind dried to process the tamarind pickle, with addition of all required above mentioned ingredients the volume of product make up as a quantity of 131 kg of tamarind pickle was obtainable. The cost of one kilogram tamarind pickle was ₹ 230, and then the sale price of 131kg tamarind pickle was ₹30,130.

Value addition cost of tamarind dried has been highest share of 73.93 per cent followed by chilli powder with the cost of 9.99 per cent, oil was 6.83 per cent, jeera seed was 5.84 per cent, turmeric powder has the share of 2.33 per cent and last share of mustard seeds was 0.78 per cent respectively. Here highest share occupied by main raw material of tamarind dried, after that all ingredients were followed to manufacture delicious tamarind pickle. Because of adding all required ingredients the product value has been increased, this is called value addition of the product. By observing the market efficiency it was profitable with the ratio of 1.23. The similar findings were explained in the study of Begum *et al.* 2016.

Table 2: Cost incurred on value addition of tamarind pickle (₹/qtl)

SL. No.	Products	Units	Total Quantity	Cost (₹/kg)	Total cost	%Total
1	Tamarind dried (Raw Material)	kg	100	114	11,400	73.93
2	Salt	kg	4	12	48	0.31
3	Turmeric powder	kg	2	180	360	2.33
4	Oil	lit	13	81	1,053	6.83
5	Chilli powder	kg	5.50	280	1,540	9.99
6	Mustard seeds	kg	2	60	120	0.78
7	Jeera seed	kg	4.50	200	900	5.84
A	Value addition cost	-	-	-	15,421	100
B	Total processing cost	-	-	-	12,571.60	-
	Total cost (A+B)		-	-	27,993	-
	Value of main product	kg	131	-	-	-
C	Sales price of tamarind pickle	kg	131	230	30,130	-
	Net price	-	-	-	2,137.40	-
	Marketing efficiency	-	-	-	1.08	-

Economics of tamarind sauce processing in Karnataka

Table 3 shows that, out of total processing cost of ₹ 1,45,483.16, the processing cost of tamarind pickle was computed that the raw material (Tamarind concentration) has been incurred ₹1,31,000 computed with the portion of 90.04 percentage worked out for one ton and interest on working capital was ₹27,725.63, having the portion of 19.05 percentage. The cost is worked out with the combination and summation of all variable cost of ₹ 1, 44,227.26 with the contribution of 0.99 per centand fixed cost was ₹ 1,255.90with share of 0.86per cent **(**Buyinza, 2010) [2]. The process time of sauce taking long time and electric charges were more. So, that total variable cost was more out of total processing cost of tamarind sauce.

Table 3: Economics of tamarind sauce processing in Karnataka (₹/ton)

SL. No.	Particulars	Units	Quantity	Price (₹)	Total cost	%Total
1	Variable cost					
a	Tamarind concentration (Raw material)	MT	1	131	1,31,000	90.04
b	Repairs and maintenance	₹		60	60	0.04
c	Labor charges	No's	4	320	1,280	0.87
d	Telephone charges	₹		55	55	0.03
e	Electric power charge	units	350	6.5	2,275	1.56
f	Water charges	lits	310	1.25	387.5	0.26
g	Miscellaneous cost	₹	-	50	50	0.03
I	Total variable Cost	₹	-	-	4,107.50	92.86
A	Total working capital	₹	-	-	4,107.50	2.82
B	Interest on working capital @ 6.75% pa	₹	-	-	27,725.63	19.05
II	Total variable cost (A+B)	₹	-	-	1,44,227.26	0.99
a	Rental value of land and building	₹	-	-	123	0.08
b	Depreciation on machinery at 10%	₹	-	-	85	0.06
c	Salaries to permanent employees	No's	2	400	800	0.55
d	Insurance premium	₹	-	-	110	0.08
e	License fee	₹	-	-	3.34	0.00
f	Interest on fixed capital @ 12%pa	₹	-	-	150.71	0.10
III	Total fixed cost	₹	-	-	1,255.90	0.86
	Total processing Cost (II+III)	₹	-	-	1,45,483.16	100

Cost incurred on value addition of tamarind sauce

The Table 4 computed that tamarind sauce is same like tomato sauce, instead of tomato have been used tamarind sauce while preparing delicious dishes. Tamarind sauce is used in many fast foods items, while non-veg cooking and also generally use in hotels. But this product has been used in urban areas and very less use in rural areas. So, tamarind sauce has been export to other states and countries. The product, tamarind sauce was produce with the main product of tamarind concentration of one quintal having the cost of ₹ 13,100. For this required major ingredients are Headless clove ₹ 3,150 followed by garlic ₹ 2,640, mace ₹ 2,150, black pepper ₹ 1,840 and Jeera seed ₹ 1,220. These were major raw material (tamarind concentration) to prepare the tamarind sauce. Here glacial acetic acid and sodium benzoate act as a preservative to increase the shelf life. Mainly 95 percent was cooked by adding all required ingredients in industry itself only.

Tamarind sauce is a direct having more demand. The tamarind concentration was major portion of main raw material to prepare tamarind sauce. Remaining product have been give good taste and satisfaction to the people, overall observations were exhibit that the production of tamarind sauce, total processing cost was ₹ 14,453. So, together of value addition cost and total processing cost was ₹ 42,374.40. Value addition cost of tamarind sauce has been highest share of 54.12 per cent followed by garlic with the cost of 10.91per cent, coriander seed powder was 9.40 per cent and chilli powder share was 8.68 per cent, oil was 8.62 per cent, jeera seed has the share of 5.04 per 6cent and last share of turmeric seeds was 1.49 per cent respectively. Here highest share occupied by main raw material of tamarind dried, after that all ingredients were followed to manufacture delicious tamarind pickle. The cost of value addition of main product (tamarind sauce was found to be the highest compare to total processing cost and raw material cost (tamarind concentration). By

considering one quintal of tamarind concentration to process the tamarind sauce, the mixing of all ingredients with the main raw material of tamarind concentration to prepare tamarind sauce and then value of main product quantity was 242.90kg with the sales price of per kilogram tamarind sauce was ₹ 183. After that the prepared main product of tamarind sauce with the volume of ₹ 44,450.70. After removal of all total returns the net price of tamarind sauce was ₹2,076.30. Based on these values the ratio of marketing efficiency was 1.04. So, it indicates profitability. The similar observations were identified in Mehta, 2014.

Table 4: Cost incurred on value addition of tamarind sauce (₹/qtl)

SL. No.	Products	Units	Total Quantity	Rate(₹/kg)	Total amount	Total
1	Tamarind concentration (Raw material)	kg	100	131	13,100	54.12
2	Garlic	kg	22	120	2,640	10.91
2	Jeera seed	kg	6.10	200	1,220	5.04
3	Chilli powder	kg	7.50	280	2,100	8.68
4	Turmeric powder	kg	2.00	180	360	1.49
5	Asafoetida powder	kg	2.12	15	31.8	0.13
6	Mustard seed	kg	4.63	60	277.8	1.15
7	Coriander seed powder	kg	9.10	250	2,275	9.40
8	Curry leaves powder	kg	2.00	34.20	68.40	0.28
9	Salt	kg	4.00	12	48	0.20
10	oil	kg	25.75	81	2,085.75	8.62
A	Value addition cost	-	-	-	24,206.75	100
B	Total processing cost	-	-	-	14,548.32	-
	Total cost (A+B)	-	-	-	38,755.07	-
	Value of main product	kg	185.20	-	-	-
C	Sales price of tamarind rasam paste	₹/kg	185.20	245	45,374	-
	Net price	-	-	-	6,618.93	-
	Marketing efficiency	-	-	-	1.17	-

Economics of tamarind rasam paste processing in Karnataka

Table 5 shows that, out of total processing cost of ₹ 1,44,660.74, the processing cost of tamarind pickle was computed that the raw material (Tamarind concentration) has been incurred ₹ 1,31,000 computed with the portion of 90.55 percentage worked out for one ton and interest on working capital was ₹9,077, having the portion of 6.27 percentage. The cost is worked out with the combination and summation of all variable cost of ₹ 143,557 with the contribution of 99.23 per cent and fixed cost was ₹ 1,103.34 with share of 0.76 per cent (Dinesh and Ramasamy, 2016) [3]. Out of total processing cost, the total variable cost was more due to raw material of tamarind concentration.

Table 5: Economics of tamarind rasam paste processing in Karnataka (₹/ton)

Sl. No.	Particulars	Units	Quantity	Price (₹)	Total cost	% Total
1	Variable cost					
a	Tamarind concentration (Raw material)	MT	1	131	1,31,000	90.55
b	Repairs and maintenance	₹		50	50	0.03
c	Labor charges	No's	3	350	1,050	0.72
d	Telephone charges	₹		65	65	0.04
e	Electric power charge	units	300	7.5	2,250	1.55
f	Miscellaneous cost	₹		65	65	0.04
I	Total variable Cost	₹			1,34,480	92.96
A	Total working capital (I)	₹			1,34,480	92.96
B	Interest on working capital @ 6.75% pa	₹			9,077	6.27
II	Total variable cost (A+B)	₹			143,557	99.23
2	Fixed capital					
a	Rental value of land and building	₹			49.35	0.03
b	Depreciation on machinery at 10%	₹			7.05	
c	Salaries to permanent employees	No's	2	400	800	0.55
d	Insurance premium	₹			113	0.07
e	License fee	₹			3.22	
f	Interest on fixed capital @ 12%pa	₹			130.72	0.09
III	Total fixed cost	₹			1,103.34	0.76
	Total processing Cost (II+III)	₹			1,44,660.74	100

Cost incurred on value addition of tamarind rasam paste

Generally, normal rasam prepare in kitchens, but now a day in busy scheduled life style in urban and rural areas the people looking for ready to eat foods. Because of life trend many instant foods have been coming, observing all this tamarind rasam paste also started, prepare as a ready to eat food, it having brand name called 2-minutes. Now in Karnataka, it has been started as a broad business. It is exporting to other states and countries. Table 6 given details were the product, tamarind rasam paste was produce with the main product of tamarind concentration of one quintal having the cost of ₹ 13,100. For this required major ingredients are Garlic 2,640 followed by coriander seed powder, chilli powder and oil.

Table 6: Cost incurred on value addition of tamarind rasam paste (₹/qtl)

SL. No.	Products	Units	Total Quantity	Rate(₹/kg)	Total amount	% Total
1	Tamarind concentration (Raw material)	kg	100	131	13,100	54.12
2	Garlic	kg	22	120	2,640	10.91
2	Jeera seed	kg	6.10	200	1,220	5.04
3	Chilli powder	kg	7.50	280	2,100	8.68
4	Turmeric powder	kg	2.00	180	360	1.49
5	Asafoetida powder	kg	2.12	15	31.80	0.13
6	Mustard seed	kg	4.63	60	277.80	1.15
7	Coriander seed powder	kg	9.10	250	2,275	9.40
8	Curry leaves powder	kg	2.00	34.20	68.40	0.28
9	Salt	kg	4.00	12	48.00	0.2
10	oil	kg	25.75	81	2,085.75	8.62
A	Value addition cost	-	-	-	24,206.75	100
B	Total processing cost	-	-	-	14,466.07	-
	Total cost (A+B)	-	-	-	38,672.82	-
	Value of main product	kg	185.20	-	-	-
C	Sales price of tamarind rasam paste	₹/kg	185.20	245	45,374	-
	Net price	-	-	-	6,701.18	-
	Marketing efficiency	-	-	-	1.17	-

They are major raw material to prepare the tamarind rasam paste. Here oil act as a preservative to increase the shelf life. Out of value addition cost of tamarind sauce has been highest share of 46.92 per cent followed by headless clove with the cost of 11.28per cent, garlic was 9.46per cent and mace share was 7.70 per cent black pepper was 6.59 per cent, jeera seed has the share of 4.37per cent and last share of mustard seeds was 0.78 per cent respectively. Here highest share occupied by main raw material of tamarind dried, after that all ingredients were followed to manufacture delicious tamarind pickle. Mainly 46.92 percent was cooked by adding all required ingredients in industry itself only. Only 53.08 per cent remain have been cook in home. So, it is instant tamarind rasam having more demand. The tamarind concentration was major portion of main raw material to prepare tamarind rasam paste. Remaining product have been give good taste and satisfaction to the people. Overall observations Table 4.28 revealed that the production of tamarind rasam paste, total processing cost was ₹ 14,453.00. So, together of value addition cost and total processing cost was ₹ 38,659.75. The cost of value addition of main product (tamarind rasam paste) was found to be the highest compare to total processing cost and raw material cost (tamarind concentration). By considering one quintal of tamarind concentration to process the tamarind rasam paste, the mixing of all ingredients with the main raw material of tamarind concentration to prepare rasam paste and then value of main product quantity was 185.20 kg with the sales price of per kilogram rasam paste was ₹ 245. After that the prepared main product of tamarind rasam paste with the volume of ₹ 45,374. After removal of all total returns the net price of tamarind rasam paste was ₹ 6,714.25. So, based on these values the ratio of marketing efficiency was 1.17. The similar findings were finding in Neeta and Harish (2016) [9].

References

1. Begum M, Ahmed MR, Noor T, Hossain MI. Marketing of orange: a value chain perspective in the selected areas of Sylhet District in Bangladesh. Progressive Agric. 2016; 27(3):327-338.
2. Buyinza M, Senjong M, Lusiba B. Economic valuation of a tamarind (*Tamarindus indica* L.) production system: green money from dry lands of Eastern Uganda. Small-scale Forestry. 2010; 9(1):317-329.
3. Dinesh KV, Ramasamy D. Pomegranate processing and value addition. J Food Process Technol. 2016; 7(3):1-11.
4. Kakade AP. Studies on storage of tamarind and processing of value added tamarind products. M. Tech. (Agril. Engg) Thesis, Indira Gandhi Agril. Univ., Raipur (C.G), Chhattisgarh (India), 2004.
5. Karthick V, Mani K, Anbarassan A. Mango pulp processing industry in Tamil Nadu-an economic analysis. American Intl. J Res. in Hum. Arts and Soc. Sci. 2013; 2(1):48-52.
6. Kidaha ML, Rimberia FK, Wekesa RK, Kariuki W. Evaluation of tamarind (*Tamarindus indica*. L) Utilization and production in eastern parts of Kenya. Asian Res. J Agri. 2017; 6(2):1-7.
7. Kolur AS, Murthy C, Mahajanashetti SB, Venugopal CK. Value addition and marketing efficiency in arecanut processing units. Karnataka J Agric. Sci. 2012; 25(1):77-81.
8. Mehta AK. An analysis of processing and marketing of litchi based value added products in Bihar. MBA (ABM) Thesis, Univ. Agril. Sci., Benguluru, Karnataka (India), 2014.
9. Neeta K, Harish G. Value addition to underutilized fruits and entrepreneurship prospects for rural women. J Progressive Agric. 2016; 7(2):82-94.