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MANUFACTURING AND QUALITY PRACTICES OF FOOD PROCESSING INDUSTRIES IN RAYALASEEMA REGION OF ANDHRA PRADESH

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ABSTRACT
The developing countries enjoying competitive advantage in the abundance of raw materials and inexpensive labour, fertile soils etc., it is important to note that all these factors are impossible to sustain in a competitive environment, especially as technological advances shrink distance between countries. Reliance on natural resources alone cannot create competitiveness. Orienting production, quality, marketing and distribution towards the consumer remains the only means by which a country can become competitive. Food processing industries are rapidly growing to meet the needs of the consumer and to sustain in the competition, quality plays an important role to satisfy the consumers, this paper mainly focused on the type of manufacturing products of food processing units in the Rayalseema region of Andhra Pradesh and their quality, there are about 118 units of the food processing Industry units were selected as a sample and analyzed the data to know the Manufacturing and quality practices of food processing Industries in Rayalaseema Region of Andhra Pradesh
Key words: Food processing, Quality, manufacturing

1. INTRODUCTION

The term 'food processing' is mainly defined as a process of value addition to the agricultural or horticultural produce by various methods like grading, sorting and packaging. In other words, it is a technique of manufacturing and preserving food substances in an effective manner with a view to enhance their shelf life; improve quality as well as make them functionally more useful. It covers spectrum of products from sub-sectors comprising agriculture, horticulture, plantation, animal husbandry and fisheries. Food processing industry is one of the largest industry in India and is ranked 5th in terms of production, consumption and export. Earlier, food processing was largely confined to the food preservation, packaging and transportation, which mainly involved salting, curdling, drying, pickling, etc. However, over the years, with emerging new

ISSN: 2348 9510
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Volume 3, Issue 4, July 2016

markets and technologies, the sector has widened its scope. It has started producing many new items like ready-to-eat food, beverages, processed and frozen fruit and vegetable products, marine and meat products, etc. It also includes establishment of post-harvest infrastructure for processing of various food items like cold storage facilities, food parks, packaging centers and value added centers. The Indian food processing industry stands at $135 billion and is estimated to grow with a CAGR of 10 per cent to reach $200 billion by 2015. The food processing industry contributed 7% to India‘s GDP. The industry employs around 13 million workers directly and about 35 million indirectly.

2. OBJECTIVES

- To analyze the type of manufacturing of products in food processing units of Rayalaseema region.
- To evaluate the quality of the manufacturing of products in food processing industries.

3. RESEARCH METHODOLOGY

For undertaking the present study on manufacturing and quality practices of food processing industries in Rayalaseema region selected the units based on type of their ownership. The food processing units altogether are510 units which are situated in the Rayalaseema region. Among these 118 units are taken as the sample for the present study i.e. 25% of the population (510) units is taken as sample, which comes to 122 units. After 118 units are considered appropriate for the present study. 4 units which left the exclusion of the unfilled questionnaire will not have any impact on the analysis and results of the study. The present research is carried in the region of Rayalaseema including its districts Chittoor, Kadapa, kurnool and Ananthapur;Collected data is analyzed using appropriate statistical tools i.e., frequency, percentages, Chi-square test, by using SPSS-19; A proportionate stratified random sampling technique is adopted to collect the data from owners of Food Processing units and also the respondents from each district were taken up for the study.

SOURCES OF DATA

The data was collected with two sources as:

Primary Data: The primary data is collected through the structured questionnaire and personal interview;

Secondary Data: It can be classified as:Published sources: These are annual Report survey, journals, handbooks, newspapers, directories, websites and magazines,Unpublished Sources: Records of Units, letters etc.

ISSN: 2348 9510
International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 4, July 2016

4. ANALYSIS AND INTERPRETATION

4.1 Summary of chi-square test based on Age and Type of Manufacturing Products

Chi-square value	p-value	Type of Manufacturing Products					Total
150.38**	0.000	Beverages	Squashes & syrups	Fruit pulp	Milk Products	Fruit juices and Others juices	
Age	<25 years	0	21	1	0	9	31
		0.0%	67.7%	3.2%	0.0%	29.0%	100.0%
	26 - 35 years	0	6	0	0	8	14
		0.0%	42.9%	0.0%	0.0%	57.1%	100.0%
	36- 45 years	0	0	0	1	26	27
		0.0%	0.0%	0.0%	3.7%	96.3%	100.0%
	> 46 years	19	0	0	24	3	46
		41.3%	0.0%	0.0%	52.2%	6.5%	100.0%
Total		19	27	1	25	46	118
		16.1%	22.9%	0.8%	21.2%	39.0%	100.0%

Source: Primary data

The above table depicts about the chi-square test and p-values of types of manufacturing products with age. It was analyzed in this that 21 of squashes manufacturing companies with production less than 25 years are resulting 67.7% and fruit juices and other juices are 57.1% and so on. As this type of manufacturing products with the age leading in the industry are more than 46 years of age is 46 out of the total 118 units and the chi-square test resulted with 150.38** and p value 0.00(<1% significant level) which shows that there is a significant difference between age and type of manufacturing products .

4.2 Summary of chi-square test based on Family Members in the same Business and Type of Manufacturing Products

Chi-square value	p-value	Type of Manufacturing Products					Total
53.46**	0.000	Beverages	Squashes& syrups	Fruit pulp	Milk Products	Others	
Family members in the same business	No	19	5	1	0	23	48
		39.6%	10.4%	2.1%	0.0%	47.9%	100.0%
	Yes	0	22	0	25	23	70
		0.0%	31.4%	0.0%	35.7%	32.9%	100.0%
Total		19	27	1	25	46	118
		16.1%	22.9%	0.8%	21.2%	39.0%	100.0%

Source: Primary data

The above table depicts that there is a significant difference between presence of family members in the same business and type of manufacturing products as the $\chi 2$ – value is 53.46and p value is 0.00 less than the

ISSN: 2348 9510
International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 4, July 2016

significant level 1%. By application of chi-square test it is proved that there is significant impact of family members in the same business on the type of manufacturing products, In squashes & syrups 22(31.4%) and milk products 25 (35.7%) under family members in the same business.

4.3 Summary of chi-square test based on Educational Qualification and Type of Ownership

Chi-square value	p-value	Type of Ownership			Total
5.519	0.063	Proprietary	Partnership	Cooperative	
Educational Qualification	Post-Graduation	52	57	3	112
		46.4%	50.9%	2.7%	100.0%
	Graduation	0	6	0	6
		0.0%	100.0%	0.0%	100.0%
Total		52	63	3	118
		44.1%	53.4%	2.5%	100.0%

Source: Primary data

The above table reveals that the there is no significant difference between the educational qualifications of the respondents and type of ownership because the significant level is less than 1% i.e., p value 0.063 and chi square value is 5.519, the educational qualification which supported the proprietary ownership is 52(46.4%) and partnership is 57(50.9%) respectively.

4.4 Summary of chi-square test based on Educational Qualification and Type of Manufacturing Products

Chi-square value	p-value	Type of Manufacturing Products					Total
21.30**	0.000	Beverages	Squashes& syrups	Fruit pulp	Milk Products	Others	
Educational Qualification	Post-Graduation	19	21	1	25	46	112
		17.0%	18.8%	0.9%	22.3%	41.1%	100.0%
	Graduation	0	6	0	0	0	6
		0.0%	100.0%	0.0%	0.0%	0.0%	100.0%
Total		19	27	1	25	46	118
		16.1%	22.9%	0.8%	21.2%	39.0%	100.0%

Source: Primary data

The $\chi 2$ – calculated value is 21.30 and p value is 0.00 which is less than the 0.01 significant level, so, it can be acknowledged that there is a significant difference between the educational qualifications of the respondents and type of manufacturing products. As in beverages (17%), Squashes & Syrups (18.8%), Fruit Pulp (0.9%), Milk Products (22.3%), Fruit & Juices, sauce and Fruit Pulp (41.1%) are produced in post-graduation education qualified respondents respectively.

ISSN: 2348 9510
International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 4, July 2016

4.5 Summary of chi-square test based on Business Experience and Type of Manufacturing products

Chi-square value	p-value	Type of Ownership			Total
30.565**	0.000	Proprietary	Partnership	Cooperative	
Business Experience	5 -10 years	0	27	0	27
		0.0%	100.0%	0.0%	100.0%
	> 10 years	52	36	3	91
		57.1%	39.6%	3.3%	100.0%
Total		52	63	3	118
		44.1%	53.4%	2.5%	100.0%

Source: Primary data

The above table depicts that$\chi 2$ value is 30.565** p value is less than 0.00 and the type of ownership is considered as one of the significant variables to assess the business experience of the food processing industries of Rayalaseema region. By application of chi-square test it is proved that there is significant difference between business experience and type of ownership can be seen between business experience of the respondents and type of ownership.

4.6 Summary of chi-square test based on Business Experience Programs and Type of Manufacturing products

Chi-square value	p-value	Type of Manufacturing Products					Total
118**	0.000	Beverages	Squashes& syrups	Fruit pulp	Milk Products	Fruit and other juices	
Business Experience	5 -10 years	0	27	0	0	0	27
		0.0%	100.0%	0.0%	0.0%	0.0%	100.0%
	> 10 years	19	0	1	25	46	91
		20.9%	0.0%	1.1%	27.5%	50.5%	100.0%
Total		19	27	1	25	46	118
		16.1%	22.9%	0.8%	21.2%	39.0%	100.0%

Source: Primary data

The above table depicts that$\chi 2$ value is 90.05** P value is 0.00 which is less than 1% significant level. By application of chi-square test it is proved that there is significant difference between attending orientation programe and type of manufacturing products in squashes & Syrups are 21(22.6%), fruit pulp is 1(1.1%), Milk products is 25(26.9%) and juices, sauce and fruit pulp is 46(49.5%) respectively.

ISSN: 2348 9510
International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 4, July 2016

4.7 Summary of type of ownership and output of products

Chi-square value	p-value	Type of Ownership			Total
41.09**	0.000	Proprietary	Partnership	Cooperative	
Output of Products	4001 - 7000 tons	0	6	0	6
		0.0%	9.5%	0.0%	5.1%
	7001 - 10000 tons	24	0	0	24
		46.2%	0.0%	0.0%	20.3%
	Above 10000 tons	28	57	3	88
		53.8%	90.5%	100.0%	74.6%
Total		52	63	3	118
		100.0%	100.0%	100.0%	100.0%

Source: Primary data

The above table depicts about the type of ownership by output of products. Ownership is considered as one of the significant variables to assess the output of products of the food processing industries of Rayalaseema region. By application of chi-square test it is proved that there is significant impact of output of products on the type of ownership at less than 1% significant level i.e., chi-square value 41.09, p value 0.00. The output of products in tons between 4001-7000 in partnership is 6 (9.5%) and at 7001-10000 tons it is 24(46.2%) in proprietary, in above 10000 tons in proprietorship 28(53.8%), partnership 57(90.5%) and cooperative 3(100%).

4.8 Summary of output of products by type of manufacturing products:

Chi-square value	p-value	Type of Manufacturing Products					Total
59.99**	0.000	Beverages	Squashes& syrups	Fruit pulp	Milk Products	Fruit and other Juices	
Output of Products	4001 - 7000 tons	0	6	0	0	0	6
		0.0%	22.2%	0.0%	0.0%	0.0%	5.1%
	7001 - 10000 tons	0	0	0	1	23	24
		0.0%	0.0%	0.0%	4.0%	50.0%	20.3%
	Above 10000 tons	19	21	1	24	23	88
		100.0%	77.8%	100.0%	96.0%	50.0%	74.6%
Total		19	27	1	25	46	118
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Primary data

The above table depicts the type of manufacturing products with output of products. Type of manufacturing products is considered as one of the significant variables to assess the output products of the food processing industries of Rayalaseema region. By application of chi-square test it is proved that there is significant impact of output of products on type of manufacturing products. The chi-square value is 59.99** p value is 0.00. The squashes & syrups are 6(22.2%) in case of 4001-7000 tons, in 70001-10000 tonns fruit and other juices are 23, (50.0%) and above 10000 tons in case of beverages 19 (100%) squashes & syrups 21 (77.8%),

ISSN: 2348 9510
International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 4, July 2016

milk products 24 (96%), fruit and other juices are 23 (50%).

4.9 Summary of by products and type of ownership

Chi-square value	p-value	Type of Ownership			Total
19.56**	0.001	Proprietary	Partnership	Cooperative	
By-Products	Acid	24	21	0	45
		46.2%	33.3%	0.0%	38.1%
	Colour& Essences	24	30	0	54
		46.2%	47.6%	0.0%	45.8%
	Acid &Colour, Essences,	4	12	3	19
		7.7%	19.0%	100.0%	16.1%
Total		52	63	3	118
		100.0%	100.0%	100.0%	100.0%

Source: Primary data

The above table depicts the type of ownership on by-products. Ownership is considered as one of the significant variables to assess the by-products of the food processing industries of Rayalaseema region. By application of chi-square test it is proved that there is significant impact of by-products on the type of ownership at 1% significant level. The usage of by-products in proprietorship the highest is colour and essences that is 24(46.2%), The usage of by-products in colour& essences in proprietorship is 30(47.6%) and acid & color essence in cooperative is 3 (100%).

4.10 Summary of by-products and type of manufacturing products:

Chi-square value	p-value	Type of Manufacturing Products					Total
208.95**	0.000	Beverages	Squashes& syrups	Fruit pulp	Milk Products	Fruit and other juices	
By-Products	Acid	0	21	0	24	0	45
		0.0%	77.8%	0.0%	96.0%	0.0%	38.1%
	Colour& Essences	0	6	1	1	46	54
		0.0%	22.2%	100.0%	4.0%	100.0%	45.8%
	Acid &Colour Essence	19	0	0	0	0	19
		100.0%	0.0%	0.0%	0.0%	0.0%	16.1%
Total		19	27	1	25	46	118
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Primary data

The above table depicts by application of chi-square test it is proved that there is significant impact on byproducts on type of manufacturing products at 1% significant level as chi square value is 208.95 and p value is 0.00. The manufacturing products includes acid with 24(96%) in milk products, in color essences Fruit and other juices are 46(100%), in acid and colors it is 19 (100%) in beverages.

ISSN: 2348 9510
International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 4, July 2016

4.11 Summary of chi-square test based on Packing Materials and Type of Ownership

Chi-square value	p-value	Type of Ownership			Total
87.86**	0.000	Proprietary	Partnership	Cooperative	
Packing Materials	Bottles & Jars	28	12	3	43
		53.8%	19.0%	100.0%	36.4%
	Sachets	0	27	0	27
		0.0%	42.9%	0.0%	22.9%
	Recycling plastic bottles	0	24	0	24
		0.0%	38.1%	0.0%	20.3%
	Bottles, Jars &Alluminium packs	24	0	0	24
		46.2%	0.0%	0.0%	20.3%
Total		52	63	3	118
		100.0%	100.0%	100.0%	100.0%

Source: Primary data

The above table depicts the type of ownership by packing materials. By application of chi-square test it is proved that there is significant impact of packing materials on the type of ownership at 1% significant level as chi square value is 87.86 and p value is 0.00. The packing materials with bottles & jars 28 (53.8%) in proprietary ownership, sachets are involved 27(42.9%) in partnership units, in recycling and plastic bottles it is 24(38.1%), Only 3 units are engaged with cooperative units in bottle and jars.

4.12 Summary of chi-square test based on Precautions to produce best quality and Type of Manufacturing Products

Chi-square value	p-value	Type of Manufacturing Products					Total
323.82**	0.000	Beverages	Squashes& syrups	Fruit pulp	Milk Products	Fruit and Other juices	
Precautions to produce best quality	Safeguarding products through laborers	0	0	0	1	22	23
		0.0%	0.0%	0.0%	4.0%	47.8%	19.5%
	Storage Facility	0	21	0	0	0	21
		0.0%	77.8%	0.0%	0.0%	0.0%	17.8%
	To realize the expected durability for the product	0	6	0	1	1	8
		0.0%	22.2%	0.0%	4.0%	2.2%	6.8%
	Any guaranteed certifications from Government	0	0	0	21	0	21
		0.0%	0.0%	0.0%	84.0%	0.0%	17.8%
	By maintaining six sigma	0	0	0	2	1	3
		0.0%	0.0%	0.0%	8.0%	2.2%	2.5%
	To realize the expected	0	0	1	0	21	22

ISSN: 2348 9510
International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 4, July 2016

	durability & any guaranteed certificate	0.0%	0.0%	100.0%	0.0%	45.7%	18.6%
	Any guaranteed certifications from Government & six sigma	19	0	0	0	1	20
		100.0%	0.0%	0.0%	0.0%	2.2%	16.9%
Total		19	27	1	25	46	118
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Primary data

The above table depicts the type of manufacturing products by precautions to produce best quality. By application of chi-square test 323.8 and p value is 0.00, it is proved that there is significant impact of productions to produce best quality and type of manufacturing productsat 1% significant level. The production of qualitative products in beverages is 19(100%) for Any guaranteed certifications from Government & six sigma, and to realize the expected durability and any guaranteed certificate 21(45.7%) for fuit and other juices, By maintaining six sigma 2(8.0%) for milk products, Any guaranteed certifications from Government 21(84%) for milk products, for storage facility 21(77.8%) for squashes and syrups, for Safeguarding products through laborers it is 22 (47.8%) for Safeguarding products through laborers.

4.13 Summary of chi-square test based on Approaching CFTRI/FCI for Product Quality and type of Manufacturing Products

Chi-square value	p-value	Type of Manufacturing Products					Total
90.05**	0.000	Beverages	Squashes& syrups	Fruit pulp	Milk Products	Fruit and Other juices	
Approaching CFTRI/FCI for production quality	No	19	6	0	0	0	25
		100.0%	22.2%	0.0%	0.0%	0.0%	21.2%
	Yes	0	21	1	25	46	93
		0.0%	77.8%	100.0%	100.0%	100.0%	78.8%
Total		19	27	1	25	46	118
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Primary data

The above table depicts the type of manufacturing products and approaching CFTRI/FCI for production quality. The approaches. By application of chi-square test it is proved that there is significant impact of approaching CFTRI/FCI for production quality on the type of manufacturing products at 1% significant level as chi square value is 90.05 and p value is 0.00. The approaches CFRI/FCI for production quality is existing in squashes syrups resulting with 21 (77.8%) and approaching CFTRI/FCI for production quality is existing less in beverages with 19(100%).

5. FINDINGS SUGGESTIONS AND CONCLUSIONS

The age group of 46 years and above are more in numbers in establishing the food processing manufacturing companies, family members in the same business are more in manufacturing of food processing companies when compared to others, post graduated people are more in number than the graduation, more than 10 years

ISSN: 2348 9510
International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 4, July 2016

of experience are there for the respondents in food processing industries in the Rayalaseema industries, output is more for the 10000 and above tons, colours and essences are the major byproducts in the food processing industries in the Rayalaseema region, more number of companies are using bottles and jars as a packing, Safeguarding products through laborers is used for the best Precautions to produce best quality and Approaching CFTRI/FCI for production quality is more in food processing Industries. By all the above findings it is concluded that the manufacturing and quality practices in the food processing units are good in Rayalseema region and the government should provide necessary benefits to the food processing units to encourage youth entrepreneurs and Infrastructure should updated to cope up with the future challenges arising in the industry.

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