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An Organoleptic Evaluation of Deep Fried Snacks Prepared by the Street Food Vendors in Guntur Town, Andhra Pradesh.

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ABSTRACT: Street vended deep fried foods and ready to eat foods plays a vital role in present scenario as they are easily available to millions of population and also as they can be carried and consumed anywhere by the consumer. Oils and fats in which these foods are deep – fried play a major role in determining the quality of the food. The food and the oils which are exposed to heat repeatedly undergo many changes in terms of physical, chemical and sensory attributes. In this study both samples of oils that were used for deep fat frying as well as the deep fried snacks were collected from the street vendors. The chemical parameters of oils such as peroxide value, free fatty acids, iodine value and sensory evaluation of the snacks were analyzed. An association between chemical parameters and acceptability of the foodswas done. The results showed that inspite of an increase of chemical parameters after frying of oils, there was a rancid development in the foods which were slightly acceptable. Though the researchers obtained unused oil samples from the vendors, the chemical analysis showed marked differences in quality aspects. And due to consumption of these deep fried street foods, there may be an hindrance effect on health of a consumer.

KEY WORDS:Street vendors, deep fried snacks, deep fried oils, chemical parameters, organoleptic evaluation.

I. INTRODUCTION:

Snack foods are an important part of the diet and have been commercially increased on a wide scale[1]. Deep-fat frying is the most operated food preparation, as evidenced by the worldwide annual production of more than 20 million tons of frying oil[2]. During deep fat frying, the fat acts as heating medium and due to high temperatures, water within the food gets heated and pumped out into the surrounding oil in the form of steam[3].The process of deep fat frying is carried out near the temperature of 175 – 195^0C. Due to high temperature and presence of air and moisture, many physical and chemical changes occur in the food causing oxidative degradation of oil[4]. Decrease in the oxidative stability and flavor quality of oil are due to high frying temperature, number of fryings and the contents of free fatty acids of oil[5]. Repeated frying leads to many oxidative and thermal reactions due to which there will a change in the physico chemical, nutritional and sensory properties of the oil. When atmospheric oxygen reacts instantly with oil and other organic compounds of oil, it leads to structural degradation, which is harmful for the human health[6].

Consumption of deep fried snacks from street vendors is a common practice among people of various age groups owing to its convenience in terms of ubiquitous availability and affordability. However, the quality of oils used during preparation of these snack items is questionable which affects the human health. Hence a study was planned to understand the quality of fats, sensory attributes and association between chemical parameters and acceptability among deep fried snacks.

II. MATERIAL AND METHODS:

Selection of Vendors: A preliminary survey has been conducted in Guntur city by using a structured questionnaire to collect the information regarding number of street food vendors, their food preparation and selling practices, type of oils used and other observations. Four different vendors of

each food variety, total of 16 vendors (four from each quadrant) were selected by using Random sampling technique.

Collection of Samples: Both oil samples and deep fried foods were collected from the selected street vendors prior to the analysis.

Chemical Parameters: Three chemical parameters, namely, Free fatty acids (FFA), Iodine value (IV) and Peroxide value (PV) of used and unused oils were studied.

Free Fatty Acids: Free fatty acid of both fresh and used oil samples was determined by AOAC (1990) method[7]. Acid value or free fatty acid value depicts the amount of fatty acids hydrolyzed from triacylglycerols. Free fatty acid value is defined as, milligrams of potassium hydroxide needed to neutralize the free acids present in 1g of fat or oil. A fat sample or an oil sample is combined with neutralized 95% ethanol and is titrated with standardized sodium hydroxide to a phenolphthalein endpoint. Along with the weight of the sample, the volume and normality of the sodium hydroxide are used to calculate the free fatty acid value.

Peroxide Value: Peroxide value of both used and unused oil samples was determined by AOAC (1990) method[8].The amount of milliequivalents of peroxides per kilogram of fat is the peroxide value that is determined by titration method to measure the amount of peroxide or hydroperoxide groups. To the known amount of fat / oil excess amount of potassium iodide is added that reacts with the peroxides in the sample and the iodine that is liberated is titrated with the standardized sodium thiosulfate using starch as an indicator. The amount of potassium iodide required to react with the peroxide present is used to determine the peroxide value.

Iodine Value: Peroxide value of both used and unused oil samples was estimation was done by using the method AOAC 920.159, 2000[9].The test sample added in carbon tetrachloride is treated with known amount of excess iodine monochloride solution in glacial acetic acid (wij's solution). The excess of iodine monochloride is treated with potassium iodide and liberated iodine is estimated by titrating with sodium thiosulfate solution.

Organoleptic Evaluation of Selected Street Foods: Organoleptic evaluation of selected street foods wascarried out by following standard procedures to understand the presence of flavor rancidity and over all acceptability ofsamosa, bajji, jilebi and punugu.

Selection and Training of Panel of Judges

The panel of judges was selected based on their ability to identify the tastes (salt and sweet) at low level concentrations. To test this, sensitivity threshold test recommended by the Committee on Sensory Evaluation of Food Technologists was followedwherein the members were presented 0.2 percent, 0.3 percent, 0.4 percent, 0.6 percent, 1.0 percent and 1.2 percent solutions of salt, and 0.25 percent, 0.50 percent, 0.75 percent, 1.0 percent, 1.35 percent, 1.50 percent and 1.75 percent solutions of sugar. Panel of ten trained judges were selected who were able to identify the tastes at a lower threshold level.

Development of Score Cards: Score cards were prepared keeping in view the quality parameters of the food product and development of rancid flavor in street foods. Nine point Hedonic scale and seven point Hedonic scale were used to assess the degree of acceptance of the products and Rancidity levels in the products respectively[10].

Nine point hedonic scalewas used to evaluate the overall acceptability of the product where the scoring ranges from 1 to 9, that is, from dislike extremely (1) to like extremely (9). The panel will score the product as per their sensory expression.

Seven point hedonic scalewas used to assess the rancidity of the product in which the scoring ranges between 0 to 6. The score 0 denotes blandness, 1, 2, 3, 4, 5, and 6 depicts suspicion off flavor, noticeable very slight off flavor, noticeable off flavor, distinct off flavor, dis agreeable off flavor and very rancid flavor respectively.

Testing the Products for Acceptability: The test of acceptability was carried out in the sensory evaluation laboratory where the selected samples obtained from the vendors were coded and arranged for organoleptic evaluation. The judges were given necessary instructions about the method of scoring the products.

Statistical Analysis : Paired comparison t – test was followed to compare the values of fresh oil samples and used oil samples for all three chemical parameters (IV, PV and FFA). Significant difference between foods with regard to each chemical parameter was tested using one way ANOVA. Comparison of values for chemical parameters obtained in the study with standard values was done using one sample t – test for both fresh and used oil samples.Analysis of sensory evaluation was done using descriptive statistics and the acceptability of samples as well as presence of rancidity was understood.

III. RESULTS AND DISCUSSION:

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Sensory Evaluation of Deep Fried Foods: The sensory evaluation was conducted to test the acceptability of four types of deep fried foods collected from different vendors. Ten panel members were selected for sensory evaluation. Two different score cards were used for the evaluation of the products, i.e., 9 – point Hedonic scale to determine the overall acceptability of the foods and 7 – point Hedonic scale for the identification of rancid flavor in foods. The mean scores obtained for acceptability and rancidity of the four deep fried foods (samosa, punugu, bajji and jilebi) were presented.

Table 1.Mean scores of sensory evaluation of acceptability and rancidity of deep fried foods

Foods and vendors	Mean scores of overall acceptability test	Mean scores of rancidity test
Samosa 1	5.8	2.1
Samosa 2	4.8	2.3
Samosa 3	3.5	3.2
Samosa 4	5.5	2.4
Bajji 1	5.9	2.3
Bajji 2	5.6	1.9
Bajji 3	5.8	1.7
Bajji 4	6	1.7
Punugu 1	6.1	1.7
Punugu 2	5.6	1.5
Punugu 3	4.5	2.7
Punugu 4	5.3	2.4
Jilebi 1	6.1	0.7
Jilebi 2	6.7	0.9
Jilebi 3	5.5	1.9
Jilebi 4	3.5	2.8

Fig. 1) Mean scores of overall acceptability and rancidity for samosa sold by the four vendors

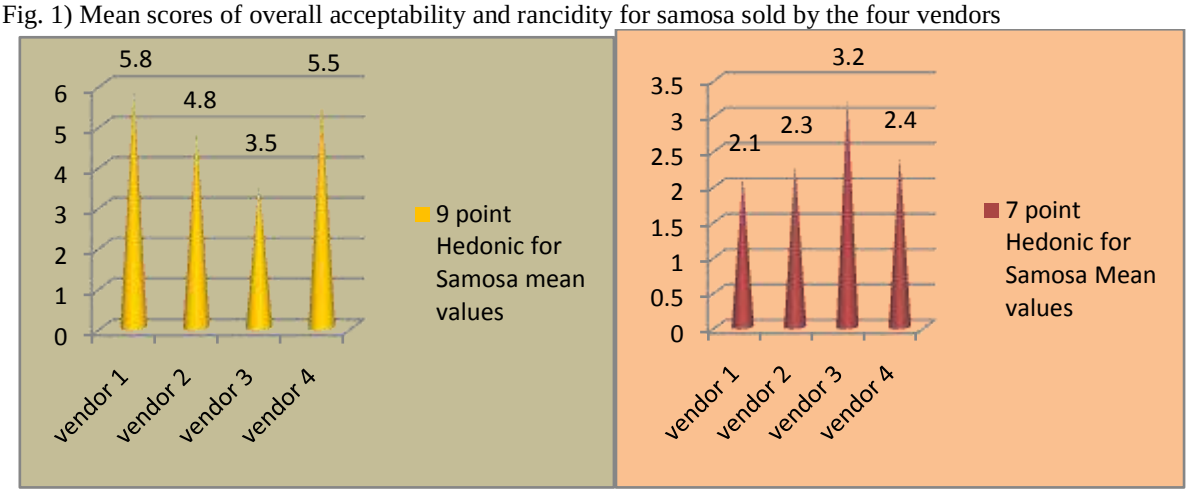

Fig.1.1) 9 point hedonic scale Fig.1.2) 7 - point hedonic scale

From the figure 1.1, it can be stated that the mean scores obtained for acceptability of samosa sold by four vendors indicates that the foods sold by vendor 3 had low acceptability compared to the foods sold by other vendors. By the figure 1.2, it can be observed that the mean scores obtained for rancid flavor development in deep fried foods sold by vendors shows that third vendor selling samosa had scoring of dislike moderately and has noticeable off – flavour which may be reason for the lesser acceptability of food.

Fig. 2) Mean scores of overall acceptability and rancidity forBajji sold by the four vendors

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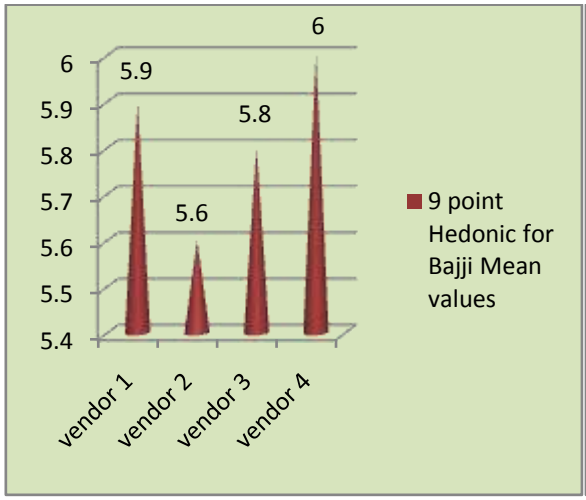

Fig.2.1) 9 - point hedonic scale

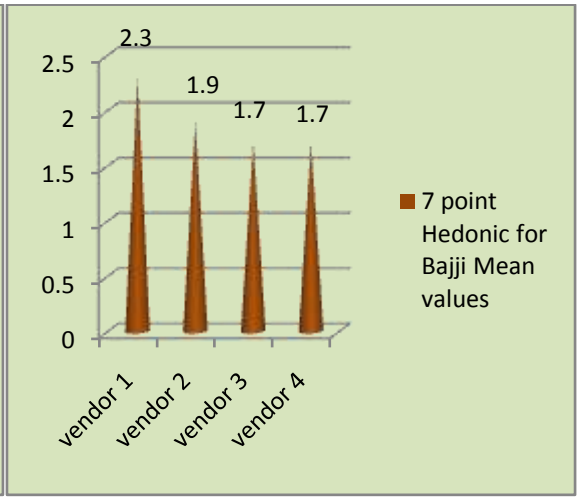

Fig.2.2) 7 - point hedonic scale

From the figure 2.1, it can be stated that the mean values obtained for the acceptability of bajji from four vendors shows that bajjisold by vendor 3 has low acceptability among other vendors. By the figure 2.2, it can be observed that mean scores obtained for rancid flavor development in deep fried foods (bajji) sold by all 4 vendors indicates the suspicion of off - flavor.

Fig. 3) Mean scores of overall acceptability and rancidity for punugu sold by the four vendors

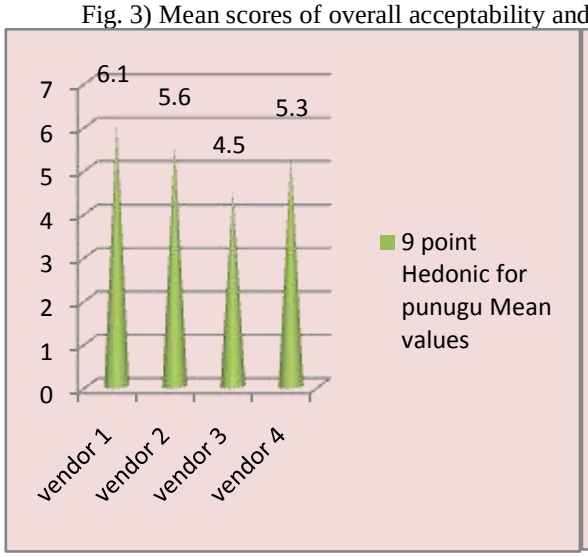

Fig.3.1) 9 point hedonic scale

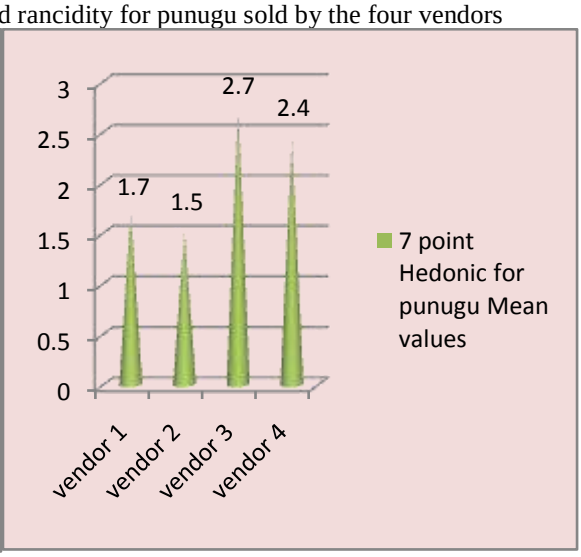

Fig.3.2) 7- point hedonic scale

From the figure 3.1, it can be stated that among the mean values obtained for the acceptability of punugu from four vendors, vendor 3 has low acceptability than others. And figure 3.2, indicates the mean scores obtained for rancid flavour development in deep fried foods punugu sold by vendors which shows that punugufrom third vendor had scored with feeling of dislike slightly and also with distinct off – flavor, which might be the reason for lesser acceptability.

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Fig. 4) Mean scores of overall acceptability and rancidity forjilebi sold by four vendors

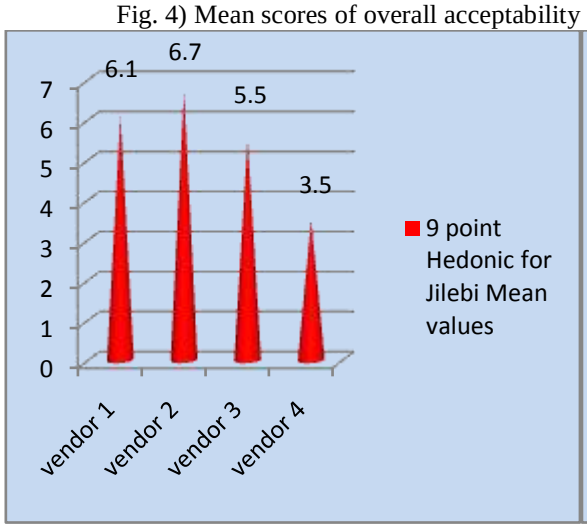

Fig.4.1) 9 - point hedonic scale

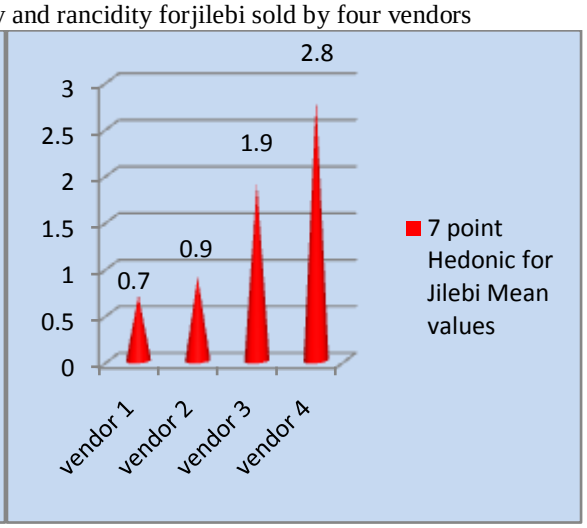

Fig.4.2) 7- point hedonic scale

From the figure 4.1, it can be stated that among all the mean values obtained for the acceptability of jilebi from four vendors, vendor 4 has low acceptability than others.By the figure 4.2, it can be observed that mean scores obtained for rancid flavor development in deep fried foods (jilebi) sold by the fourth vendor had scored with feeling of dislike moderately and also with noticeable off – flavor, which might be the reason for lesser acceptability when compared to other vendors.

Using descriptive statistical method the significance between the mean scores obtained from sensory evaluation data were compared with results of chemical parameters. It was found that there is no significant difference in the acceptability and rancidity of the foods (P – 0.437). Oxidative rancidity is formed due to oxidation of double bond of fatty acid with the formation of aldehydes, ketones and acid of low molecular weight than fatty acids originally present. This process depends on the presence of oxygen; and it is increased by heat, light, moisture and certain metal catalysts. Oxidative rancidity mainly occurs due to the oxidation of oleic acid[11]. Similarly, the flavor of the food will not be much affected by the number of fryings, but by the type of oil used for frying[12].

Association between Chemical Parameters and Acceptability of Foods

The analysis of chemical parameters was done to observe the quality of the oils and also the sensory evaluation was done to observe the acceptability and rancidity development in the foods which were deep fried. It was assumed that the chemical composition of oils will affect the acceptability and rancid flavors of the foods. The association between the mean values of chemical parameters and the mean values of sensory evaluation scores (hedonic scales) were summarized in table 2.

Table 2. Mean values of chemical parameters of oils and organoleptic evaluation of foods.

Foods and vendors	Means of FFA of fried foods	Means of PV of fried foods	Means of IV of fried foods	Mean scores of overall acceptability test	Mean scores of rancidity test
Samosa 1	6.01	16	8.45	5.8	2.1
Samosa 2	10.00	16	8.13	4.8	2.3
Samosa 3	7.52	20	8.14	3.5	3.2
Samosa 4	6.76	24	8.77	5.5	2.4
Bajji 1	7.88	20	7.90	5.9	2.3
Bajji 2	7.88	24	8.23	5.6	1.9
Bajji 3	7.12	22.66	8.31	5.8	1.7
Bajji 4	7.51	26.66	8.10	6	1.7
Punugu 1	7.48	26.66	8.54	6.1	1.7
Punugu 2	7.89	26.66	7.88	5.6	1.5

Punugu 3	9.80	24	8.74	4.5	2.7
Punugu 4	6.74	25.33	8.52	5.3	2.4
Jilebi 1	8.26	18	8.54	6.1	0.7
Jilebi 2	6.03	26	8.74	6.7	0.9
Jilebi 3	7.53	26.66	8.75	5.5	1.9
Jilebi 4	7.11	26.66	8.74	3.5	2.8

IV. CONCLUSION:

An observation between the chemical parameters and sensory attributes was done to find the effect of frying of foods on chemical parameters and acceptability of foods. However, observations during the study showed that these foods were moving faster in the market. As in overall view it can be concluded that, though the free fatty acids, peroxide value and iodine values are not in their normal ranges, the acceptability of foods from selected vendors ranged between dislike moderately to like slightly. And the rancid flavor of the food ranged between suspicion off – flavor to distinct off flavor. But unknowingly or without having any knowledge about the chemical changes happening in the frying process, the consumers are still accepting more, which leads to hindered ill – health effects.

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