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# Comparative Study of Deep Fat Fried Samosa and Oxyair Fried Samosa

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***Abstract*- Samosa is one of the majority admired savory deep fat fried snack product, consumed by all age group, it is most palatable snack in young generation. Being deep fried it possess high trans fats and saturated fats which increases risk of obesity, type -2 diabetes and cardiac arrest among youngsters. An attempt was carried out to minimize such lethal effects of fat frying by using oxy air fryer. Here a comparative study of reduction in fats, TPA and colour in deep fat fried snack samosa (DFS) and oxy air fried samosa (OFS) and study of palatability were investigated. As final result value for fat content was 22.83% for DFS and for 10.08% OFS. Colour values showed reduction in brightness (L) which ranged from 66.27 to 44.33; increase in yellowness (b) was observed (35.22 to 41.08) and redness (a) value from10.10 to 23.37 for DFS and OFS respectively. Moisture content was 22.25 % for DFS, 9.65% for OFS, while hardness for DFS is 38g While for OFS is 55g, hence from sensory evaluation it is revealed that oxyair fried samosa is acceptable and favorable for good health.**

**Key Words: - TPA, Trans fats, Deep fat fried samosa, Oxy air fried samosa, Hardness.**

## I. INTRODUCTION

Samosa is an Indian deep fried puffed pastry (Shalini et al 2012), and a pass time snack favorite among all age group mostly in youngsters. It is readily available in canteens, even in hotels. It is tasty and palatable as rich in fat content, which is adversely affecting health. Eating quality of any food can be altered by means of unit operation namely 'frying'. Deep frying is a process in which heat is transferred from oil to the food, where moisture reduces and oil get absorbed in the food. Being deep fried product it contains high degree of saturated fatty acids as well as trans fats, thus increasing the risk of coronary artery disease (Fellows, 2009). Deep frying process involves evaporation of moisture and absorption of oil (Sakhale, et.al. 2011; Ziaiifar, 2008). Now a day's there is demand for healthy snack foods with low oil content. To minimize this risk an attempt was carried out to prepare low fat samosa for it oxy air fryer was used. The oxy air fryer works alternatively by coating the desired food in a thin layer of oil while circulating air heated up to 200 °C to give energy and initiate the reaction. A mechanical fan circulates the hot air around the food at high speed, hence cooking of food and rising crispy layer through the Maillard reaction (Desirable non enzymatic browning). The oil uptake is relatively low in air frying process. Oil uptake can be reduced up to 50-70%, which implies the economic and healthy way to prepare samosa. Air frying provides less fat uptake and less fat oxidation (Santos et.al. 2017). Oxy air fryer could be the better option for the future of healthy life and for snacks too (Shaker, 2014).

## II. MATERIALS AND METHODS

All the raw material viz. refined flour, refined soybean oil, potatoes, peas, spices and condiments were purchased from nearby super market of Aurangabad.

**Preparation of Samosa**

Refined flour, water and oil was taken in the proportion of 10:4:1, for the outer casing of samosa, filling was prepared by using boiled, peeled potatoes, onion, ginger-garlic paste, chili, turmeric powder, green peas, and garam masala. Pyramid shaped samosa were prepares by using 20 g dough and 10-12 g filling batter (Sakhale et. al. 2011)

**Deep Frying of Samosa**

Prepared samosa was deep fried in refined soybean oil at 150±50C for about 6-8mins, till turns to golden casing. Prepared samosa was labeled as DFS.

Oxy air frying of samosa

Prepared samosa was subjected to Kenstar Aster 1500-Watt, Operating Voltage: 220-240 volts Oxy Fryer at1600C for about 10-12 min, till turns to golden casing. Prepared samosa was labeled as OFS.

**Proximate analysis**

Sample was analyzed for moisture (method 44-15A), ash (method 08-01), fat (method 30-10), according to the standard methods (AACC 2000).

**Color measurement**

The color of sample was measured in term of lightness (L) and color (+ a: red, -a: green, +b: yellow, -b: blue) using the Hunter Lab Color Measuring System (Color Measuring Labscan XE system, Reston, VA).

**Texture analysis:**

The Texture Profile Analysis was carried out for hardness, cohesiveness and springiness by using Brookfield CT3

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Texture analyzer, probe TA 9 needle, 1mm diameter, 43 mm length.

**Statistical analyses**

Sensory data was analyzed by one way analysis of variance (ANOVA) at 5% level of significance. A value of $p<0.05$ was considered statistically significant.

## III. RESULT AND DISCUSSION

**Proximate analysis:**

The deep fat fried samosa (DFS) and oxy air fried samosa (OFS) was analyzed for proximate analysis. It was found that moisture content of DFS about 22.25% where as for OFS was 9.65%. DFS contains about 22.83% fat and OFS 10.08%. Results indicate decrease in moisture and fat content. This is due to methodology used for frying. In conventional frying process the samosa is fully dipped in oil but in oxy air fryer only surface of samosa applied with oil not actual dipping. Decrease in oil content in air fried French fries compared to conventional frying (Teruel et.al 2015).Saguy and Pinthus (1995) reported that various researches showed the relation between moisture loss and frying time. According to that the moisture loss is proportional to the square root of frying time and that oil absorption occurs as moisture is removed from the food.

**Color analysis**

Table.1 shows the result of color for DFS and OFS. It has been observed that OFS sample shows reduction in brightness as compared to DFS. For +a value and +b value showed increasing trend for OFS as compared to DFS. This variation in color values is due to difference in frying process. Uniform color and appearance of food is due to surfaces of food receive similar heat in deep frying.

***Table.1: Colour values for DFS and OFS***

| Samples | Parameters* | | |
|---|---|---|---|
| | L | a | b |
| DFS | 66.27±0.02 | 10.10±0.01 | 35.22±0.04 |
| OFS | 44.33±0.04 | 23.37±0.02 | 41.08±0.00 |

Values are mean ± standard deviation of three independent determinations

*L: lightness/darkness; ±a: red/blue; ±b: yellow/green

DFS- Deep fried samosa; OFS- Oxy fried samosa

***Deep Fat Fried Samosa***

***Oxy Air Fried Samosa***

***Fig.1: Deep fat fried samosa and Oxy air fried samosa***

**Sensory analysis:**

The DFS and OFS samples were evaluated for sensory and labeled as S1 and S2. It was found that samosa sample S2 had overall quality score 8.5 and for S1 it was 8, indicating the low oil absorption of samosa. Based on the above results it can be concluded that samosa fried in air fryer was acceptable because of less oil uptake. The data was analyzed for ANOVA. The values for F were found to be 0.004 and -0.99 for treatments and parameters respectively and value for CD (5%) was 11.16.

***Table.2: Sensory analysis***

| Parameter | S1 | S2 |
|---|---|---|
| Color | 7±0.01 | 8±0.00 |
| Taste | 8±0.02 | 8.2±0.02 |
| Aroma | 7.9±0.02 | 7.9±0.03 |
| Texture | 8±0.01 | 8±0.00 |
| Crispiness | 7.2±0.03 | 7.5±0.02 |
| Mouth feel | 8±0.01 | 8.2±0.05 |
| Overall acceptability | 8±0.04 | 8.5±0.01 |

Values are mean ± standard deviation of three independent determinations

**Texture analysis:**
Both the samples were analyzed for TPA. DFS sample showed 38g hardness, cohesiveness 0.49 and springiness 4.1mm whereas; OFS showed 55g hardness, 0.51 cohesiveness and 4.5mm springiness. Values show that oxy fried samosa is slightly harder in texture in comparison with deep fat fried samosa. Teruel et.al (2015) showed that air fried samosa having texture harder in comparison with deep fat fried French fries. In air frying the loss of moisture is higher in comparison with conventional frying (Andrés et.al 2013)

## IV. CONCLUSION

From above study it is revealed that use of air fryer reduces oil uptake in samosa. Reduction in oil uptake is beneficial for reduction in cholesterol level, obesity and other causative health illness. In comparison with conventional frying process air fried samosa possesses acceptable sensory characteristics. It can conclude that air frying is an option available for replacement of conventional frying.

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