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SHELF LIFE OF *SAMOSA* UTILIZING SPENT HEN MEAT EMULSION

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Abstract: A study on shelf life of chicken samosa utilizing spent hen meat emulsion was under taken. The samosas were prepared with raw emulsion (type 1) and scrambled emulsion (type 2). The samosas were aerobically packed and stored at 4±1° C upto 6 days. There was significant ($p < 0.01$) difference in cooking yield and proximate composition between type 1 and type 2 samosas. The pH and total plate counts were significantly ($p< 0.01$) lower in type 2 samosas. However, type 2 samosas had significantly higher TBA number. During storage period, there was significant ($P<0.05$) increase in pH, TBA number and total plate count between both type of samosas. Scrambled emulsion samosa had higher sensory scores. Both types of samosas could be stored up to six days at 4±1°C without any appreciable deterioration in the quality and acceptability of the products.

Keywords: Emulsion samosa, Shelf life, Spent hen.

INTRODUCTION

The rapid growth of poultry industry during last four decades made our country fifth largest producers of egg in the world. The per capita consumption of egg has increased from seven eggs in 1961 to 48 eggs at present. The availability of culled and spent hens has also increased many folds. Meat obtained from these spent animals is generally tough, coarse and chewy in nature due to increase in tensile strength of collagen with age. The sensory attributes of meat especially tenderness, flavour and juiciness tend to decrease with increase in age of birds. Development of minced/emulsion type of meat product has been considered a potential solution for utilization of meat from spent birds and animals. Comminution of meat eliminates to a considerable extent, the toughness associated with the meat. Comminuted product also allow inclusion of non meat ingredients such as plant proteins, vegetables and meat by-products as skin, gizzard and heart from chicken which would help to reduce the product cost, improve the yield and quality of product. Many convenience products such as

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sausages (Kondaiah *et al.,* 1988 and Sreenivasa Rao *et al.,* 2011), patties (Kondaiah and Panda, 1992; Reddy and Rao 1997 and Biswas *et al.,* 2006), meat loaves (Sen and Sharma 1996) and nuggets (Konda Reddy *et al.,* 2001; Kumar and Tanwar, 2011) were developed utilizing spent hen meat.

Samosa is one of tasty and delicious popular traditional snack in India. It generally consists of a fried triangular or round shell with a savory filling. Preparation of samosa has been reported using raw meat and combination of cooked and raw meat as stuff (Keshri *et al.,* 1988), different stuff binders in chevon samosas (Sharma *et al.,* 1998) and spent hen frames meat with potato (Geetha Chauhan *et al.,* 2003). The present study was conducted to analyses the quality of chicken samosa utilizing spent hen meat emulsion for samosa making.

MATERIALS AND METHODS

Preparation of emulsion

Spent hens (more than 80 weeks old) obtained from commercial layer farm at Rudravally, Hyderabad. After adequate rest, they were slaughtered, dressed and deboned manually. The meat were packed separately in clean polyethylene bags and stored at -20ºC until used. Emulsion was made as per the following formulation.

The frozen lean meat and Skin, Heart and Gizzard (SHG) were sliced and minced separately using 4.5 mm plate in a meat mincer (SIRMAN, Italy). The minced meat and SHG were then chopped in bowl chopper (DADAUX CE, France) using three blade cutter. The emulsion was prepared by adding minced meat and SHG blended with salt, sodium tripolyphosphate and sodium nitrite for 1 min. Water in the crushed ice form was added and blending continued for 1 min. This was followed by addition of condiment, spice mix and maida and again mixed for 1.5 to 2 min to get desired consistency.

Preparation of samosa

Samosas with raw emulsion stuff (type 1) and scrambled emulsion stuff (type 2) were prepared. Preparation of type 1 involves mixing of raw emulsion mixed with 10 per cent onion and 1.5 per cent green chilli whereas, type 2 samosa stuff contained scrambled emulsion with 10 per cent onion and 1.5 per cent green chilli. The spread for outer cover of samosa was made with refined wheat flour 85 % and corn flour 15 % dough (to this add 1% salt). The round shaped spreads was divided into two halves and were given shape of cone. Cone was stuffed with both types of stuffs separately and deep fat fried in hot vegetable oil on medium heat till they become golden brown (160^{o}C/5 min).

Analysis

After preparation, samosas were allowed to cool down and the yield of samosa was recorded. Proximate compositions of the products were evaluated (AOAC, 1995). The pH of the samples was determined by blending 10 g of sample with 50 ml of distilled water for 60 s in a homogenizer (MICCRA D8-Si, ART-moderne Labortechnik, Germany). The pH values were measured using a standardized electrode attached to a digital pH meter (Thermo Orion model 420A+, Beverly, MA). TBA value was estimated following Witte *et al.* (1970) method. Aerobic plate count was done following the APHA (1984) procedure using plate count agar. The warm samosas were subjected to sensory evaluation. Various quality attributes viz., appearance, flavour, juiciness, texture, binding, adhesion and over all acceptability were recorded using 8 point hedonic scale.

Both types of samosas were aerobically packed in polyethylene bags, sealed and stored at refrigerated storage (4±1°C). The pH, TBA number and total plate count of the samosas samples were analysed on sixth day.

RESULTS AND DISCUSSION

Cooking yield of type 1 and type 2 samosas were 88.34±0.86 and 94.37±1.14 % respectively. Significantly higher cooking yield in types 2 samosa could be due to less moisture loss during cooking as the emulsion was scrambled. The proximate composition of samosas is presented in table 2. Significant difference was observed in moisture, protein and fat content between type 1 and type 2 of samosas. Moisture content of type 2 samosas was significant ($p<0.01$) lower when compare to type 1 samosas. It might be due to scrambling of emulsion which reduced the moisture content. The moisture reduction might be the reason for increases in protein and fat content of type 2 samosas. Further, type 2 samosas had higher fat because of oil added during scrambling of stuff.

Chemical and microbial qualities of chicken samosas during refrigerated storage (4±1º) are presented in table 3. The pH and total plate counts were significantly lower in type 2 samosas on zero day. Significantly higher TBA number in type 2 samosa might be due to use of vegetable oil during scrambling of stuff. Significant increase in pH, TBA number and total plate count was observed during refrigerated storage. The pH increased at sixth day. It was agreement with the result of Geetha Chauhan et al. (2003) who made samosas from spent hen frames meat.

Although the TBA number increased in both type of samosas during storage, scrambled samosas had higher values. Similar trends were reported by various workers (Salahuddin et

al., 1989; Geetha Chauhan et al., 2003 and Muthulakshmi et al. 2009). The higher fat content might be the reason for higher TBA values in the type 2 samosas.

Total plate counts of products were 1.73±0.04 and 1.46±0.04 on zero day and 2.13±0.05 and 1.86±0.06 on 6th day. Geetha Chauthan et al. (2003) also reported increased total plate count in samosas during storage period. Type 2 samosas had lower microbial load compared to type 1 samosas. Frying during scrambling and again during samosa making might be reason for lower microbial load in type 2 samosas. Total plate count of both type of samosas were within the prescribed limits up to 6th day of storage.

Sensory scores of samosas are presented in table 4. Though there was no significant difference in sensory attributes like appearance, binding and adhesion between 2 types of samosas, type 2 samosas had significantly higher texture, flavour, juiciness and over all acceptability than type 1 samosas.

From above study it is concluded that accaptable quality samosas could be prepared from spent hen meat emulsion and they could be stored up to six days at 4±1°C without any appreciable deterioration in the quality and acceptability of the product.

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Table 1: Formulation of emulsion

Ingredients	Quantity (Per cent)
Spent hen meat	65
Skin, heart and gizzard (SHG)	15
Maida	3
Spice mix	1.5
Condiments	3.5
Salt	1.5
Sodium tripolyphosphate	0.3
Sugar	0.3
Sodium nitrite	0.1
Ice	10

Table 2: Proximate composition of samosa prepared from spent hen meat emulsion

Parameter	Type 1	Type 2	Level of significance
Moisture	67.27 ± 0.69	46.29 ± 0.28	**
Protein	19.60 ± 0.42	21.27 ± 0.47	*
Fat	11.98 ± 0.30	14.88 ± 0.06	**

*P<0.05; **P<0.01

Table 3: Chemical and microbial qualities of chicken samosas during refrigerated storage (4 ±1°)

	Type 1	Type 2	Overall mean
pH			
0 day	6.31± 0.01 ^{b}	6.28 ± 0.01^{a}	6.30 ± 0.02^{A}
6th day	6.42 ± 0.01 ^{b}	6.37 ± 0.01 ^{a}	6.40 ± 0.02^{B}
TBA(mg malonaldehyde/kg)			
0 day	0.29 ± 0.01 ^{a}	0.61 ± 0.01 ^{b}	0.45 ± 0.09 ^{A}
6th day	0.51 ± 0.36 ^{a}	0.77 ± 0.44 ^{b}	0.64 ± 0.40 ^{B}
Total plate counts (log CFU/g)			

0 day	1.73 ± 0.04 [b]	1.46 ± 0.04 [a]	1.60 ± 0.08 [A]
6th day	2.13 ± 0.04 [b]	1.87 ± 0.04 [a]	2.00 ± 0.08 [B]

a and b- significant difference between samples

A and B- significant difference between storage

Table 4: Sensory attributes of chicken samosas prepared from spent hen meat emulsion

Sensory attributes	Type 1	Type 2	Level of significance
Appearance	6.97 ± 1.05	7.36 ± 0.82	ns
Flavour	6.17 ± 1.01[a]	7.32 ± 0.82[b]	**
Juiciness	6.50 ± 1.04 [a]	7.36 ± 0.82 [b]	*
Texture	6.00 ± 1.00 [a]	7.32 ± 0.82 [b]	**
Binding	6.67 ± 0.97	7.18 ± 0.81	ns
Adhesion	6.50 ± 0.22	6.58 ± 0.27	ns
Overall acceptability	6.00 ± 1.00 [a]	7.25 ± 0.81 [b]	*

*P<0.05; **P<0.01