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Developement and Evaluation of Egg Patties By Incorporating Chicken Gizzard

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ABSTRACT

The current development in the fast food sector is showing a demand for processed value added egg products. Gizzard is one of the edible byproducts of poultry processing which are being marketed as variety meat along with dressed chicken. Keeping these factors in mind, an experiment was envisaged to standardize the processing methodology and formulation of egg patties incorporated with gizzard. The standardized recipe for the product contained liquid egg (92.5%), dry spices-1.5%, wet condiments {ginger – garlic paste (2:1)}-3%, salt-1% and maida -3%. Different levels (25, 50 & 75%) of gizzard were incorporated in the standardized recipe by replacing the liquid egg. The effect of different levels of gizzard on the physicochemical and sensory properties of egg patties were investigated. Even up to 75% incorporation of gizzard in egg patties did not show any significant difference in the cooking yield (85.89-87.75%). Moisture level (55.05-66.15%) was significantly higher in control followed by patties containing gizzard at 25% incorporation. In contrast, protein content (11.44-22.34%) of the product was significantly higher at 75% level of gizzard incorporation. The crude fat (5.72-11.48**)** content did not differ significantly with different levels of incorporation of gizzard in egg patties. Similarly, the sensory scores for the product did not differ significantly for all the parameters up to 75% level of gizzard incorporation. The sensory score for appearance, flavor, juiciness, texture and overall acceptability were ranged between 5.85-6.52, 6.15-6.53, 5.95-6.34, 6.25-6.55 and 5.90-6.55, respectively. Hence, the incorporation of gizzard in egg patties will be have a favourable consumer appeal by considering its high protein value, low crude fat content with similar sensory attributes.

Key words: *Egg patties, gizzard, sensory quality, physico-chemical quality.*

The current development in the fast food sector is showing the demand for processed value added egg products. Different egg products are being prepared, taking into consideration its importance in human health. With the growing poultry production and processing activities, there is an increased availability of edible byproducts too. The major edible byproducts of poultry include heart, liver and gizzard, which are being marketed as variety meats along with dressed chicken. Among the edible byproducts, gizzard forms about 1.6-2.3 % of live broiler chicken (Mountney and Parkhurst, 2001). The proximate composition and aminoacid profile of gizzard are nearly same as that of chicken. Gizzard contains approximately 20% protein besides possessing unique textural and flavor characteristics (Rao *et al.*, 1994). It forms nearly 3% of the dressed chicken (Charonpong and Chen, 1980) and is not generally preferred by the consumers due to its toughness, flavour and texture (Maiti and Ahlawat, 2010). Studies on the development of fried chicken gizzad and its storage stability has been reported (Pangas *et al*, 1998). Further, utilization of this byproduct would increase the profitability of broiler industry. Among the various popular value-added egg products, patty is one which could find increasing popularity in the food service industry, particularly in fast food outlets. The present study was planned with on the different levels of incorporation of gizzard into the egg patties by replacing the liquid eggs.

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Eggs for the preparation of patties were obtained from the Instructional Farm, of Rajiv Gandhi College of Veterinary and Animal Sciences. Gizzards were collected from broiler chicken, slaughtered hygienically in the Department of Livestock Products Technology and packed in low density polyethylene cover and stored under frozen condition(-18ºC).

The standardized recipe for the products contained liquid egg (92.5%), dry spices-1.5%, wet condiments {ginger – garlic paste (2:1)}-3%, salt-1% and maida-3%. In the experimental products, cooked and minced gizzards were incorporated at the level of 25, 50 and 75% by replacing the liquid eggs. After thawing the frozen gizzards, were cooked for is min the in pressure cooker after the addition of turmeric powder and salt at 0.5 and 1% respectively. Later cooked gizzards were allowed to cool at room temperature and minced in a meat mincer (Mado Shop Mincer Junior, Germany) using 4mm plate. Minced gizzard was incorporated at different levels in patties by replacing the liquid eggs. By using home mixer grinder (Sumeet Machines Ltd, Mumbai), it was mixed properly for 30 seconds. The batters obtained were filled in a glass moulds for shaping and cooked in an oven toaster grill (Crompton Greaves) at 160 ºC for 30 minutes.

Processing of egg patties incorporated with gizzard

Thawing of the frozen gizzard

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Mixing with turmeric and salt

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Pressure cooking of gizzard (15 lb for 15 minutes)

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Mincing mincer using 8mm plate

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Addition of salt (1%), dry spices (1.5%) and wet condiments (3%)

!

Addition of liquid eggs and binder (3%)

!

Mixing home mixer grinder for 30 seconds

!

Filling of batters in moulds

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Cooking (oven toaster grill at 160 ºC for 30 minutes)

The cooking yield was determined as per Murphy *et al.* (1975) and expressed in percentage. The moisture, crude proteins and ether extract content were estimated following AOAC (1995) methods. The products were evaluated organoleptically by semitrained panelists using 8 point hedonic scale (Keeton, 1983) where 8 indicates extremely desirable and 1 indicates extremely undesirable. Three trails were conducted for each experiment and each parameter was analyzed in duplicates.

One way analysis of variance (ANOVA) was applied for all the parameters and the data were tabulated. The levels of significant effects were tested using the least significant difference (LSD) test (Snedecor and Cochran, 1967).

Results indicated that no significant differences were observed on the cooking yield (87.75-85.89%) of egg patties at different level of gizzard incorporations. Similar to our finding, no significant differences were recorded on the cooking yield with increase in the level of gizzards up to 30% in the formulation of restructured chicken slices (Mandal *et al.,* 2011; Sudheer *et al.,* 2011). Pandey *et al.* (1999) reported that patties containing 60 and 70% level of egg incorporation had significantly ($p<0.05$) higher cooking yield. Reddy and Vijayalakshmi (1998) reported much lower cooking yield in chicken sausages (75.13–79.39%) containing skin, gizzard, heart and yolk at levels of 15 and 18%.

Moisture content was significantly ($p<0.05$) higher in control followed by patties containing gizzard at 25% level of incorporation. Similar to the finding of present study, Pandey *et al.* (1999) reported that greatest moisture retention (91.5%) was noticed in patties containing highest egg level (70%). But no significant increase in the moisture content were observed in control products compared to gizzard incorporated restructured chicken slices (Sudheer *et al.,* 2011). The crude fat content did not differ significantly at different levels of gizzard incorporation in egg patties. Pandey *et al.* (1999) reported that the patties containing 50, 60 and 70% whole egg did not show any significant difference in the crude fat content.

Table: 1 Effect of incorporation of gizzard on the physicochemical and sensory properties of egg patties:

Parameters	Gizzard level (%)			
Physico chemical*	**Control**	**25**	**50**	**75**
Cooking Yield	88.03±0.20	87.50±0.32	87.76±0.26	85.89±0.21
Moisture	66.15^{a}±0.44	61.55^{b}±0.50	58.73^{c}±0.18	55.05^{d}±0.75
Protein	11.44^{a}±0.44	13.92^{b}±0.69	18.64^{c}±0.43	22.34^{d}±0.78
Crude fat	11.48±0.40	10.17±0.11	7.99±0.44	5.72±0.26
Sensory Quality**				
Appearance	6.00±00	6.52±0.17	6.41±0.18	5.85±0.20
Flavour	6.24±0.15	6.53±0.15	6.42±0.13	6.15±0.14
Juiciness	6.12±0.17	6.34±0.19	6.14±0.19	5.95±0.19
Texture	6.25±0.12	6.31±0.11	6.55±0.14	6.25±0.16
Overall acceptability	6.22±0.15	6.55±0.14	6.34±0.16	5.90±0.17

Means ±SE with different superscripts in a row differ significantly (P<0.05)

Sensory scores based on 8 point descriptive scale where 8- extremely desirable and 1- extremely undesirable

*n=6 for each treatment **n=20 for each treatment

Kondaiah *et al*. (1993) and Reddy and Vijayalakshmi (1998) reported much lower moisture content and much higher fat content in mutton nuggets and chicken sausages incorporated with skin, heart, gizzard and yolk. But restructured chicken slices incorporated with gizzard were recorded lower crude fat content compared to control products (Mandal *et al.*, 2011; Sudheer *et* 2011).

As expected, increasing the level of incorporation of gizzard in egg patties increased the protein content significantly ($p<0.05$) and maximum value were noticed at 75% incorporation of gizzard. Rao *et al*. (1994) reported that gizzard contains approximately 20% protein. Similar to our observation, Sudheer *et al,* (2011) reported that protein content increased significantly upto 40% gizzard incorporation in restructured chicken slices compared to control products.

The sensory scores of the product did not differ significantly for all parameters up to 75% level of gizzard incorporation. The sensory scores for appearance, flavor, juiciness, texture and overall acceptability ranged between 5.85-6.5, 6.15-6.5, 5.95-6.3, 6.25-6.55 and 5.90-6.55. Similar to our observation, Pandey *et al*. (1999) reported that patties containing 70% egg level were preferred by the panelists. Sensory scores of the product increased significantly ($p<0.05$) for all the parameters up to 40% level of gizzard incorporation (Sudheer *et al*, 2011). Malik and Panda (1994) and Reddy and Vijayalakshmi (1998) reported higher acceptability scores for mutton blocks incorporated with 25% gizzard and 5% heart and chicken sausages incorporated with skin, heart, gizzard and yolk at levels of 15 and 18%, respectively.

Cooking yield did not differ significantly between the products even though lower value at highest gizzard level incorporation was observed. As expected, protein content of the products were significantly ($p<0.05$) higher at increased the levels of gizzard incorporation. In contrast, moisture level was significantly ($p<0.05$) lower in the products with high egg content. No significant reduction in the crude fat content was noticed between the products. The sensory scores for the products did not differ significantly for all parameters up to 75% level of gizzard incorporation.

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