

Original Research Article

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Low Cost Sausage Preparation from Poultry by- Products and Broiler Meat

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ABSTRACT

Chicken sausage from poultry by-products were prepared from a standardized formulation and were extended with optimized level of non meat binders viz., sodium caseinate and whole egg powder at 0.5, 1.5 and 2.5% and 2, 4, and 6% level respectively. Optimization of levels for extenders was done under different experiments based on sensory attributes and those having sensory status closer to control were selected. The cost of sausage from poultry by-products after replacement of lean with selected level of non meat binders were compared among themselves to determine the most economic preparation. It was found that extended chicken sausage was cheaper than control sausage and among the extended sausage cost was for poultry by-products. The cost for poultry by-products sausage and binder extended sausage were almost same, but in case of sodium caseinate price were lower than the whole egg powder. In case of poultry by-products (skin, fat, heart and gizzard) were lower in price than extended binder sausage because of higher yield and high level of replacement of lean meat. Thus, it was concluded that formulation accordingly, the net profit per 30g sausage was considerable higher in value added experimental product I (By products) followed by II (SC) and III (WEP)

Keywords

Chicken sausage, Economics, Poultry by-products, Processing, Binders

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Introduction

Poultry production in India has taken a quantum jump during two decades despite the threat of avian influenza. Poultry industry is still growing at a much faster rate as compared to other sectors contributing at Rs. 100 billions

to the Gross National product (Mohanty and Rajendra, 2003). Poultry meat is considered relatively cheaper and no social taboo is attached to its consumption and hence it is most preferred for developing convenience meat products. Through fresh chicken dominates the Indian market, the consumers

preference particularly in big cities and metros is shifting in favour of processed products. The increased concern for nutritional security of common mass demands a holistic approach to stretch the availability of quality protein sources by reducing the cost of formulated products.

Comminuted meat products are widely consumed through out of the world but unfortunately its cost especially in the developing countries is not within the reach of middle class non-vegetarian society. Efforts are being made to prepare value added meat based convenience products using low value meat components. It is estimated that during slaughtering of birds, about 10 to 13% live poultry weight is wasted in the form of skin, gizzard, heart and other by-products (Sharma, 1999). The nutritive value of these edible by-products in respect of protein and fat is as good as lean meat. It more advisable to incorporate chicken giblet (Heart and gizzard) in the preparation of processed meat products if the consumer is looking for low calorie diet having high protein and polyunsaturated fatty acids.

Effective utilization of these by products for production of value added meat products is one way to realize maximum returns from poultry sector. The ICMR recommendation for protein consumption of 1g/Kg b.wt/day with Net Protein Utilization (NPU) of 65 could be achieved only by introducing the animal proteins in regular diet. Poultry industry, a vibrant, organized and scientific sector now a day in India, can play a key role in ensuring quality animal proteins at cheaper rate, particularly through spent hen meat (FAO, 2006). Processing of meat from spent hen to different “value added products” open the avenues for not only its judicious utilization, but a readily accessible animal protein sources for poor people. Emphasis over food processing and economic formulation has

made it necessary to do the needful work in this direction. Reduction of cost by replacement of costly meat with economic non- meaty substances (Huang *et al.*, 2005; Yilmaz and Daglioglu, 2003) has been in practice since long back, but reporting about the actual figure is still inconclusive. At present poultry meat is an important component of human diet particularly in developing countries since it is an affordable source of animal protein for low income class people (Reddy and Qudaratullah, 1996). In general, poultry meat is more acceptable because of its flavour, ease of digestion, low fat content and high ratio of unsaturated fatty acids. Recent studies revealed that apart from supplying essential nutrients, certain bio-active peptides present in meat seen to have distinct physiological health promoting functions. Thus, the present study envisaged to study the actual economization of preparation cost of sausage from poultry by- products after replacement with selected binders at optimum level.

Materials and Methods

Broiler of approx, 8 wks old were procured from the local market, shyambazar, Kolkata. They were slaughter and dressed according to traditional Halal method. All tendons were removed and separable connective tissue and fat were trimmed off. Dressed meat packed in LDPE pouches was quickly brought to the laboratory, chilled overnight at 41°c and then frozen at- 18⁰ C till the experiment. Fresh edible poultry by- products viz. Skin, fat, heart and gizzard were procured from the local meat shop, Kolkata. Gizzard and heart were cleaned for its excess fat. Heart was cut open along its longitudinal section and the clotted blood was removed. Likewise, skin and fat were clean properly, packed in LDPE pouches separately and stored in deep freezer at -18⁰ C for overnight. After adequate thawing, it was cut into small chunk and minced in meat mincer.

Minced meat was chopped in bowl chopper for desired duration. The sausage was prepared as per standard method given in flow chart. Cooked chicken sausage was subjected to sensory evaluation and physico-chemical analysis. Sausage batter was stuffed into 20 mm diameter artificial cellulose casing using mechanical hand stuffer and linked manually. The cooking of sausages in cellulose casing were suspended inside the water bath and cooked for 20 min at 80⁰ C with continuous turning to attain an internal temperature of 70 ±2°C. After removal from water bath, cold showering was done for 10 min, followed by peeling of casing. Chicken sausage after cooling to room temperature was packed in high density polythene pouches and immediately served to sensory panellists. Overall quality of product made with or without incorporation of poultry by-products and binder was judged on the basis of sensory and physico-chemical characteristics. Cooked chicken sausage was prepared by substituting meat with different levels (10, 14 and 18 %) of skin and fat. The best quality product was decided on the basis of sensory and physico-chemical characteristics.

Attempts were made to improve the quality of chicken sausage by incorporating different levels of binders viz sodium caseinate (SC) @0.5, 1.5 and 2.5% and whole egg powder (WEP) @2, 4 and 6% level. Meat of the recipe was proportionately replaced with SC and WEP. The product was evaluated for its quality on the basis of different physico-chemical characteristics viz., pH, product yield, emulsion stability and proximate composition (moisture, fat and protein content). The product was also subjected to sensory evaluation. The best level of SC and WEP was selected on the basis of above parameters.

Results and Discussion

The cost of production of one kg sausage emulsion of control and experimental products is presented in Table 1. The prevailing market rates of different ingredients including boneless meat and edible poultry by-products were considered for calculating the cost. It is observed that the cost per kg emulsion of control sausage (Rs. 153.65) was higher than the emulsion cost of experimental products.

The emulsion cost was observed to be lowest (Rs. 138.00) in sausage made with incorporation of edible by-products. Further, considering the products yield the cost of production for preparing one kg sausage was comparatively higher (Rs. 162.78) in control sausage. However, the costs of all the experimental products were almost similar. Since the sausage individually packed in pouches is sold in market, the cost of preparing individual 30g sausage was calculated. Accordingly, the net profit per 30g sausage was considerably higher in value added experimental product I followed by II and III.

Moreover, it offers better utilization of different types of meat, cuts and edible by-products. It further facilitates incorporation of low value meat and non-meat ingredients for economy and quality. Milk protein binders such as caseinate and whey protein concentrate are being used to improve the quality of processed meat. The use of whole egg powder at present is limited. Lot of scope exists to utilize the egg components and protein binders not only to improve the quality but also to lower the cost of processed meat products. Present study thus aimed to develop acceptable value added chicken sausage using low value meat components and binders.

Table.1 Cost structure of chicken sausage

Particulars	Control sausage	Experimental product I (By-products)	Experimental Product II (SC)	Experimental powder III(WEP)
Boneless meat * (Rs)	122.4	111.60	109.00	104.40
Edible poultry by- products ** (Rs)	-	3.40	3.40	3.40
Vegetable oil (Rs)	8.25	-	-	-
Whole egg powder (Rs)	-	-	-	12.00
Casing (Rs)	5.00	5.00	5.00	5.00
Fuel & labour charges (Rs)	10.00	10.00	10.00	10.00
Other ingredients (Spices, condiments etc) (Rs)	8.00	8.00	8.00	8.00
Cost of 1kg emulsion (Rs)	153.65	138.00	142.15	142.80
Product yield (gm)	943.90	951.00	967.60	969.80
Per kg product cost (Rs)	192.78	145.11	146.75	147.24
Cost of 30g sausage (Rs)	4.88	4.35	4.40	4.42
Net profit (Rs)	2.62	3.15	3.10	3.08

Boneless meat @ Rs. 180/kg

Poultry by- products (skin, fat, heart and gizzard) @ Rs. 20/kg

Market price of 30g sausage: Rs. 7.50/-

The price of sausage can be lowered with optimum replacement of lean meat by suitable non- meat extenders without a significant compromise with quality. In the study it was also observed that sausage with poultry by-products extension was cheapest because of higher level of replacement and yield.

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