The Pharma Innovation Journal 2022; SP-11(11): 1107-1109

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(10): 1107-1109

www.thepharmajournal.com
Received: 21-09-2022
Accepted: 29-10-2022

Nitu Sourya
Department of Livestock Products Technology, Bihar Animal Sciences University, Patna, Bihar, India

Sushma Kumari
Department of Livestock Products Technology, Bihar Animal Sciences University, Patna, Bihar, India

Sanjay Kumar
Department of Livestock Production Management, Bihar Animal Sciences University, Patna, Bihar, India

SP Sahu
Department of Livestock Production Management, Bihar Animal Sciences University, Patna, Bihar, India

Nitish Kumar
Department of Livestock Products Technology, Bihar Animal Sciences University, Patna, Bihar, India

Corresponding Author:
Sushma Kumari
Department of Livestock Products Technology, Bihar Animal Sciences University, Patna, Bihar, India

Studies on economics of meat stuffed dough ball production

Nitu Sourya, Sushma Kumari, Sanjay Kumar, SP Sahu and Nitish Kumar

Abstract
A study was conducted to produce value added stuffed dough ball. It is basically a vegetarian street food and traditionally prepared by adding Bengal gram flour as stuffing material but in this experiment it was totally replaced by non-vegetarian items. The ingredients used were deboned and minced spent hen meat, chevon, spices, condiments etc as stuffing materials and wheat flour and maize flour for making dough. 3 types of meat stuffed dough ball were prepared by stuffing spent hen meat 100% (T1), Chevon 100% (T2) and spent hen meat:chevon::50:50 (T3). After cooking, sensory quality evaluation of the products were done and it was found that the product was good for marketing because the products were very much liked by the consumers. Since the future of marketing of any product depends upon its price value, so keeping this in view, the production cost were evaluated. The estimated production cost taking into consideration of all the expenditure from various ingredients (excluding labour cost and fuel) were found to be ₹ 123 kg^{-1} for T_4, ₹ 247 kg^{-1} for T_5 and ₹ 193 for T_6. Although T_2 was significantly (p<0.05) higher in most of the quality parameters including sensory qualities over T_3 and T_1 but upon cost consideration, T_1 was found to be cheaper than other two formulations. Cost of T_3 was found to be intermediate between the other two formulations however it showed similarities with T_2 in most of the quality parameters.

Keywords: Chevon, cost, hen, litti, meat, spent, stuffed

1. Introduction
Liking of people towards street food is increasing day-by-day. In Latin America people spend nearly 30% of their pocket money on street food (FAO, 2011; Ackah *et al*., 2011; Badrie *et al*., 2013) [6, 1, 3]. Street food have socio-economic and cultural influences as they reflect historical roots and consumers become ready to pay higher for these products (Alimi, 2016; Buscemi *et al*. 2011; Liu *et al*., 2013) [2, 4, 15]. Street foods are mostly traditional or indigeneous types of variety products vary from region to region such as Kashmiri wazwan, Bihari Litti etc. (Rather *et al*, 2015) [19]. Traditional meat products have high sensory quality and good nutritional value but their limitations are due to high saturated fatty acids and cholestrol factor in meat (Laranjo *et al*., 2017; Rather, et.al., 2016) [12, 20]. But limited research has been done till now on its value addition and standardization of methods for its preparation. Therefore, its marketing has been limited to unorganized sector only till now. Stuffed dough ball (Litti) is one of the most popular street- cum- traditional food of Bihar but its popularity is world wide due to its exclusive method of preparation and taste. Generally, it is prepared by stuffing gram flour and dough is prepared from wheat flour. Bengal gram flour stuffing in it provides satiety for vegetarian people but replacement of stuffing material with meat will attract non-vegetarian consumers also. In most of the countries like Korea, India, Thailand, Brazil etc., spent hens are a regular component of table foods, although their meat is tough but they are good source of protein and omega 3-fatty acids and can be marketed as chicken soup, snack, and processed meat products (Chueachuaychoo *et al*., 2011; Mendiratta *et al*., 2012; Sabikun *et al*. 2020) [5, 16, 21]. Each spent hen provides nearly 1.8 kg meat on average (Zubair *et al*., 2019) [7]. Utilization of spent hen meat and chevon for stuffing material in dough ball will open avenue for profitable venture for producers apart from availability of varieties for consumers. By adopting comminution technique, toughness of spent hen meat can't be an obstacle to the production of a variety of comminuted products (Kondaiah and Panda, 1992) [8]. The mincing of meat increases the texture, juiciness and water binding ability in chevon cutlet (Singh, *et al*., 2014) [22]. Additives with high water holding capacity can be added to process spent hen meat (Lee and Kim, 2021) [13]. Substitution of spent hen meat up to 75% did not decrease the sensory acceptance of the sausages by consumers and were economic (Rocha *et al*., 2019) [8].

Chicken patties from spent hen meat were prepared by extended with optimized level of sorghum flour, barley flour and pressed rice flour at 5%, 10% and 5% respectively and were found cheaper with 10% barley (Kumar *et al*., 2014) [11]. Traditional fermented food improve entrepreneurial opportunities (Valentina *et al*., 2021) [24].

Goat meat is almost universally acceptable and free from culture, tradition, social and economic conditions (Verma *et al*., 2014) [25]. Lee, *et al*., 2017 [14] prepared jerky by traditional method from chevon. To make products economic and cheaper extenders such as millet flour, soy nuggets may be added. Finger millet flour can be incorporated for development of fiber enriched goat meat patties and to improve its acceptability (Kumar, *et al*., 2015; Talukdar and Sharma, 2013) [9, 10, 23]. Yadav *et al*. (2013) [26] added soy protein in chevon patties and found cost-effective and beneficial for health. The sensory evaluation of meat product is essential because it is related with meat quality and price of products depends upon taste and quality. (Park and Kim, 2021) [17].

So, a trail was made for production of meat stuffed ball (litti) by replacing the gram flour filling with minced spent hen meat and chevon and to calculate its economics with a objective to improve the quality, texture and overall acceptability of the product.

2. Materials and Methods

The study was conducted during July -December 2020. Stuffed dough ball were prepared by standardizing the method. For making of dough wheat flour and maize flour were used in the 50:50 ratio and for stuffing material minced meat were used. Three types of stuffing material were prepared by taking minced spent hen meat (100%) as T1, minced chevon (100%) as T2 and both spent hen meat and chevon in 50:50 ratio as T3. After stuffing of meat in dough, ball was prepared and were cooked in gas oven and were ready to serve. It was subjected to sensory panel for quality evaluation and they suggested for marketing of these products. Therefore the cost of production piece^{-1} and kg^{-1} formulation of stuffed dough balls were calculated for each formulations i.e. T1, T2 and T3 separately. Production cost was calculated considering only ingredients and raw material cost purchased from local market. Labour cost was not included.

3. Results and Discussion

Results depicted in Table 1 showed the rate of raw materials and ingredients purchased from local market of patna and the quantity used for the preparation of products of all three types separately. The estimated production cost taking into consideration of all the expenditure from various ingredients (excluding labour cost) were found to be ₹ 123 kg^{-1} for T_1, ₹ 247 kg^{-1} for T_2 and ₹ 193 for T_3. Although T_2 was significantly (p<0.05) higher in most of the quality parameters including sensory qualities over T_3 and T_1 but upon cost consideration, T_2 was found to be costlier than other two formulations. T_1 was cheapest and cost of T_3 was found to be intermediate between the other two formulations however it showed similarities with T_2 in most of the quality parameters.

Cost is one of the most important factors that affects the acceptability and future marketability of any product. A reduction of about 25–30% in production cost has been shown possible, when whole meat (deboned meat+edible by-products) components were utilized compared to only deboned meat formulation.

Table 1: Cost of production of stuffed dough ball (litti).

Ingredients	Rate (₹)	T1 (100% Chicken)		T2 (100% Chevon)		T3 (Chicken: Chevon::50:50)	
		Quantity (g)	Cost (₹)	Quantity (g)	Cost (₹)	Quantity (g)	Cost (₹)
Spent hen meat deboned	180 kg^{-1}	200 g	36	_	_	100	18
Deboned chevon	800 kg^{-1}	_	_	200 g	160	100	80
Wheat flour	30 kg^{-1}	265	8	265	8	265	11
Maize flour	42 kg^{-1}	265	11	265	11	265	19
Spices mix	75 kg^{-1}	25	19	25	19	25	19
Condiment Mix	400 kg^{-1}	50	20	50	20	50	20
Salt	40 kg^{-1}	20	1	20	1	20	1
Soya nuggets	15 100 g^{-1}	50	8	15	8	15	8
Oil	160 L^{-1}	125	201	125	20	125	20
Total cost of production			₹ 123 kg^{-1} or ₹ 9 piece^{-1}		247 kg^{-1} or ₹ 18 piece^{-1}		193 kg^{-1} or ₹ 14 piece^{-1}

Cost of production

T1=1 kg stuffed dough ball (Litti)=14 pieces of litti of about 70 g weight

Cost of 1 kg only chicken (spent hen meat) stuffed dough ball= ₹ 123/-

i.e. ₹ 8.80 piece^{-1} of 70g weight

cost in round figure is ₹ 9 piece^{-1}.

T2=Cost of 1 kg only chevon (goat meat) stuffed dough ball= ₹ 247/-

i.e. ₹ 17.60 piece^{-1} of 70 g weight

cost in round figure is ₹ 18- piece^{-1}

T3=Cost of one 1 chicken: chevon (50:50) stuffed dough ball= ₹ 193

i.e. ₹ 13.70 piece^{-1} of 70g weight

cost in round figure is ₹ 14 piece^{-1}.

4. Conclusion

It can be concluded that although T2 was good in most of the parameters evaluated and most preferred one formulation by the sensory panel but it was costly followed by T3, which was nearly equally good in qualities evaluated and T1 was cheapest and economic, affordable and well within the pocket of people below the middleclass of the society in the developing country like India to fulfill the demand of quality meat protein.

5. Acknowledgement

Author(s) acknowledge the supports from institutes involved

6. Source of Funding

The research was conducted with the kind and supports from Institute.

7. Conflict of Interest

The authors have declared no conflict of interests exist.

8. Reference

1. Ackah M, Gyamfi ET, Anim AK, Osei J, Hansen JK, Agyemang O, *et al*. Socio-Economic profile, knowledge of hygiene and food safety practices among street-food vendors in some parts of Accra-Ghana. Internet Journal of Food Safety. 2011;13(1):191-197.
2. Alimi BA. Risk factors in street food practices in developing countries: a review, Food Science and Human Wellness. 2016;5(3):141-148. [Links]
3. Badrie N, Joseph A, Chen A, *et al*. An observational study of food safety practices by street vendors and microbiological quality of street-purchased hamburger beef patties in Trinidad, West Indies. Internet Journal of Food Safety. 2013;3(1):25-31.
4. Buscemi S, Barile A, Maniaci V, Batsis JA, Mattina A, Verga S, *et al*. Characterization of street food consumption in Palermo, possible effects on health. Nutrition Journal. 2011;10(1):119.
5. Chueachuaychoo A, Wattanachant S, Beenjakul S, *et al*. Quality characteristics of raw and cooked spent hens pectoris major muscles during chilled storage: Effect of salt and phosphate. International Food Research Journal. 2011;18(1):593-605. [Google Scholar]
6. Food and Agriculture Organization (FAO). The place of urban and peri-urban agriculture (UPA) in national food security programmes. Rome (Italy). Technical Cooperation Dept; c2011. ISBN 978-92-5-106845-8. Available at http,//www.fao.org/docrep/014/i2177e/i2177e00.pdf (accessed Dec 30, 2015).
7. Zubair M, Wu J, Ullah A, *et al*. Hybrid bio nanocomposites from spent hen proteins. ACS Omega. 2019;4(2):3772-3781.
8. Kondaiah N, Panda B. Processing and utilization of spent hens. Poultry Science. 1992;48:255-265. [Google Scholar]
9. Kumar A, Mendiratta SK, Sen AR, Kandeepan G, Talukder S, Sharma H, *et al*. Preparation and storage stability of meat spread developed from spent hens. Vet World. 2015;8(5):651-655. Published online 2015 May 23
10. Kumar D, Chatli MK, Mehta N, Verma AK, Kumar P, *et al*. Quality evaluation of chevon patties fortifies with dietary fibre. The Indian Journal of Small Ruminants. 2015;21(1):85-91.
11. Kumar RR, Sharma BD, Talukder S, *et al*. Preparation cost of patties from spent hen meat. Journal of Animal Research. 2014;4(1):97-101.
12. Laranjo M, Talon R, Laukova A, Fraqueza MJ, Elias M. Traditional Meat Products: Improvement of Quality and Safety. Journal of Food Quality; c2017. Article ID 2873793 | https://doi.org/10.1155/2017/2873793
13. Lee SH, Kim HY. Comparison of Quality and Sensory Characteristics of Spent Hen and Broiler in South Korea. Animals (Basel). 2021;11(9):2565.
14. Lee JH, Alford L, Kannan G, Kouakou B, *et al*. Curing properties of sodium nitrite in restructured goat meat (chevon) jerky. International Journal of Food Properties. 2017;20(3):526-537.
15. Liu R, Pieniak Z, Verbeke W, *et al*. Consumers' attitudes and behaviour towards safe food in China, A review. Food Control. 2013;33(1):93-104.
16. Mendiratta SK, Sharma BD, Majhi M, Kumar RR, *et al*. Effect of post – Mortem handling conditions on the quality of the spent hen meat curry. Journal of Food Science of Technology Technol. 2012;49(2):246-25.
17. Park SY, Kim HY. Fried pork loin batter quality with the addition of various dietary fibers. Journal of Animal Science and Technology. 2021;2021;63(1):137-148. [CrossRef]
18. Rocha YJP, Lorenzo JM, Barros JC, Trindade MA, *et al*. Effect of chicken meat replacement by spent laying hen meat on physicochemical properties and sensorial characteristics of fresh sausage. British Poultry Science. 2019;60(2):139-145.
19. Rather SA, Masoodi FA, Akhter R, Gani A, Wani SM, Malik AH, *et al*. Xanthan gum as a fat replacer in goshtaba-a traditional meat product of India: effects on quality and oxidative stability, Journal of Food Science and Technology. 2015;52(1):8104-8112.
20. Rather SA, Masoodi FA, Akhter R, Gani A, Wani SM, Malik AH, *et al*. Effects of guar gum as fat replacer on some quality parameters of mutton goshtaba, a traditional Indian meat product, Small Ruminant Research. 2016;137(1):169-176.
21. Sabikun N, Bakhsh A, Rahman MS, Hwang YH, Joo ST, *et al*. Evaluation of chicken nugget properties using spent hen meat added with milk fat and potato mash at different levels. Journal of Food Science and Technology 2020;58(1):2783-2791. DOI: 10.1007/s13197-020-04787-7. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
22. Singh PK, Kumar S, Kumar P, Bhat ZF, *et al*. Effect of mincing on the quality characteristics of chevon cutlets. Journal of Animal Research. 2014;4(2):193-200.
23. Talukdar S, Sharma BD. Scope of millet grains as an extender in meat products, Critical Reviews in Food Science and Nutrition. 2013;55(6):672-674.
24. Valentina CM, Anita RL, Smid EJ, Sijmen ES, *et al*. Contribution of traditional fermented foods to food systems transformation: value addition and inclusive entrepreneurship. Food Security. 2021;13(1):1163-1177.
25. Verma AK, Singh VP, Pathak V, *et al*. Effect of jackfruit supplement and ageing on the physico-chemical, texture and sensory characteristics of Chevon patties. Journal of Applied Animal Research. 2014;43(3):247-255. DOI doi.org/10.1080/09712119.2014.963094.
26. Yadav SK, Tanwar VK, Sharma JK, Yadav S, *et al*. Effect of added soy protein on physicochemical properties of chevon patties. J Meat. Sci. Technology. 2013;1(1):35-39.