

EFFECT OF DIFFERENT COOKING METHODS ON QUALITY OF BROILER CHICKEN MEAT CHAT

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ABSTRACT

The present study is envisaged for the comparative quality assessment of broiler chicken meat chat prepared by three cooking techniques (roasting, microwave cooking and frying). The chat was prepared with broiler chicken meat, condiments, spice mix, salt, lemon juice and coriander leaves. Cooking yield was estimated along with sensory evaluation and proximate analysis. On the basis of study we found that broiler meat chat prepared by roasting scored highest for sensory attributes. Nutritionally, broiler chicken meat chat prepared with microwave cooking was found best among all three cooking techniques. The analysis of data revealed that colour and appearance, flavour, texture, mouth coating of roasted and fried broiler chicken chat were non-significantly different among each other but these values were significantly higher than that of microwave cooked products. The sensory scores of saltiness and overall acceptability revealed significant difference among different cooking techniques. The data on proximate analysis (except fat value) and cooking parameters also showed non-significant differences among each other. Fat values of roasted and microwave cooked products were found similar and were significantly different from fried products.

Key words: Broiler, chicken, chat, roasting, frying, microwave cooking

The poultry industry of India has emerged as the second largest market in the world (IAI Expo, 2011). Poultry products are universally popular because they are not subjected to cultural or religious constraints; the meat itself is perceived as wholesome, healthy and nutritious, relatively low in fat and with a more desirable unsaturated fatty-acid content than other meats (Mead, 2004). Most importantly, high-quality poultry products are available to many people at affordable prices, although production costs may vary around the world (Van Horne, 2002).

For cooking of meat products, roasting and frying are the most popular techniques. These techniques are used for tender cuts of meat and are based on the technology of dry heat use (Pearson and Gillet, 1997). In roasting, meat or meat products are heated near the fire and the temperature depends on the need of the product (150-160°C with core temperature of 80°C). In frying, vegetable oil is used and product is cooked with almost same temperature with same core temperature. However, cooking by microwave technique involves exposure of the product to

microwaves of 2450 MHz and 915 MHz; the cooking is more uniform because microwaves cook the products from each and every side without enhancing the temperature (Pearson and Gillet, 1997).

Due to urbanization, change in socio economic status, lifestyle of the consumers and awareness among masses to take balanced diet, there has been an increase in consumption of proteins from animal sources. In addition, there has been an increasing trend of consumption of ready to use animal products including chats. However, chats are mainly based on vegetable sources which lack proteins and essential nutrients and provide high amount of carbohydrates. To provide valuable nutrients and the taste to the consumers, a study on broiler chicken meat chat preparation and their quality characteristics was undertaken.

MATERIALS AND METHODS

Raw Materials: Broiler chicken carcass was obtained from the local meat market, Mathura. Dressing and cuts making was done in the department. Salt (Tata), refined oil (Fortune), meat masala (Everest), onion, ginger and garlic were obtained from the local market. After

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peeling and washing, a fine paste of onion, ginger and garlic (2:1:1) was prepared in a grinder (Inalsa). Fresh lemon and coriander leaves were also obtained from the local market. The formulations for the preparation of chat by different cooking methods are given in Table 1.

Preparations of Broiler Meat Chat: Broiler chicken carcass was washed with potable water and dried with the help of a paper towel. The meat was then partitioned into the cuts of 2.5 to 3 cm and required table salt was rubbed over the cuts. After that, three cooking techniques were tried to prepare the broiler chicken meat (bone-in) chat. In roasting (on grills), salted meat cuts were first roasted with the rubbing of 5 ml of refined oil over the cuts at 150°C for 6 minutes and then blended with condiments and again roasted for 2 minutes. Meat masala (10 g) was then added and again roasted for next 2 minutes. Finally the meat cuts were cooked at the inner temperature of 80°C. Similar procedure as mentioned in roasting was also adopted for frying the meat cuts. In microwave (LG Pvt. Ltd.) of 915 MHz frequency, meat cuts were first cooked for about 6 minutes and then blended with condiments and again cooked for 2 minutes. Then the condiment blended cuts were again mixed with meat masala (10 g) and cooked for two more minutes. Lemon juice and coriander leaves were sprinkled over the prepared chat.

Sensory Evaluation: All the products developed by these techniques were presented to the sensory panellists (six in number). The products were evaluated by the panellists on the basis of several attributes i.e. colour and appearance, flavour, texture, saltiness, mouth coating, overall acceptability in the 8-point hedonic scale. In this scale, 8 was the most liked score

and 1 was the most disliked score.

Proximate Analysis: Broiler chicken meat chat was evaluated for moisture, fat, protein and ash contents as per the standard procedures adopted by AOAC (1999).

Cooking Parameters: The chat was also evaluated for the cooking yield and cooking losses on the basis of the differences observed in initial weight of all ingredients used in the preparations and the final weight of broiler meat chat in all three cooking techniques.

Statistical Analysis: The data was evaluated with one way ANOVA at 0.5% level (Snedecor and Cochran, 1999). There were three observations for each parameter.

RESULTS AND DISCUSSION

The products were prepared thrice and subjected each time for sensory evaluation as well as proximate analysis and cooking parameters. The data showed that chat prepared by roasting had the highest scores for all the sensory attributes except saltiness (Table 2). The saltiness scores were the highest in the chat prepared by frying which may be due to cooking effect. Khouryieh *et al.* (2006) also reported similar effects of cooking on egg products. Overall sensory scores on colour and appearance, flavour, texture and mouth coating of chat prepared by roasting were very similar to that of frying but these scores were significantly ($P < 0.05$) different in chat scores obtained on microwave cooking (Table 2). Among all three cooking, broiler chicken meat chat prepared by roasting had the highest scores followed by frying and microwave cooking. These sensory attributes are also due to cooking effects on meat proteins as reported by El-Magoli *et al.* (1996) in meat patties. However, scores for saltiness and overall acceptability were significantly

Table 1
Product formulations for broiler meat chat

Ingredients	Roasting	Microwave	Frying
Broiler chicken meat (g)	500	500	500
Salt (g)	10	10	10
Condiment (g)	25	25	25
Refined oil (g)	50	50	50
Meat masala (g)	10	10	10
Lemon juice (tsf)	5	5	5
Coriander leaves (g)	25	25	25
Total weight (g)	625	625	625
Cooking time	150°C x 10 min	915 MHZ x 10 min	150°C x 10 min

Table 2
Sensory attributes of broiler meat chat prepared by different cooking techniques

Attributes	Roasting	Microwave	Frying
Colour and appearance	6.57 ^a ±0.17	5.00 ^b ±0.09	6.14 ^a ±0.29
Flavour	6.43 ^a ±0.16	4.86 ^b ±0.19	6.00 ^a ±0.15
Texture	6.14 ^a ±0.12	4.57 ^b ±0.06	5.86 ^a ±0.18
Mouth coating	5.71 ^a ±0.13	5.00 ^b ±0.08	5.57 ^a ±0.21
Saltiness	4.67 ^a ±0.19	5.33 ^b ±0.23	6.33 ^c ±0.13
Overall acceptability	6.71 ^a ±0.08	4.71 ^b ±0.27	5.57 ^c ±0.21

Mean values with different superscripts within a row for a parameter differ significantly ($P \leq 0.05$)

($P < 0.05$) different among cooking techniques (Table 2). Among all, the highest score for saltiness was with frying followed by microwave and roasting. However, overall acceptability score was the highest for roasted broiler chicken meat chat followed by fried and microwave cooked chat (Table 2). These findings might be due to less fat or oil absorption by the product and differences in absorption of salt in various cooking methods. Similar results were also obtained by the Vetrimani and Rahim (1994) during the hot air oven drying of the vermicelli.

The values on proximate quality (Table 3) of broiler meat chat prepared by three different cooking methods were very well in the acceptance limits. The data obtained on cooking parameters such as cooking yield and cooking losses showed non-significant differences among broiler chicken meat chat prepared by roasting, microwave and frying methods except in fat contents. However, the highest yield was observed in microwave cooking followed by frying and roasting. Murphy and Marks (2000) reported similar observations on chicken breast patties. Our findings were in contrast to the findings of Xazela *et al.* (2011) on chevon cooking. The fat contents were the highest in frying followed by microwave cooking and roasting (Table 3) with significant ($P < 0.05$) difference between roasted and fried chat and non-significant differences between roasting and microwave cooked chat. The difference in fat contents was similar to the results obtained by Domiszewski *et al.* (2011) on striped catfish. The protein and moisture contents were the highest in microwave cooking followed by frying and roasting. Ash contents were the highest in roasting followed by microwave cooking and frying. The contents of protein, moisture and ash were almost similar to the findings reported by Nisar *et al.* (2010) for buffalo meat patties.

Thus, it is concluded that the broiler chicken meat chat can be successfully prepared by roasting, microwave cooking and frying. Based on sensory evaluation, the broiler chicken meat chat prepared by roasting was found the best. However, the chat prepared by microwave cooking was the best nutritionally. The future study requires the critical

Table 3
Proximate values and cooking parameters for different broiler meat chat

Parameters	Roasting	Microwave	Frying
Moisture	60.11 ^a ±0.08	66.07 ^a ±0.92	65.94 ^a ±0.89
Fat	15.17 ^a ±0.47	16.50 ^a ±0.29	17.00 ^b ±0.56
Protein	17.17 ^a ±0.37	17.92 ^a ±0.38	17.33 ^a ±0.58
Ash	1.92 ^a ±0.02	1.85 ^a ±0.06	1.83 ^a ±0.06
Cooking yield	69.67 ^a ±2.54	69.92 ^a ±2.68	69.91 ^a ±2.27
Cooking loss	30.33 ^a ±2.54	30.08 ^a ±2.68	30.09 ^a ±2.27

Mean values with different superscripts within a row for a parameter differ significantly ($P \leq 0.05$)

evaluation of protein and fatty acid profiles along with textural parameters on chart.

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