The Haryana Veterinarian (June, 2023) **62(1),** 16-18 ISSN 0033-4359 (P) **Research Article**

OPTIMIZATION OF COOKING TIME OF CHICKEN MEAT LOAF PREPARED WITH STEAM COOKING WITHOUT PRESSURE

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ABSTRACT

The present study was carried out to study the effect of steam cooking without pressure for 15 minutes (SC1), 20 minutes (SC2) and 25 minutes (SC3) on physico-chemical properties, texture profile analysis as well as sensorial properties of chicken meat loaf. SC3 had significantly ($P<0.05$) higher pH, cooking yield, moisture, fat retention and moisture retention compared to other treatments. However, there was no significant difference in protein, fat, carbohydrate and ash content among the treatments. Springiness and gumminess values increased significantly ($P<0.05$) with increasing time of steam cooking; however, there was no significant difference in hardness, cohesiveness, chewiness and resilience values among the treatments. The scores of sensory parameters except for saltiness increased significantly ($P<0.05$) with increased cooking time. Therefore, it was concluded that well acceptable chicken meat loaf was prepared by steam cooking without pressure for 25 minutes.

Keywords: Chicken meat loaf, Steam cooking without pressure, Quality characteristics

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Chicken meat loaf is one of the most popular processed meats and is consumed in many countries. Meat is a very good source of animal protein that consists of essential amino acid, minerals, vitamins and essential fatty acids. As per BAHS (2021), total meat production in India was 8.80 million tons in 2020-21.

Poultry products are universally accepted, because they are not subject to cultural or religious constraints (Naveena *et al.*, 2014). When foods are prepared to be eaten, there are significant changes in the flavor as well as in the nutritional composition of the food. Time plays an important role in the characteristics of cooked muscle-based food products (Sobral *et al.*, 2018). Meat undergoes many changes during cooking, both physical and chemical, including weight loss, modifications of water-holding capacity, texture, muscle fibre shrinkage, colour and aroma development (Walsh *et al.*, 2010) that are strongly dependent on protein denaturation and water loss. Cooked meat flavor is influenced by water-soluble components that contribute to taste; it is the volatile compounds formed during cooking that produce the aroma that contribute the characteristic flavors of meat. Generally, dry and moist cooking methods have been used for processed meat products. Therefore; the present study was conducted to evaluate the effect of steam cooking without pressure on physico-chemical properties, textural parameters and sensory properties of chicken meat loaf. The use of steam cooking on chicken meat and its effect on the properties of the cooked product are interesting and worthy of investigation.

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MATERIALS AND METHODS

The experiments were conducted in Department of Livestock Products Technology, College of Veterinary Sciences and Animal Husbandry, DUVASU, Mathura, 281001 (UP), India.

Source of Raw Material: Live birds were procured from Department of Poultry Science, DUVASU Mathura and slaughtered in Meat Processing Laboratory of Department of LPT as per standard procedure following Halal method. Other ingredients such as refined wheat flour, condiments, food grade refined oil, salt, spice mix were purchased from local market of Mathura. The formulation of standardized spice mix is given in Table 1.

Preparation of chicken meat loaf: Chicken meat loaf was prepared as per method followed by Devatkal *et al.* (2004) with slight modifications.

Analytical procedure: Developed chicken meat loaf was evaluated for various physico-chemical properties; pH (Trout *et al.*, 1992), cooking yield (Murphy *et al.*, 1975), proximate analysis (AOAC, 1995), fat retention (Murphy *et al.*, 1975), water activity (by Aqua Lab water activity meter), moisture retention by El-Magoli *et al.* (1996), texture profile analysis (Bourne, 1978) and sensory evaluation were done by using 8 point hedonic scale with 8 point as extremely desirable and 1 as extremely poor (Keeton, 1983).

Statistical analysis: The data obtained in the study on various parameters were statistically analyzed on 'SPSS-16.0'

software package as per standard methods of Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Physico-chemical properties: The effect of steam cooking without pressure on physico-chemical properties of chicken meat loaf is presented in table. 2. The pH, cooking yield and fat retention were significantly (P<0.05) higher in SC3 than SC1, however values of SC2 were comparable to both SC1 and SC2. Singh (2018) also observed significant (P<0.05) increase in pH values of chicken pickle with increase in cooking time. Mora *et al.* (2011) also reported significant (P<0.05) increase in cooking yield of turkey breast meat cooked under steam than air convection cooking method. Moisture content and moisture retention values increased significantly (P<0.05) with increasing time of steam cooking which might be due to moisture incorporation in steam cooking. There was no significant difference in protein, fat, carbohydrate and ash among the treatments. Khanam (2017) did not observe significant difference in proximate parameters in steam cooked chicken spread at different cooking times.

Textural parameters: There was no significant difference in hardness, cohesiveness, chewiness and resilience values among the treatments in steam cooked chicken meat loaf (Table 3). Springiness and gumminess values were increased

Table 1. Composition of spice mix

S. No.	Spices	Percentage (%)
1.	Black cardamom (Badi elaichi)	05
2.	Cinnamon (Dalchini)	05
3.	Caraway seed (Ajwain)	07
4.	Clove (Loang)	05
5.	Red chilli	08
6.	Coriander (Dhania)	18
7.	Cumin (zeera)	16
8.	Black pepper (Kalimirch)	10
9.	Fennel seed (Soanf)	07
10.	Dried ginger powder (Soanth)	08
11.	Mace (Javitri)	03
12.	Nutmeg (Jaifal)	02
13.	Green cardamom (Choti elaichi)	02
14.	Star anise	02
15.	White pepper	02
	Total	100

Table 2. Effect of steam cooking without pressure on physico-chemical properties of chicken meat loaf

Parameters	SC1	SC2	SC3	Treatment Mean
pH	6.11^{b}±0.02	6.14^{ab}±0.04	6.18^{a}±0.04	6.14±0.02
Cooking yield (%)	95.08^{b}±0.04	95.23^{ab}±0.05	95.56^{a}±0.03	95.29±0.05
Moisture (%)	66.52^{c}±0.10	66.85^{b}±0.06	67.61^{a}±0.05	66.99±0.08
Protein (%)	16.82±0.05	16.84±0.04	16.94±0.03	16.87±0.02
Fat (%)	9.37±0.04	9.42±0.04	9.53±0.05	9.44±0.03
Carbohydrate (%)	6.19±0.03	5.82±0.04	4.74±0.05	5.58±0.05
Ash (%)	1.10±0.03	1.07±0.04	1.18±0.03	1.12±0.02
Fat retention (%)	86.05^{b}±0.09	86.17^{ab}±0.29	86.23^{a}±0.32	86.15±0.22
Moisture retention (%)	63.25^{c}±0.07	63.66^{b}±0.06	64.61^{a}±0.06	63.84±0.07

- SC1, SC2 and SC3- chicken meat loaf prepared by steam cooking without pressure for 15 minutes, 20 minutesand 25 minutes, respectively
- Overall means bearing different superscripts in a row (a, b, c, d.....) differ significantly (P<0.05)
- n= 6 for each treatments

Table 3. Effect of steam cooking without pressure on textural parameters of chicken meat loaf

Parameters	SC1	SC2	SC3	Treatment Mean
Hardness (N/cm2)	11.30±0.04	11.35±0.05	11.42±0.06	11.36±0.03
Springiness (mm)	24.02b±0.04	24.14ab±0.05	24.23a±0.06	24.13±0.03
Cohesiveness (Ratio)	0.61±0.06	0.64±0.07	0.69±0.05	0.64±0.03
Gumminess(N/cm2)	5.42b±0.05	5.49ab±0.04	5.53a±0.05	5.48±0.03
Chewiness (N/cm)	132.49±0.04	132.54±0.05	132.63±0.06	132.55±0.03
Resilience (Ratio)	0.45±0.04	0.52±0.04	0.59±0.06	0.52±0.03

- SC1, SC2 and SC3- chicken meat loaf prepared by steam cooking without pressure for 15 minutes, 20 minutesand 25 minutes, respectively
- Overall means bearing different superscripts in a row (a, b, c, d.....) differ significantly (P<0.05)
- n= 6 for each treatments

Table 4. Effect of steam cooking without pressure on sensory scores of chicken meat loaf

Attributes	SC1	SC2	SC3	Treatment mean
Colour and appearance	6.49^{c}±0.03	7.02^{b}±0.09	7.32^{a}±0.81	6.94±0.60
Flavour	6.75^{c}±0.01	7.01^{b}±0.08	7.50^{a}±0.06	7.09±0.05
Texture	6.50^{c}±0.03	7.04^{b}±0.07	7.40^{a}±0.07	6.98±0.05
Juiciness	6.77^{c}±0.01	7.24^{b}±0.06	7.35^{a}±0.07	7.12±0.04
Saltiness	7.15±0.04	7.23±0.08	7.34±0.06	7.24±0.05
Mouth coating	6.55^{c}±0.01	7.04^{b}±0.07	7.45^{a}±0.07	7.01±0.05
Meat flavour intensity	6.64^{c}±0.01	7.13^{b}±0.08	7.50^{a}±0.07	7.09±0.05
Overall acceptability	6.66^{c}±0.01	7.05^{b}±0.07	7.45^{a}±0.06	7.05±0.05

- SC1, SC2 and SC3- chicken meat loaf prepared by steam cooking without pressure for 15 minutes, 20 minutes and 25 minutes respectively.
- Overall means bearing different superscripts in a row (a, b, c, d.....) differ significantly (P<0.05); - n= 21 for each treatment

significantly (P<0.05) with increasing time of steam cooking. However, values of SC2 were comparable to both SC1 and SC3. Higher gumminess and springiness values in SC3 might be due to interaction of meat protein with non-meat ingredients which provides desired texture to the product.

Sensory evaluation: Colour and appearance, flavour, texture, juiciness, mouth coating, meat flavour intensity and overall acceptability scores increased significantly (P<0.05) with increasing time under steam without pressure (Table 4). Higher scores with increase steam cooking time might be because of proper cooking provides good flavor and appropriate texture to the product. Oh *et al.* (2014) reported significantly (p<0.05) higher sensory scores of superheated steam cooked chicken breast fillets at 330º C for 8 minutes than 6 and 10 minutes respectively. There was no significant difference in saltiness scores among the treatments. Khanam *et al.* (2020) did not find any significant difference in saltiness scores of chicken meat spread prepared by steam cooking (without pressure) and braising. Higher overall acceptability scores of SC3 might be due to appropriate cooking, desirable flavour and texture than other treatments. Therefore, SC3 was selected as the best treatment.

CONCLUSION

From the obtained results it can be concluded that well acceptable chicken meat loaf was prepared by steam cooking without pressure for 25 minutes without any adverse effect on physico-chemical and sensory properties.

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