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Effect of Mincing on the Quality Characteristics of Chevon Cutlets

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ABSTRACT

The present study was undertaken to evaluate the effect of mincing and added water on the quality characteristics of chevon cutlets. The lean meat was minced once, twice and thrice, respectively through 4 mm plate to evaluate the effect of mincing on physic-chemical and sensory parameters. A significant effect of mincing was observed with the highest scores for juiciness and texture for the products developed from twice minced lean meat. Thus, good quality chevon cutlets could be prepared by mincing the lean meat twice and with incorporation of 5% shredded potato and 3% added water from tough and less palatable chevon.

Keywords: Cutlets, Chevon, Mincing, Shredded potato, Quality characteristics.

Meat cutlets are ready to eat convenient meat products that are very famous throughout the world and widely used in the breakfast. Cutlets are flat croquette of minced meat, flour, pulse, nuts, shredded potato, condiments, spices and often coated with rusk crumbs. The nutritive value and sensory quality of the cutlets can be further enhanced by utilization of goat meat. Being low in fat and total calories, the chevon cutlets will prove a better option for the non-vegetarian consumers. Development of fast food sector is mainly contributed to the rapid urbanization and change in the food habits. The ready to eat / ready to prepare (RTE/ RTP) food provided a suitable option for consumers in today's busy life style.

The goat meat is very popular and widely favoured by the consumers in most part of the globe. Chevon is red meat that is often viewed as potential competitor to beef and sheep meat. It is almost universally acceptable and free from culture, tradition, social and economic conditions (Verma *et al.,* 2014). Unlike with pork or beef, there is no religious taboo against chevon. Total goat meat production is 3.6

Million Tonnes out of which India contributes 16.38% (0.59 MT) (FAO, 2010). In India, it fetches highest price in comparison to other meat. Some peculiar qualities such as lower in calories, total fat, saturated fat and cholesterol makes it suitable for health conscious people. It is suitable for individuals suffering from heart ailments due to the higher potassium and lower sodium content and is rich in high quality proteins with essential amino acids in comparison to other red meats (Chakraborty *et al*., 2003; Singh *et al*., 2012). The major constraints in using this meat are the presence of higher amount of connective tissue and goaty odour (Lawrie, 1985)**.** The high amount of connective tissue in chevon makes it tough and less juicy and during post-mortem aging intramuscular connective tissue remain unchanged (Kannan *et al.,* 2005) which could be overcome by suitable processing techniques (Hedrick *et al.,* 1994; Lawrie, 1985).

The mincing of meat has profound effect on the quality attributes of the meat products. It increases the texture, juiciness and water binding ability of the meat and helps in the extraction of myofibrillar proteins (Pearson and Gillet, 1997 Khandagale *et al.,* 2009). Rusk is a baked and ground material made from wheat flour with sizes ranging from coarse, granules, pinhead and superfine. Rusk shows very high water absorbing capacity (3-4 times of its weight) and it increases with the increase in the surface. It prevents excessive abrasive force on fat tissues before they become soaked and improves the texture of the products (Eissen, 2007).

Thus the present study was envisaged to evaluate the effect of mincing on the quality characteristics of chevon cutlets.

MATERIALS AND METHODS

Source of raw materials

The round part of adult *Bhakarwal* goat meat was purchased from the local market of Jammu and were kept in low density polyethylene (LDPE) bags after removing the connective tissue, fascia and separable fat. Spice mix was prepared from 16 different spice ingredients as per the formulation developed in the laboratory (Table 1). The spice ingredients were kept in hot air oven at 55-60^{0}C for overnight for drying. Condiments were prepared by making paste of peeled onion, ginger and garlic in the ratio of 3:1:1.

Preparation of chevon meat cutlets

The frozen goat meat was minced (once, twice and thrice) to know the effect of mincing. Curing ingredients, table salt, sugar and sodium nitrite were added to it (Table 2) and this was kept for 15-20 min at refrigeration temperature (4±1 °C). The mixture was fried in 2.5% w/w refined oil for 8 minutes in shallow fat fried.

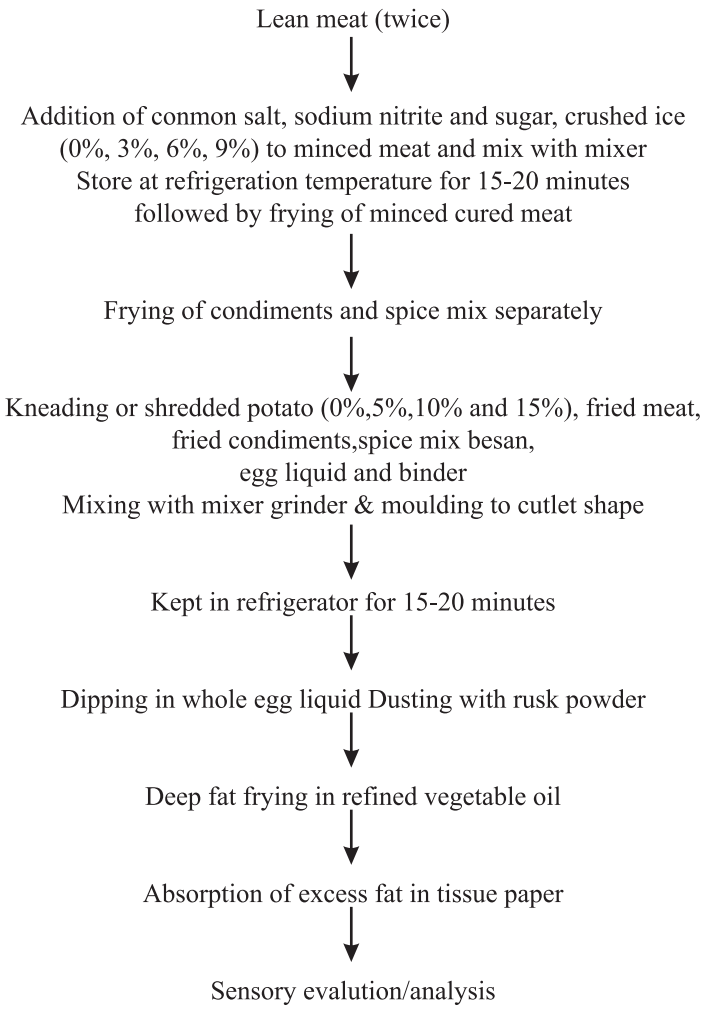

Figure 1. Flow diagram of preparation of chevon cutlets

The condiments and spice mixture were fried separately till the appearance of golden brown colour. The fried meat, fried condiments, gram flour and whole egg liquid were mixed in mixer. The batter so formed after blending was used in the preparation of cutlets by using moulds. The moulds were kept at refrigerator temperature for retaining the shape for 15-20 minutes. The cutlets were dipped in whole egg liquid and rolled in rusk powder till uniform coating was formed on the surface and were deep fat fried in refined oil till golden brown colour. The internal core temperature was measured with the help of a thermometer (80°C) and the excess fat was removed from the fried cutlets by using tissue paper.

Physico-chemical analysis

The products were evaluated for pH, rusk pick up percentage, product yield, percent shrinkage and proximate composition. The pH of both raw and fried chevon meat cutlets was determined (Keller *et al.*, 1992). The cooking yield was recorded by noting the weight of cutlets before and after frying.

$$\text{Cooking Yield (\%)} = \frac{\text{Weight of fried enrobed cutlets}}{\text{Weight of raw enrobed cutlets}} \times 100$$

The rusk pick up percent was determined as per formula given by Hsia *et al*. (1992) by noting the weights of cutlets before and after rusk pick up.

$$\text{Rusk powder pick up (\%)} = \frac{\text{Weight of cutlet after dusting - weight of cutlet before dusting}}{\text{Weight of cutlet before dusting}} \times 100$$

Proximate composition

Proximate composition such as moisture (oven drying), ether extract (Soxhlet apparatus), ash (muffle furnace) of both raw and fried goat meat cutlet was determined using AOAC (1995) methods.

Table 1. Composition of spice mixture

Ingridients	Percent (%)
Aniseed (soanf)	10
Caraway seed (Ajwain)	5
Elaichi	5
White pepper	05
Bay leaves (Tejpatta)	02
Black pepper (Kali mirch)	10
Cardamom (Badi Elaichi)	05
Cinnamon (Dalchini)	05
Cloves (laung)	02
Degi mirch	05
Coriander (dhania)	15
Cumin seed (zeera)	15
Mace (javitri)	02
Nutmeg (Jaiphal)	02
Red Chilli (Lal mirch)	07
Turmeric (Haldi)	5

Sensory analysis

A trained sensory evaluation panel (Keeton, 1983) consisting of seven members from the scientists and post-graduate students of the Division of Livestock Product Technology, Faculty of Veterinary Science and Animal Husbandry, SKUAST of Jammu evaluated the cutlets. The products were evaluated for appearance and colour, flavour, juiciness, texture and overall acceptability, using an 8-point descriptive scale, where 8 is extremely desirable and 1 is extremely undesirable. The panellists were seated in a room free of noise and odours and suitably illuminated. Coded samples for sensory evaluation were prepared and served warm to the panellists. Water was provided for oral rinsing between the samples.

Table 2: Basic formulation for the preparation of chevon cutlets.

Ingredients	Amount (%)
Meat	82
Condiments*	10
Spices	2
Salt	1.75
Sugar	0.25
Gram flour	2
Sodium nitrite	150ppm
Whole egg liquid	2

*Onion3: garlic 1:ginger1

Statistical analysis

The data obtained from various trials under each experiment were subjected to statistical analysis (Snedecor and Cochran, 1989) for analysis of variance and Duncan's multiple range test (DMRT) to compare the means. Means and standard error were calculated following the standard statistical procedures. Each experiment was replicated thrice and the samples were analysed in duplicate except for the sensory score. In significant effects, least significant differences were calculated at appropriate level of significance (0.05) for a pair-wise comparison of treatment means.

RESULTS AND DISCUSSION

Physico-chemical parameters

The mean values of various physico-chemical parameters under single, twice and thrice mincing of raw and cooked chevon cutlets are presented in Table 3. The

moisture content of raw chevon cutlets showed an increasing trend though the difference was non-significant ($p>0.05$) whereas in the cooked chevon cutlets, the moisture in treatment II (product made with twice minced lean meat) and Treatment III (product made with thrice minced lean meat) are comparable. pH of both raw and cooked chevon cutlets of treatments were comparable. The cooking yield of treatment III was significantly higher ($p<0.05$) than the other treatments. This could be due to increases water binding capacity due to increased level of mincing which is in agreement with the findings of Beuschel *et al*. (1992).

Table 3. Effect of mincing on the physic-chemical parameters on the raw and cooked chevon cutlets (Mean±SE)

Parameters	Treatment I	Treatment II	Treatment III
Raw chevon cutlets			
PH	5.87 ± 0.01	5.88 ±0.002	5.89 ±0.002
Moisture	58.79 ± 0.32	58.82 ± 0.18	58.88 ± 0.19
Cooked chevon cutlets			
pH	5.87 ± 0.15	5.90 ± 0.16	5.91± 0.19
Moisture	54.19±0.33^{b}	55.0± 0.19^{a}	55.48±0.10^{a}
Cooking yield	97.0± 0.38^{b}	97.23±0.28^{b}	98.08±0.24^{a}

n= 6 for each treatment. Mean with different superscript differ significantly ($p<0.05$) in a row.

Treatments I= single mincing, II= twice mincing and III= thrice mincing

Table 4: Effect of mincing on the sensory scores of cooked chevon cutlets (Mean±SE)

Attributes	Treatment I	Treatment II	Treatment III
Appearance and Colour	6.45±0.16	6.47±0.05	6.43±0.09
Flavour	6.47±0.078	6.48±0.050	6.52±0.045
Juiciness	6.50±0.14^{b}	6.97±0.15^{a}	6.51±0.09^{b}
Texture	6.62±0.056^{b}	6.85±0.097^{a}	6.65±0.122^{b}
Overall Acceptability	6.44±0.11^{b}	6.95±0.06^{a}	6.58±0.07^{b}

Mean±SE with different superscripts in a row differ significantly ($P<0.05$) Mean are scores given by sensory panellists on 8 point hedonic scale where 1 = Extremely undesirable and 8 = extremely desirable

Treatments I= single mincing, II= twice mincing and III= thrice mincing

n = 21 for all sensory attributes

Sensory attributes

The appearance and colour of the product did not vary significantly with the levels of mincing of lean meat (Table 4). The texture and juiciness scores of treatment II (product made after twice mincing) were significantly ($p<0.5$) higher than the treatment I and III. The probable reason might be the reduction of the particle size than the desired one. The overall acceptability of the Treatment II was significantly ($p<0.5$) higher than the other two treatments. Based on the sensory scores, the treatment II (product made with twice minced lean meat) was considered as optimum and the further products were developed by twice mincing of lean meat.

CONCLUSION

It was concluded that during the preparation of chevon cutlets, twice mincing of the lean meat was considered optimum for preparation of good quality chevon cutlets.

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