Indian J. Anim. Prod. Mgmt. Vol. 29 (1-2) 20-24 (2013)

PROXIMATE COMPOSITION AND SENSORY QUALITIES OF FAT REDUCED CHEVON SALAMIS ENRICHED WITH DIETARY FIBER

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(Received : 01.07.2013, Accepted : 03.10.2013)

ABSTRACT

The proximate composition and sensory qualities of low fat chevon salamis prepared by incorporating 10% goat fat (GF) and three different levels of dietary fibers viz. wheat bran (WB) and oat bran (OB) added @2%, 3% fiber & 4% (T_1, T_2 & T_3) respectively were evaluated in this study. WB and OB were added in such quantities that maintains equal proportion of dietary fiber in the product from either source. The control product contained 20 per cent GF with no added dietary fiber sources. The study revealed significant decrease in percent moisture, crude protein, ether extract and total ash contents along with the increased incorporation levels of dietary fibers in the treated formulations. Sensory evaluation chevon salamis showed significant decrease ($P<0.01$) in juiciness and tenderness scores in fiber enriched formulated products. Amongst the different formulations, T_1 registered highest overall acceptability next to the control, suggesting its better suitability for preparation of low fat chevon salamis although other product formulations were also found to be acceptable.

Keywords : Proximate composition, chevon salamis, sensory qualities, low fat.

In the recent years, there has been an upsurge in the production and consumption of processed meat products particularly amongst the urban elites. This might be due to the changes in traditional food habits, increasing per capita income and rise in the living standard of the people.[5] Along with this development there is also an increased awareness amongst the consumers about the ill affect of energy dense fatty diet. Consequent to this there is a growing demand for health promoting foods containing high-fiber and low-fat. However it is well known fact that excess reduction of fat adversely affects the products yield, besides, flavour, Juiciness and texture quality of the product. Various technological interventions have been devised to overcome these shortcomings, consequent to which several low fat meat product have been successfully produced with desired palatability.[6] Amongst many other sources of dietary fibers, wheat bran (WB) and oat bran (OB) have been identified as rich sources of insoluble and soluble dietary fibers, and oat has been found to be quite effective in reducing dietary cholesterol.[11] Besides enriching the fiber content in the finished products, they also improve texture and cooking yield , leading to better profit margin. Chevon is one of the most preferred meats presently sold in Indian market. Salamis thus prepared with chevon incorporating WB and OB will certainly widen the marketing scope besides providing a health promoting processed meat product to the ever increasing non-vegetarian population.

MATERIALS AND METHODS

Meat samples (chevon) from leg and shoulder cuts of adult goat carcasses were collected from the nearby butcher shops in and around six mile areas of Guwahati city. The separable fat were trimmed off, lean portions were cut into small pieces, packed tightly in

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polyethylene bags, coded and kept overnight at 4°C and subsequently in a freezer at -18°C till required for further processing. Along with lean, separable goat fat (GF) was also collected, packaged and stored overnight at 4°C followed by storage at -18°C. WB and OB (Baggry's India Ltd.) were procured from the local super-markets.

Both lean and fat were separately minced at a low (2 mm) in a meat mincer. The control formulation contained 68 per cent lean meat with 20% added goat fat (GF) besides other ingredients (1.5 % salt, 1.5 % spices, 4 % condiments and 5 % ice flakes, 100 ppm sodium nitrite) . The treated formulations contained variable levels of lean meat and 10 percent GF along with other ingredients as in the control. A mixture of WB and OB was added in such quantities which maintain equal proportion of dietary fibers from either sources in the finished products. Incorporation of mixtures of WB and OB were made at three different levels i.e. @ 2%, 3% and 4%. All other ingredients including minced lean and fat were thoroughly mixed, homogenized and stuffed into artificial salami casings. Chevon salamis thus prepared were cooked in water heated at 75°C for 45 minutes or till the internal temperature attains 70°C. After chilled water cooling, salamis were sliced and stored in polyethylene bags at 4°C for their quality evaluation. A total of 5 batches of salamis were prepared and evaluated for each treated formulation.

Proximate composition were estimated according to the procedure of A.O.A.C.(1995)[1]. The sensory attributes viz. colour, flavour, juiciness, tenderness and overall acceptability were evaluated between 10-11 a m by employing a 7 member semi-trained panel of judges comprising of either sex and by using 9- point Hedonic scale. Data obtained were analysed as per the standard statistical methods.[8]

RESULTS AND DISCUSSION

Moisture -The moisture content of chevon salamis decreased significantly ($P < 0.01$) along with increased levels of incorporation of WB and OB. Such decrease in moisture content might be due to an increase in dry matter content of the treated formulations as was reported in beef patties added with flex seed flour.[2] The findings of the present study corroborated well with the results of other workers, who also recorded significant decrease in moisture content of chicken patties prepared by addition of different levels of wheat and OB[9] and also in meat balls incorporated with WB[14] and cereal bran.[12]

Table 1 : Proximate composition of fat reduced chevon salamis enriched with different levels of dietary fiber of WB and OB.

Proximate composition (%)	Control 20% GF + 0% Fiber of WB & OB	T1 10% GF + 2% Fiber WB & OB	T2 10% GF + 3% Fiber WB & OB	T3 10% GF + 4% Fiber WB & OB
Moisture**	$64.55^{a} \pm 0.21$	$63.99^{b} \pm 0.19$	$63.23^{c} \pm 0.09$	$62.92^{cd} \pm 0.20$
Protein*	$14.87^{a} \pm 0.28$	$14.41^{ab} \pm 0.24$	$13.72^{bc} \pm 0.30$	$13.60^{bcd} \pm 0.32$
Ether Extract**	$16.26^{a} \pm 0.12$	$13.91^{b} \pm 0.10$	$12.75^{c} \pm 0.14$	$11.84^{d} \pm 0.35$
Ash**	$1.45^{a} \pm 0.08$	$1.69^{b} \pm 0.3$	$1.87^{c} \pm 0.02$	$1.98^{cd} \pm 0.04$

G F = Goat fat, Fiber of WB &OB = Mixture of equal levels dietary fiber from wheat and oat brans.

Means bearing different superscript between treatments differed significantly.

* indicates significant difference ($P < 0.05$) and ** indicates significant difference ($P < 0.01$).

Protein - The crude protein content also decreased significantly ($P < 0.05$) in different formulations on incorporation of increasing levels of fiber in the chevon salamis. Similar results were also obtained by other workers on addition of WB and OB in chicken patties[9], rice bran in pork meat balls[4] and oat bran in chevon patties.[3] The results obtained are also in agreement with the findings of several earlier workers *i.e*. addition of increasing levels of wheat bran in meat balls[14]; incorporation of roasted pea flour in chicken nuggets[7] and increased levels of chickpea hull flour in low fat chicken nuggets.[10]

Ether Extract -The per cent content of ether extract (EE) in chevon salamis incorporated with WB and OB were significantly ($P < 0.01$) lower as compared to the control. Such marked differences in the EE contents of treated products might largely be ascribed to initial decrease levels of incorporation of fat in the treated formulations. Moreover, significant decrease in per cent EE contents recorded in T_1, T_2 and T_3formulations along with the increased levels of incorporation dietary fibers. The findings of present study corroborated well with the reports stating that increased levels of incorporation of WB in chicken patties[9], oat bran in chevon patties[3]; rice bran in emulsified pork meat ball[4], pea flour in chicken nuggets[7]and oat and other cereal brans in meatballs[14&12] results in decreased fat content in the finished products.

Total ash - The total ash (TA) content however increased significantly ($P < 0.01$) along with the increased incorporation levels of WB & OB in the treated formulations. Such increased TA content in the treated products might be a corollary to the high ash content in the added fiber sources i. e. WB and OB. The findings of the present study are well in agreement with the reports of others workers who too observed that addition of WB and other cereal brans in meatballs[14&12] and addition of flaxseed flour in beef patties[2] significantly increased TA content in the finished products.

Sensory Qualities:-

The visual colour scores of chevon salamis showed significant decrease ($P < 0.01$) in different treatment formulations and were found to directly related to the levels of added dietary fibers in the products. Such reduction in colour scores might be related to the increased incorporation levels of WB & OB having yellowish brown and whitish colour respectively which were added in the treated formulations. Reports of several other workers also indicated that incorporation of WB & OB significantly decreased the redness of low fat meat balls and other meat products.[14&15]

Table 2: Sensory qualities of fat reduced chevon salamis enriched with different levels of dietary fiber of WB and OB.

Sensory attributes	Control 20% GF + 0% Fiber of WB & OB	T1 10% GF + 2% Fiber WB & OB	T2 10% GF + 3% Fiber WB & OB	T3 10% GF + 4% Fiber WB & OB
Colour	$7.25^{a} \pm 0.34$	$7.22^{ab} \pm 0.34$	$7.15^{c} \pm 0.31$	$7.11^{cd} \pm 0.30$
Flavour	$7.33^{a} \pm 0.32$	$6.9^{b} \pm 0.36$	$6.77^{c} \pm 0.35$	$6.65^{d} \pm 0.35$
Juiciness	$7.2^{a} \pm 0.32$	$6.96^{ab} \pm 0.26$	$6.48^{c} \pm 0.12$	$6.27^{cd} \pm 0.10$
Tenderness	$7.62^{a} \pm 0.13$	$7.21^{b} \pm 0.08$	$7.07^{bc} \pm 0.08$	$6.88^{d} \pm 0.05$
Overall acceptability	$7.35^{a} \pm 0.28$	$7.07^{b} \pm 0.26$	$6.87^{c} \pm 0.21$	$6.72^{d} \pm 0.20$

G F = Goat fat, fiber of WB and OB = Mixture of wheat and oat bran with equal levels of dietary fiber from both the sources. Means bearing different superscript between treatments differ significantly ($P < 0.01$).

Flavour scores also decreased significantly (P<0.01) along with the increased levels of WB and OB as compared to the control. Recording of poor flavour score in treated products might be due to addition of WB and OB that had altered the natural meaty flavour. Similar results were also reported by several other workers i.e. chicken nuggets with the addition of chickpea hull flour[10], in meat balls with the addition of wheat bran[14].

The significantly decreased (P < 0.01) juiciness scores recorded in the treated products might be related to the decreased levels of fat and moisture content due to simultaneous increase in the dietary fiber levels. Moreover, the coarseness perceived by the panelists in evaluating WB & OB treated products could possibly might be the other cause for recording of low juiciness scores. The findings of the present study corroborated well with the reports of the other workers, who incorporated oat bran in preparation of meat balls.[15]

The decreased tenderness score recorded in the study might be a reflection of reduction of fat and increased incorporation of WB and OB in the treated products. The coarse texture imparted due to incorporation of WB & OB might have affected the batter matrix (formation) resulting in recording of low tenderness scores. Such reduction in tenderness scores was also reported in chicken nuggets prepared with added chickpea hull flour[10] and in chicken patties incorporated with WB and OB[9].

The overall acceptability score was markedly higher (P < 0.01) in the control product as compared to the treated formulations. This might be a corollary to the low scores recorded for colour, flavour, juiciness and tenderness qualities due to incorporation of WB & OB. The results for overall acceptability registered in the study are well in agreement with the ones recorded for meat balls prepared with the incorporation of cereal bran[12] and in chicken patties with the addition of WB and OB[9].

CONCLUSION

The results obtained in the study leads to the conclusion that low fat chevon salamis can be prepared suitably with good consumer's acceptability and with an edge over the other two formulations i.e. T_2 and T_3 by incorporating 2 percent dietary fiber levels of WB and OB i.e. in T_1 in the finished product. Moreover, the study also revealed the suitability and acceptability of the later two formulations i.e. T_2 and T_3 in the preparation of low fat chevon salamis.

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