

Physico-Chemical, Sensory and Microbial Quality of Chicken Meat Chips

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Abstract

Chicken meat chips with different extenders (Bengal gram flour, Black gram flour and cooked mashed potato each at 15% level) and control were prepared and stored up to 8 weeks both at ambient ($37\pm 2^{\circ}\text{C}$) and refrigerated ($7\pm 1^{\circ}\text{C}$) temperature. The samples were analyzed for physical, chemical, microbiological and sensory quality characteristics.

Key Words: Chicken meat chips, Extenders, Sensory quality, Physico-chemical properties, Microbial quality.

Chips, a well known snack food are one of the most unique and universal nutrient fast food items. Its beneficial properties are enhanced when prepared with meat having high biological quality. Comminution of spent hen meat into a variety product like chicken meat chips opens an avenue for better utilization of tough, unpalatable, less juicy spent hen meat, besides providing an easily digestible ready-to-eat meat product. Hence in this present investigation chicken meat chips were prepared and evaluated for their physico-chemical, Microbiological and sensory quality characteristics.

Materials and Methods

Forty spent layers were slaughtered conventionally in four trails often each. In each trail five birds were partially cooked in pressure cooker at 6.81 kg/cm² of pressure for 5 minutes for easy deboning while the rest were kept as raw. Chips were prepared by addition of different extenders namely Bengal gram flour, Black gram flour and mashed potato each separately at 15% level. The recipe consists of chicken meat 80%, above mention extender of any one type 15%, Corn flour 3%, Maida 2%, Common salt 2%, Baking powder 0.5%, Spice mix 1.5%, Ginger and Garlic 2%, Sorbic acid 0.4% and BHA 0.04% except for the control where in 90% chicken meat 5% Corn flour and 5% Maida were used without addition of any binder while the rest of the other additives were added. Chips were prepared by rolling the minced meat added with the above ingredients into a 3mm layer on flat surface covered with Aluminum foil. This layer was cut into small squares of 2x2 cm dimensions. The cut squares were dried in the hot air oven to an internal temperature of 100°C for 2 hours. Then these chips were packed by

allotting 60 chips in each bag. These packs were sealed and stored both at ambient ($37 + 2^{\circ}\text{C}$) and refrigerated ($7 + 1^{\circ}\text{C}$) conditions for 8 weeks period. pH of the samples (Laakkonen et al 1970), TBA values (Witte et al 1970), Microbial counts as per the technique recommended by Chestnut et al (1977), the percent moisture, crude protein and ether extract of chicken meat chips were estimated as per AOAC (1994). The CMC were deep fat fried and presented to 7 member trained taste panel for subjective evaluation while still warm. The scoring for the organoleptic characters viz; color, flavour, crispiness, tastiness and overall acceptability was done on a 9 point hedonic scale. The data obtained on various parameters were subjected to statistical analysis (Snedecor and Cochran, 1980).

Results and Discussion

The chicken meat chips added with 15% cooked and mashed potato, 15% Bengal gram flour and 15% Black gram flour had recorded significantly ($P < 0.01$) lower pH values than control formulation and the pH tend to increase during the storage period both at ambient ($37\pm 2^{\circ}\text{C}$) and refrigerated ($7\pm 1^{\circ}\text{C}$) temperature irrespective of type of formulation. (Table 4). This increase might be attributed to a concomitant increase of bacteria during storage. These results were in accordance with the findings of Foda et al (1984) in commercial polyethylene wrapped laboratory sausages. The overall mean TBA values of chicken meat chip formulations added with 15% Bengal gram flour were significantly ($P < 0.01$) higher than those of the rest of three formulations. These results were similar to the findings of Janardhana Rao (1997) in chicken meat loaves. There is a significant increase in TBA values

Table-1. Effect of Ambient Storage (37 + 2°C) on the Organoleptic quality of chick meat chips

Character	Weeks								
	0	1	2	3	4	5	6	7	8
Colour	7.64±0.032	7.44b±0.034	7.14c±0.031	6.83d±0.023	6.62e±0.032	6.43f±0.030	6.30g±0.037	6.01h±0.030	5.76±0.019
Flavour	7.79s±0.06	7.60b±0.007	7.43C±0.016	7.24d±0.015	7.03e±0.009	6.81f±0.006	6.54e±0.007	6.33h±0.008	5.67±0.015
Crispiness	7.80a±0.01	7.57b±0.014	7.40C±0.013	7.18d±0.015	6.99e±0.033	6.69f±0.022	6.24B±0.016	6.83h±0.017	5.59±0.018
Tastiness	7.74a±0.02	7.48b±0.020	7.22C±0.022	6.94d±0.020	6.68e±0.020	6.27f±0.020	6.06s±0.023	5.76h±0.020	5.43±0.020
Overall Acceptability	7.56a + 0.03	7.38b±0.021	7.19C±0.014	7.02d±0.017	6.67e±0.014	6.26f±0.014	5.91±0.019	5.70h±0.01	5.33±0.013

Mean values bearing same superscript for each criterion does not differ significantly (PO.05)

during the ambient (37±2°C) and refrigerated (7±1°C) storage of chicken meat chips it might be due to oxidative changes during storage. These results were in congruent with the findings noticed by Singh and Verma (2000) in chicken patties. The chicken meat chip formulations containing 15% Bengalgram flour and 15% Black gram flour recorded significantly (P<0.01) lower percent moisture, ether extract and higher percent crude protein than control formulation. This might be due to addition of dry powdered binders which contribute additional protein. There is significant (P<0.05) increase in percent moisture and decrease in percent crude protein and ether extractives and noticed with progressing storage both at ambient (37±2°C) as well as refrigerated (7±1°C) temperatures. The results obtained were in comparison with the findings of Ahlawat *et al* (1997) in chicken papads. Irrespective of type of formulation and type of meat total plate count and yeast and mould count had increased as the storage period increased upto 8 weeks at both ambient (37±2°C) as well as at refrigerated (7±1°C) temperature. This might be due to concomitant increase in moisture content resulted in increase of bacterial load during storage.

With progressing storage, a gradual decline was noticed in organoleptic scores of colour, flavour, crispiness, tastiness and overall acceptability of chicken meat chips. However the sensory scores were within the acceptable limits upto 8 weeks at both

ambient (37±2°C) as well as refrigerated (7±1°C) storage. These findings suggest that the chicken meat chips prepared with formulations extended with 15% Balckgram flour and 15% Bengalgram flour of partially cooked meat were more acceptable upto 8 weeks at both ambient (37±2°C) and refrigerated (7±1°C) storage.

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Table-2. Effect of Refrigerated Storage (7 + 1°C) on PH, TEA, % Moisture, Crude Protein, Ether Extract and Microbial count of Chick meat Chips

Character	Weeks			
	2	4	6	8
PH	7.64±0.032	7.44b±0.034	7.14c±0.031	6.83d±0.023
TEA	7.79s±0.06	7.60b±0.007	7.43C±0.016	7.24d±0.015
% Moisture	7.80a±0.01	7.57b±0.014	7.40C±0.013	7.18d±0.015
% Crude Protein	7.74a±0.02	7.48b±0.020	7.22C±0.022	6.94d±0.020
% Ether Extract	7.56a + 0.03	7.38b±0.021	7.19C±0.014	7.02d±0.017
Total Plate Count	7.56a + 0.03	7.38b±0.021	7.19C±0.014	7.02d±0.017
Yeast and Mould Count	7.56a + 0.03	7.38b±0.021	7.19C±0.014	7.02d±0.017

Table-3. Effect of Refrigerated storage (7 + 1 °C) on the organoleptic quality of chick meat chips

Character	Weeks			
	2	4	6	8
Colour	7.12 ^s ± 0.028	6.57 ^b + 0.029	6.22 ^c + 0.039	5.69 ^d ± 0.018
Flavour	7.39 ^p ± 0.012	6.99 ^b ± 0.007	6.48 ^o + 0.007	5.64 ^d ± 0.015
Crispiness	7.35 ^a ± 0.012	6.86 ^b ± 0.017	6.16 ^c ± 0.012	5.53 ^d + 0.033
Tastiness	7.14 ^a ± 0.019	6.61 ^b ± 0.022	5.91 ^c ± 0.021	5.30 ^d ± 0.019
Overall Acceptability	7.08 ^a ± 0.053	6.63 ^b ± 0.015	5.90 ^c ± 0.19	5.32 ^d ± 0.11

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