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Manufacturing of Chicken Powder and its Evaluation at Cottage Scale

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Abstract: The main objective of the present study was to achieve the background knowledge for the preparation and packaging of chicken powder upto international standards. A part from chemical analysis the project was intended to estimate the shelf life of the prepared chicken powder. There was non significant change in nutritive value specially for protein, fat, calorific value and cholesterol contents. Only rancidity, moisture and ash contents were affected significantly with the passage of time.

Key words: Chicken powder, Chemical analysis, Organoleptic evaluation

Introduction

Presently, the poultry industry has evolved itself as the most profitable enterprises at the world level. The most vital factors in the adaptation of poultry may include the low economic value per unit, the rapid growth rate and good quality white meat all make the poultry meat, an important source of animal nutrient for the human food. It has been estimated that present chicken protein appears in the diet of more people throughout the world as a source of meat (George, 1975). According to Agricultural Statistics 1997 of Pakistan average poultry meat production during the year 1995-96 was 243 tones/million (Anonymous, 1997). Poultry meat is economical, quick and easy to prepare and serve as source of a number of desirable nutritional and sensory properties. Poultry meat contains several important classes of nutrients in the form of both saturated and unsaturated fatty acids. The fat contains essential fatty acids and the proteins which provide a good source of essential amino acids. Meat fibers are tender, easy to chew, easy to digest and flavour is mild.

The beneficial effect of low temperature storage from 40-70°F on retention of sensory as well as nutritional quality of dried and dehydrated foods has been neglected. Pre-treatment such as reduction of moisture contents upto 3 percent, packing in air-tight containers and addition of oxygen scavengers have been proposed for improving the retention of vitamin A, B, C and protein of chicken meat (Kramer, 1974).

Poultry meat contain 71 percent moisture, 15 percent calories per 100 g, 25-30 percent proteins, 1.3 percent fat in breast muscles and vitamins and some minerals (Larmond, 1977).

Chicken powder serves as a convenient food ingredient in several food preparations. Various products in which chicken powder is being used include soups, baby foods, dry mixes, as a flavour ingredient, canned chicken dehydrated powder and other meat dishes like "Kabab", "Korma" and "Vedas", etc. (George, 1975). Chicken powder is very rare in Pakistan due to heavy initial investment involved in the form of machinery. If chicken powder manufactured by the proposed method proved upto the international standards then the resultant low-cost technology may become fruitful for third world countries.

Materials and Methods

Broilers were selected from local market for chicken powder manufacturing. After proper slaughtering and dressing, the meat was washed and put in a pan. A little quantity of water was added to make it tender and to inactivate enzymes present in the meat. After deboning and mixing, the liquor was separated just after boiling. Mixed meat was put into the silver steel pan with thick base. It was placed on fire with continuous stirring and scraping with a flat bottom spoon until 5.8 percent moisture was achieved (checked by placing in oven at 70°C for 24 hours). The meat was converted into powder after cooling and packed in aluminum lined packets and stored at ambient temperature for physico-chemical evaluation. The samples were analyzed for total mineral matter (Ash), Crude fat, Moisture and Crude protein as methods given by (AOAC, 1990). Moisture was analysed by placing in oven at 70°C for 24 hours. Crude protein was determined by Kjeldohl method. Crude, fat was estimated by ether extraction through the use of condensation apparatus. Ash was determined by use of muffle furnace at 660°C. Rancidity of sample was estimated by calculating free fatty acids by titration method. Calorific value was also determined by using par Oxygen Bomb (Larick and Turner, 1992). Amino acids in chicken powder were estimated according to method given by Blackburn (1968). Cholesterol was determined by Lieberman-Banchard reaction (Stadelrnan, 1979) in the presence of acetic anhydride and sulphuric acid. Chicken powder was tested for above stated studies after every 20 days interval for upto 140 days. Product was tested organo-leptically by putting in soup recipe by a panel of judges for taste, colour, flavour and consistency after every month interval. Knor Yakhni mix (by CPC Rafhan (Pvt. Ltd., Faisalabad) was used as control and was purchased every time fresh from the market.

Results and Discussion

The moisture contents ranged from 3.30 to 3.52 percent and the storage intervals showed variation from 2.378 to 2.45 percent moisture in different samples of chicken powder (Table 1). These findings confirm to the finding of Matheson (1961), Malchalam (1961) and Chimprabha (1963). Throughout the storage intervals there was non-significant variation in the protein contents of chicken powder samples. Analysis of variance also showed that protein contents were significantly higher in the sample as compared to the control. The protein contents ranged from 83 to 79 percent in the samples. Results differed from results of Bonifer and Froning (1996) because they used only broiler powdered skin for chemical analysis rather than whole chicken meat.

The at contents were found significantly high ($p<0.05$) percentage in the chicken powder made in the Lab. as compared to the commercially available control sample Table 1. Further the storage intervals did not significantly affected fat contents of chicken powder which ranged from 10.40 to 10.62 percent. These findings are in line with the results of Bonifer and Froning (1996) and Mitsumoto *et al*. (1991) but differed from findings of Malchalam (1961) because he extracted fats from his product during processing. The results fully confirm to the findings of Rhee *et al*. (1993).

Table 1: Comparative results of chemical analysis for the chicken powder and the control during storage at ambient temperature

		Storage Intervals (Days)							
		0	20	40	60	80	100	120	140
Moisture contents	Test	3.35	3.37	3.37	3.38	3.40	3.43	3.44	3.51
(% age)	Control	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
Protein contents	Test	81.00	80.00	81.00	81.00	82.00	81.00	82.00	80.00
(% age)	Control	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Contents	Test	10.50	10.50	10.41	10.50	10.60	10.50	10.40	10.50
(% age)	Control	3.50	3.50	3.50	3.50	3.50	3.50	3.40	3.50
Ash contents	Test	6.50	6.00	6.50	7.50	7.00	6.50	7.50	7.00
i% age)	Control	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Rancidity	Test	5.40	5.42	5.00	5.53	5.60	5.60	5.70	5.75
(% age)	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cholesterol	Test	7.00	7.20	6.80	7.00	6.90	7.10	7.00	7.00
(% age)	Control	3.68	3.68	3.68	3.68	3.68	3.68	3.68	3.68
Calorific value	Test	5576.00	5576.00	5574.00	5577.00	5575.50	5576.00	5576.50	5576.50
(% age)	Control	3296.00	3296.00	3296.00	3296.00	3296.00	3296.00	3296.00	3296.00

Table 2: Organoleptic evaluation of chicken cash soup for sample (days of intervals)

Parameters	0	30	60	90	Mean
Colour	7.80	7.50	7.83	7.40	7.38
Flavour	7.00	7.66	7.66	7.20	7.38
Taste	7.20	7.66	7.00	7.60	7.53
Consistency	7.50	7.83	7.16	7.20	7.29

ANOVA (p = 0.05 percent)

Table 3: Organoleptic evaluation of chicken cash soup for control (days of intervals)

Parameters	0	30	60	90	Mean
Colour	7.60	7.83	7.83	7.40	7.66
Flavour	7.80	8.16	8.16	7.40	7.86
Taste	7.60	8.16	7.83	7.50	7.62
Consistency	7.33	7.83	7.16	7.40	7.44

ANOVA (p = 0.05 %)

The ash contents were significantly higher ($p < 0.05$) in the product sample as compared for the control which ranged from 6.687 to 3 percent (Table 1). The storage intervals showed significant variation in ash content of chicken powder samples. The results differed from findings of Bonifer and Froning (1996) because they used only powdered broiler skin for estimation. The analysis of variance regarding rancidity (Free fatty acids) differed significantly between chicken powder samples and control. Results also showed that intervals non-significantly affected rancidity of product ranged from 5.32 to 5.77 percent. These findings are in line as founded by Ahn *et al.* (1992) and Swoboda (1973) but differ from the findings of Zipser and Watts (1961) because he used anti-oxidants in his product.

The cholesterol contents did not differ significantly between the chicken powder samples and also during storage intervals. Cholesterol contents within intervals ranged from 6.8-7.4 percent (Table 1).

The calorific values of the samples were significantly higher than that of the control sample. While non-significant varoation were found during the storage of sample (Table 1). The results differ from findings of Mitsumoto *et al.* (1991), who found that calorific value of ground and cooked beef muscles were different due to fresh and non-dehydrated beef.

Sensory evaluation: The chiken corn soup prepared from chicken powder was evaluated after 0, 30, 60 and 90 days of storage, organo-leptically for colour, flavour taste and viscosity by panel of judges. The analysis of variance showed that colour, flavour, taste and consistency non-significantly affected all the aspects. These findings of results confirm to findings reported by Larick and Turner (1992) and Peterson *et al.* (1959). From analytical and statistical findings, it may be concluded that in most cases, the storage had little or no affect on the parameters, whereas, in case of samples and control chicken powder there were significant variations on chemical analysis. In case of sensory evaluation, samples of chicken powder (Table 2) and control (Table 3) showed non-significant difference with each other, the storage intervals also did not significantly affected the colour, flavour, taste and consistency of the soup prepared from chicken powder and Yakhnimix for upto 140 days.

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