Development of Ready to Eat Marinated Chicken Parts

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Introduction

The demand for chicken meat and their products in Sri Lanka is growing rapidly, since chicken consumption has no religious barriers. Poultry meat is highly suitable as a raw material for product development due to its light colour and delicate flavour which can be transformed into a wide range of value added foods. Chicken consumption in Sri Lanka is expected to increase to 8 kg per person from the current 5 kg next five years (Cheng Chih Kwong, 2010). Meat items include both ready to eat and ready to cook products. The busy lifestyle of modern day housewives do not allow them adequate time for preparation of food at home. Therefore, this study was conducted with an aim of developing a high quality, safe to eat, marinated chicken parts, which can be stored at frozen conditions and conveniently cooked by the housewives within a short time.

A marinade usually tenderizes the meat which is stringy and tough and improves the flavour. Acidic ingredients soften the food, allowing it to absorb the flavours of the sauce and also increase shelf life. These qualities were used in preparing a ready to eat marinade chicken.

Materials and methods

Marinated Chicken Parts were produced at Ceylon Agro Industries Ltd. in Seeduwa through experiments with sensory evaluation and some laboratory analysis which were conducted at the Uva Wellassa University.

Complete Randomized Block Design was used for the experiment. Chicken parts (thighs, wings and drumsticks weighing 2 kg), vinegar, yoghurt, lime, garlic powder (2 g), chilli powder (10 g), salt (8 g), Ins 621- flavour enhancer (10 g), black pepper (2 g), sugar (15 g), mustard cream(1 g), soy sauce (8 g), tomato sauce (2 g), Ins 250-preservative (1 g) and water were used to prepare the new product. Preliminary trials and 06 experiments were conducted to select the best levels of ingredients in the recipe of the final product. In the preliminary trials, amounts of vinegar, yoghurt, lime, combination of vinegar and yoghurt, combination of yoghurt and lime and combination of vinegar and lime were used as the variables respectively keeping the other ingredients constant. Then six samples from each recipe were selected and sensory evaluations were conducted to find out the best recipe for marinade. Three experiments were conducted for this purpose and sensory evaluations were carried out using trained panelists of Ceylon Agro Industries Ltd.

Then experiments were conducted to select best cooking method using three treatments; cooked at 85 °C for 20 min, cooked at 85 °C for 20 min and baked at 65 °C for 10 min, baked at 65 °C for 35 min and best marinating period was tested using 12 hr, 24 hr and 36 hr periods, respectively through a trained panel. Final sample was compared with a competitive product available in the market through an untrained panel to test the market demand. Thereafter, the samples were tested for moisture, ash, crude protein, crude fat, crude fiber. Microbiological analysis, shelf life determination (pH, WHC) and

cost determination of the final product were also carried out. All samples were subjected to sensory evaluation and data were analyzed using Friedman analysis in Minitab ver.14. Results of the experiments were analyzed using two-way ANOVA.

Results and discussion

According to the results of first 3 experiments, vinegar incorporated with yoghurt was selected as the best ingredients for marinating chicken parts. According to the results, marinated solution containing 18 g of vinegar 8 g of yoghurt and other constant ingredients are best for marinating 2 kg of chicken parts obtaining highest scores for texture, taste, aroma, saltiness, pungency, tenderness and overall taste. In the fourth experiment the baked and cooked (baked at 65 °C for 30 min and cooked at 85 °C for 10 min) method was selected as the best cooking method. The cooking method has scored higher for colour, texture, taste and overall acceptability. The fifth experiment showed that 36 hours marinating period was the best which has given better tenderness, pungency and colour.

Proximate analysis of the final product contained moisture 64.4%, ash 3.2%, protein 23.5%, fat 3.6% and fiber 5.2%. Crude protein and crude fiber contents of marinated chicken parts were higher than that of the fresh chicken meat since the ingredients in the marinade have added specific nutrient values to the marinated product.

Table 1: Storage period with pH and WHC

Storage period	pH		WHC	
	Control	Final Sample	Control	Final Sample
1st day		5.9		0.64
1st week	6	5.9	0.82	0.64
2nd week	5.95	5.9	0.85	0.64
3rd week	5.9	5.9	0.85	0.64
4th week	5.9	5.9	0.855	0.64
5th week	5.8	5.85	0.855	0.64

pH and WHC values in the marinade were better than in the control samples (Table 1). Value of pH was maintained at the same value until 4th week and thereafter it has decreased slightly. WHC value was also maintained at a constant level until 4th week and thereafter showed slightly increased values. Under anaerobic condition, protein degrades to variety of sulphur containing and non-protein nitrogen's components which emit gasses and result in decrease in pH and WHC.

Table 2: Cost determination for chicken parts

Marinated chicken parts	Cost per 500 g	
	Final product	Control sample
Drumstick	Rs.291.00	Rs. 323.00
Thigh	Rs.168.00	Rs. 248.00
Wings	Rs.285.00	Rs. 323.00

Cost determination for chicken parts is given in Table 2. And it reveals that the cost for the new product is less than for what is available in the market.

Very slight development of total plate count values could be observed with storage time since product has used effective cooking methods.

Conclusions

Use of vinegar incorporated with yoghurt marinated solution is recommended for making good quality marinated chicken with high acceptability. Keeping quality was better in marinated chicken parts than that of raw product under vacuum packaging conditions. The products are safe for human consumption for more than 6 months under frozen storage -18 °C.

References

Cheng Chih Kwong, Primus (cited 2011 march 31st), *Sri Lankans to eat more chicken* Available from <www.lankajournal.com>.

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