Development of a *Kurakkan* (*Eluesine coracana*) Incorporated Low Fat Chicken Sausage

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Introduction

The consumers' demand for low-fat or calorie products has significantly increased recently in an attempt to limit health problems, to lose or stabilize their weight, and to work within the frame of a healthier diet. The present study has been conducted to improve the nutritional and healthy value of traditional sausage production by incorporating *Kurakkan* or finger millet into low fat chicken sausage. Finger Millet contains amino acids, Lecithin and Methionine which help in bringing down cholesterol level by eliminating excess fat from Liver (Sivasankar, 2003). Its slow digestion indicates low blood sugar levels after a finger millet diet thereby reacting as a safer food for diabetics (Kumari and Sumathi, 2002). Hence in this study attempts are made to develop a finger millet based sausage for the benefit of health concerned consumers.

Methodology

The experiment was carried out at Norfolk Foods (pvt) Ltd., Homagama. The preliminary trials were conducted at first to find out the best combination of fat and water by changing the fat content in four treatments of 13%, 11%, 9% and 7%. In order to find out the best recipe which gives better sensory qualities to the sausage, another three treatments (9%, 8% and 7%) were carried out by changing only the fat and water combination. Thirdly, the best combination of bread crumbs and *Kurakkan* was selected corresponding to the best low fat control which was chosen in the second preliminary trial. Sensory evaluation, microbiological analysis and proximate composition analysis were carried out according to the AOAC (1995) for the control, treatment 1 and 2 which was having 2% and 4% *Kurakkan* levels respectively to evaluate the consumer satisfaction on the product. Keeping quality of samples were checked by means of pH and Water holding capacity (WHC) at weekly interval s during cold storage (-18^{0}C). Furthermore, total colony count (TCC) was analyzed according to AOAC (1995) methods for microbiological safety.

Sensory evaluations were carried out using 30 untrained panelists for appearance, color, taste, odor, tenderness, juiciness and overall acceptability. Sensory data were analyzed using MINITAB software version 14 Friedman non-parametric statistical methods at the 5% level of significance. Other objective data were analyzed by one-way ANOVA model, at 5% significant level using MINITAB software version 14.

Results and Discussion

The treatment 3 and 4 have equally scored at the sensory evaluation I, and no significant difference observed between the treatments ($p>0.05$) in all the sensory parameters. Therefore, the second sensory evaluation was conducted to select the best treatment. In sensory evaluation II, treatment 1 with 9% fat content was selected as the best treatment at

5% significant level. There was a significant difference ($p<0.05$) between all the sensory attributes in the second sensory evaluation.

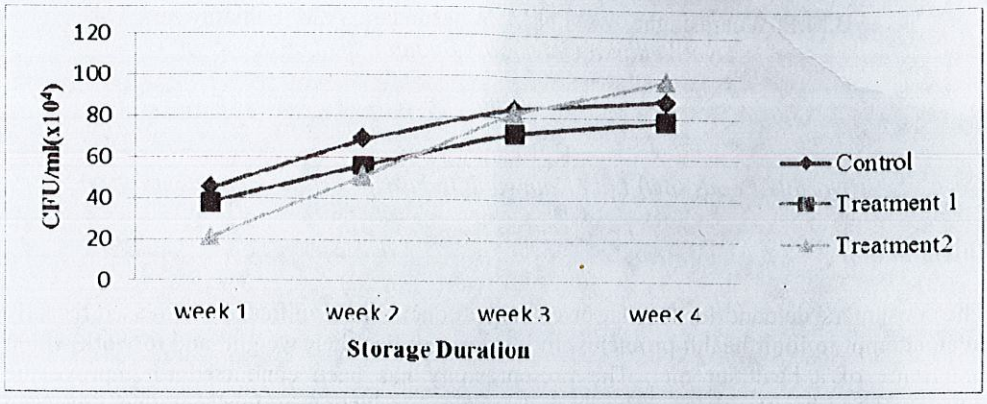

Figure 1: Changes of TCC during four weeks storage time

The third sensory evaluation showed that treatment I (2% *Kurakkan*) is comparatively better than control (Figure 1). Texture, tenderness, aroma, taste, and overall acceptability were best in the treatment 1 (Figure 2) and there was a significant difference between the treatments ($p<0.05$). All the sensory attributes except aroma was best in the control and they were significantly different between the treatments.

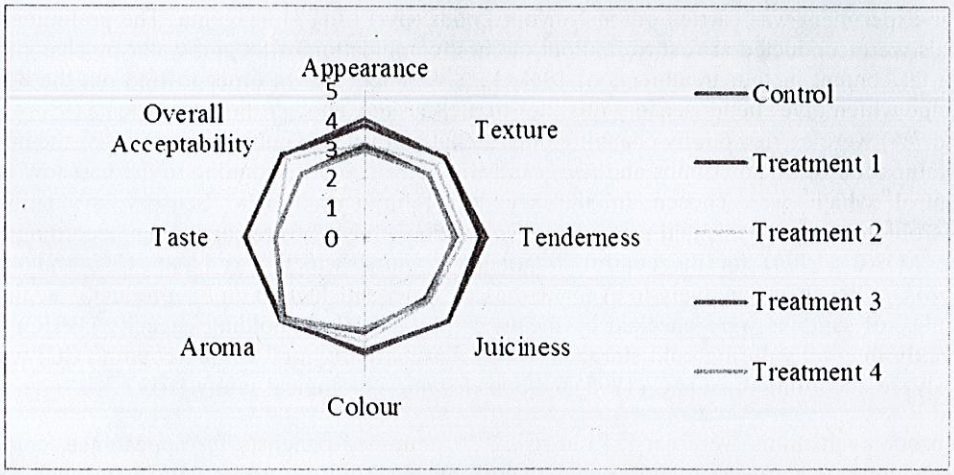

Figure 2: Web diagram for treatments T_1, T_2, T_3, T_4 and Control in sensory evaluation

Table 1: Chemical analysis of T_1, T_2 and Control treatments

Component	Treatments composition (%)		
	T_1	T_2	Control
Moisture	65.200	65.067	63.333
Total solid	34.800	34.933	36.667
Ash	2.484	2.707	2.3097
Crude fiber	2.076	2.176	1.758
Crude protein	12.625	12.33	12.510
Crude fat	8.4578	8.3661	8.5321

One-way Analysis of Variance test indicated that there is no significant difference in pH, and water holding capacity among treatments, T_1 (2% *kurakkan*), T_2 (4% *kurakkan*) and control ($P>0.05$) (Table 1). *Salmonella* and *Escherichia coli* were not detected during the storage duration. *Staphylococcus aureus* counts and TPC did not exceed the specifications in Sri Lankan Standards for sausages during the storage period at less than -18 °C temperature. Treatment 1 and 2 had the highest mean moisture content and the control sample had the lowest moisture content. While, Total solid, Ash, Crude fiber and crude fat contents were higher in the *Kurakkan* incorporated treatments.

Conclusion

The nutritional value improved within corporation of *Kurakkan* in to the low fat chicken sausages. The moisture content in *Kurakkan* incorporated treatments has increased compared to the control. This may be due to the bulkiness in *Kurakkan* that facilitate absorption of more water. Without adding any chemical or preservatives, shelf life of the developed sausage was best when stored at -18 °C with respect to microbiological and physicochemical analysis. It can be concluded that the use of *Kurakkan* in meat products to replace binder may have a beneficial effect to human health.

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