DEVELOPMENT OF A NEW SOFT CHICKEN LOAF PARTICULARLY FOR ELDERLY PERSONS AND INFANTS

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Introduction

The development and manufacturing of food products that meet the special needs of consumers is a current focus in the field of meat science (Hollingsworth group, 2003). Some people require eating meat and meat products that are soft because they are facing difficulty to bite and chew meats that are stiff. Babies and elderly people, in particular, fall within the general scope of people with these needs. Losing the ability to chew and swallow food has become a significant problem for many. Consequently, that fewer elderly people are eating meat and meat products. In addition to their most fundamental food (milk), babies at around 8 months of age begin to add solid, nutritional foods to their diet. However, it is difficult for them to process meat products at this age because their teeth are not yet strong enough or children at that age might not have many teeth. The soft chicken loaf (SCL) can provide the opportunity for these people to eat meat. Generally, SCLs are composed of chicken meat, egg white and some vegetables, which results in a complete, balanced, nutritional food product. The purpose of this study is to develop and present a new SCL including some vegetable ingredients and egg white, the aim also was intended to commercialize this product particularly for elderly persons and infants.

Materials and Methods

The main meat that was used in this research was frozen chicken legs with egg white and fat of beef. Gelatin and some vegetable ingredients were used such as fresh ginger, potato starch powder, onion, herbals (labiate) and miso (soybean paste). Moreover, some additives were utilized such as salt, fresh cream and fish powder (dried bonito), which was used to add flavour.

The frozen chicken was thawed at a refrigerated temperature; the meat was cut into cube-shaped pieces. The chicken (450 g) were mixed with 12.5 g of salt, 10 g of ginger, and 30 g of potato starch powder, 150 g fat of beef and 30 ml of water. The mentioned ingredients, including the chicken meat, were placed in a food processor for 5 min. Afterward, 50 ml of water was added again and mixed for an additional min in the same processor. As a final step in the process, 12 g of miso, 25 g of fresh cream, 2 g of fish powder and 2 g of herbal additive were added to the previously described mixture, and then all the additives were combined in the food processor for 3 min, which created a chicken paste. In addition, gelatin was added at two different ratios, 1% and 2%, to the chicken paste. In order to rid the chicken paste of the fibres or any blotches it was filtrated by a stainless steel strainer. Then, the whipped egg whites were added to the chicken paste and mixed at 90 rpm for 1 min. Each portion (40 g of the paste) was placed in a plastic bowl. These portions were steamed in a steam convection oven (Rational CM101G, Germany): 100% humidity, 80°C, for 20 min. Eventually, the fundamental measurements related to the aim of this study (determining the breaking strength and cohesiveness of the meat product) were carried out on this type of loaf by using a creep meter (Yamaden RE2-33005S, Tokyo, Japan). A sensory test analysis was conducted in a geriatric ward of a local hospital (Average age; 82 years-old). The participants included 21 people, 7 men and 14 women. The participants had a variety of teething conditions, 4 had their own teeth, 14 had artificial teeth, and 3 had not teeth. The latter group uses their gums to chew their food.

Results and Discussion

A new SCL containing vegetable ingredients, egg whites, fat of beef, fish powder and fresh whipped cream was developed. Before the essential preparations of chicken loaves came to an end, the chicken paste was divided into two groups, differentiated by the percentage of gelatin added, 1% and 2% respectively. The paste was then formed into different loaves, both of which were steamed at 80°C for 20 min, 100 % humidity. Each group (1% and 2%) had two types of samples, a control sample and a treated sample (filtered by a strainer). Additionally, another loaf, without gelatin, was ordinary soft food group used as a reference for breaking strength measurements. A sensory test analysis was conducted in geriatric ward (Average age; 82 years-old). The force resistance of loaves to the plunger sink is shown in Fig 1. The best value was of SCL filtered by a strainer and containing 1% gelatin. The breaking strength value in the samples filtered by a strainer in both groups (1% and 2% gelatin) is roughly reduced by a rate of 50% when compared to non-filtered samples. Moreover, the breaking strength of the filtered samples was significantly less than in the

samples of soft ordinary food (Fig. 2). The tenacity of foods is a very important factor for easily eating and swallowing meat products. The loaves containing 1% gelatin kept their texture cohesiveness better than soft ordinary food samples, despite having been filtered by a strainer (Fig. 3). Fig 4 depicts the ease with which a participant (female, 88 years-old) was eating and swallowing the SCL, despite the fact that she was chewing with her own gums. Moreover, it was the first meal for her after using a feeding tube for several weeks.

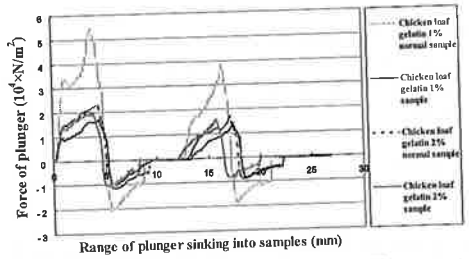

Figure 1: Chart shows the force resistance of loaves to the gelatin and various treatments such as filtration.

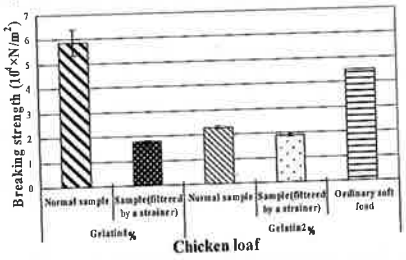

Figure 2: Breaking strength of chicken loaves with different concentrations of gelatin and ordinary soft food.

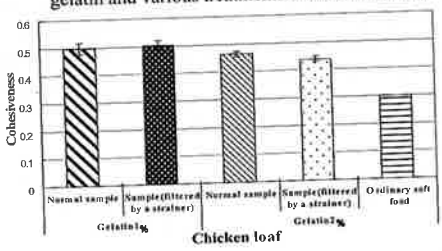

Figure 3: Cohesiveness of SCL samples with different levels of gelatin and of ordinary soft food.

Figure 4: Profiles of video-fluorographic examination show 3 major steps of eating SCL by geriatric participant (Female, 88 years-old). (A) Without teeth able to chew and bite SCL, (B) Swallowing the chewed SCL, (C) SCL is passing through the esophagus of a geriatric participant.

Conclusions

The data suggest that the loaf was tender and the taste was acceptable. The samples containing 1% gelatin and filtered by a strainer gave the lowest value on the plungers force resistance test, which indicates 1.7×10^4N/m^2. Moreover, the SCL was smooth and easily to swallow by elderly participants (Average age = 82). The breaking strength value of filtered samples (1% gelatin) was less than the breaking strength of the normal samples and ordinary soft food as well. The cohesiveness of this type of loaf is improved by the addition of gelatin in comparison with to normal food, even though it was filtered by a strainer (data not showed). This new technique is perhaps the first of its kind available for chicken processing, in order to present and commercialize a new SCL particularly for elderly persons and infants. The results of this study suggested that the new chicken loaves were accepted to humans with dysphagia (3rd grade of soft food local classification table).

Reference

President of the Hollingsworth group: Food and the aging consumer, *Food Technology,* 57(7), 28-30 (2003).