Development of a Tea Incorporated Instant Soup Cube

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Introduction

Instant soups are a new group of dried foods which play an important role in the nutrition of people because theyfulfill present and future social consumer requirements (Ayto, 2002). Next to water, tea is the most widely consumed beverage in the world (Macfarlane, 2004). Tea contains many chemical compounds that are good for health (Owen et al., 2008). This research was an effort to develop a tea incorporated instant soup cube as a tea based new value added product to compatible with the modern consumer needs. Specific objectives are to determine the appropriate amount and type of tea powder to be incorporated into the soup mixture, to determine some important physicochemical parameters of the newly developed product and microbial analysis and to compare the different aspects of the tea soup cube and a tea cup made with dust.

Methodology

Referring to the literature and the earlier trials on different ingredients ratios, six basic recipes were developed for the instant soup mixture. Among those, the best recipe was selected based on the consumer preference on overall acceptability of fifty individuals. Two tea standards wer e developed for Green Tea and Black Tea separately using dust grades to incorporate into the soup mixture. The range of quantity to be incorporated into the soup mixture was determined thorough preliminary trials. Five treatments were prepared by incorporating various quantities of tea and soup mixture as shown in Table 1.A mould was prepared to produce homogeneous soup cubes of equal weight (4 g).

Table 1. Different treatments used to develop tea incorporated instant soup cube.

Treatment	Reference no	Quantity of component (g)	
		Tea powder	Soup mixture
T1	125	3.0	1.0
T2	272	2.5	1.5
T3	325	2.0	2.0
T4	478	1.5	2.5
T5	592	1.0	3.0

The best treatment was identified through a sensory evaluation using ten professional tea tasters. Taste, odor, color, appearance, flavor, texture and overall acceptability were evaluated as sensory parameters based on 5-point hedonic scale.

Another experiment was conducted to determine the type of tea to be incorporated as the quantity of tea powder used in the selected treatment of the previous experiment. Therefore, three treatments were tested only using green tea, black tea and a mixture of black tea and green tea in 1.1 ratio. The best treatment was determined through a sensory evaluation using ten professional tea tasters on above mentioned sensory parameters based on 5 point Hedonic scale. Data were statistically analyzed using Freidman test at 5% level of significance using MINITAB statistical software.

The caffeine content, protein content, polyphenol content and anti-oxidant activity were determined for the newly developed tea incorporated instant soup cube. Aerobic palate count was calculated fortnightly for a period of two months as microbiological analysis.

Results and Discussion

Among the six basic recipes of soup mixtures, the second recipe was selected considering the majority of the consumer preference of 56%.

Analyzed statistical data of the sensory evaluation of first experiment revealed that, there was a significant difference ($p<0.05$) among five treatments in respect to the all the sensory attributes tested except the appearance. There was no significant difference ($p>0.05$) among the five treatments for the sensory attribute of appearance. According to the Figure 1, Treatment 3 (325) which consisted of 2.0 g of tea powder and 2.0 g of soup mixture was selected as the best treatment to develop the new product since each of the significantly different attribute bears the highest rank mean and median values.

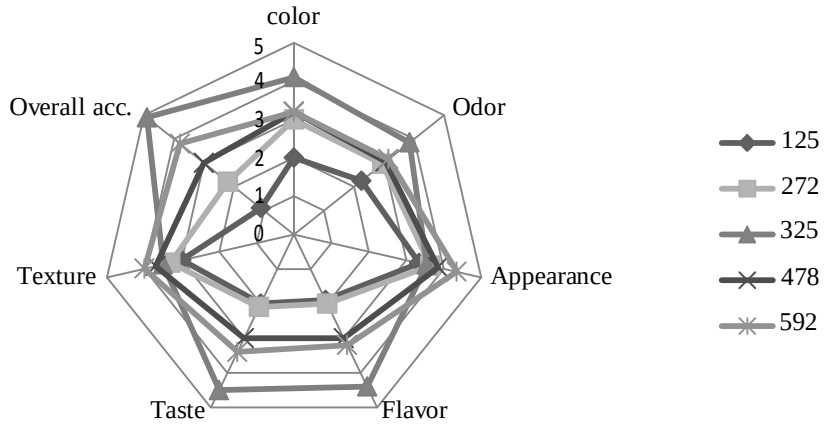

Figure 1. Sensory profiles of different treatments tested.

Considering the analyzed data of the sensory evaluation of the second experiment, there was a significant difference ($p<0.05$) among three treatments tested for tea powder prepared using different tea types for the sensory attributes of odor, taste, texture and overall acceptability. Color, appearance and flavour attributes did not show any significant difference ($p>0.05$) among treatments tested. Based on the corresponding highest rank mean and median values, the tea powder containing only black tea was selected to use for the new product development.

Table 2. Comparison of some chemical quality parameters of new product.

Parameter	New Product (%)
Protein	0.3 *
Caffeine	16.11
Polyphenol	6.78

*The protein percentage is expressed as a percentage of nitrogen

Usually, teas originating from India or Sri Lanka varieties (*Camellia sinensis* var. assamica) (30 %) have higher polyphenol contents than those from the Chinese variety (*Camellia sinensis* var. sinensis) (20 %). Total polyphenol content in black tea bags ranged from 0.42 % to 0.55 % in Argentina tea (Anesini, 2008). The range found between for polyphenol content is due to post maturation process where black tea continues to ferment (Cloughley, 1981). Therefore,

compared to a tea bag, the polyphenol content in the instant soup cube was low. While in the soup cube it is 6.78% and in a tea bag it can be 24%- 30%.

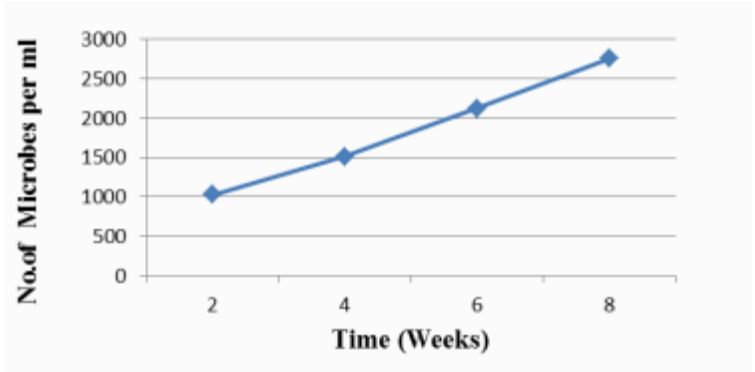

Figure 2. Variation of aerobic plate count of developed new product with the time

According to the SLSI standards, the maximum aerobic plate count limit for instant food should be 1×10^{4} g $^{-1}$. As the method given in the standard (SLS 516: Part 1) the aerobic plate count determined for time period of two months (Figure 2) according to the method given in the standard (SLS 516: Part 1) did not exceed the limit that has been given by the Sri Lankan Standard Institute.

Drinking tea just after a meal restricts the body's absorption of iron (Fe) consumed with the meal. But, tea mixed with lemon, pumpkin, neem and milk can regulate the absorption of iron (Ody, 2000). Since the new soup cube was developed by incorporating lemon as an ingredient, that negative effect might not be associated after consuming the new product. Further biochemical, pharmacological and clinical studies should be conducted to prove the fact.

Conclusions

The best treatment for the development of tea incorporated instant soup cube was Treatment 3 which composed of 2g of tea powder and 2 g of soup mixture among the five different tea powder and soup mixture ratios tested. The tea powder which was prepared using only incorporating black tea is the most suited for the developed new product rather than using only Green tea and a mixture of green tea and black tea ratio of 1:1. According to the SLSI standards, the new product is microbiologically safe for consumption.

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