

Development of Novelty Water Ice Using Locally Available Spices

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Introduction

Frozen confectioneries such as molded ice cream novelties and water ices are becoming popular due to wide variation in their shapes and flavours. According to Clarke (2004), the most important quality parameters that influence the consumer preference for ice cream are body and texture, flavour, melting quality and appearance of the product. There are many studies conducted to modify the flavor of ice cream by incorporating natural and artificial flavours and fruit pulps. Fruit flavoured water ices are one of the popular variety of ice cream among teenagers due to its refreshing nature and lower price compared to dairy ice cream. Combining the pungency of spices with fruit flavoured water ice may be a successful way to develop a novel product with higher consumer preference. The flavour and pungency of spices make them indispensable in the preparation of palatable dishes in cuisine. Spices impart aroma, colour and taste to food preparations and sometimes mask undesirable odours. The volatile oils from spices give the aroma and the oleoresins impart the taste (Parthasarathy *et al.*, 2008). Hence, this study attempted to develop a novel water ice with higher consumer preference by incorporating locally available spices.

Methodology

The research was carried out at Cargills Quality Dairies (Pvt) Ltd., Banduragoda, Sri Lanka. Four preliminary trials were conducted to select the suitable pineapple flavours, pepper powder level, chilli powder level and colour combination. Thereafter, water ice were prepared using sucrose, glucose syrup, citric acid, guar gum, vacuum salt, selected colours, flavours and spice levels according to the standard specifications (Anon, 2011) of water ice with slight modifications of the ingredient percentage. Based on the results of preliminary trials, two pineapple flavours as Kerry® F1141 and Expressions® LA 05553 were used. Best pineapple flavour was selected by sensory evaluation using 20 trained panelists. Then, selected flavour was used to develop water ice samples with different salt concentration as 0.075% (w/w), 0.095% (w/w) and 0.115% (w/w). Best salt concentration was selected by melting trials using meltdown apparatus. Existing water ice (captain cool®) was used as the control. Selected salt percentage was used to develop pineapple flavoured spicy water ice and another trial was conducted to assess the compatibility of vinegar with existing flavor profile. There were two treatments as water ice with natural vinegar and water ice without vinegar. Best treatment was selected by a sensory evaluation using fifty untrained panelist. Five point hedonic scale was used to assess sensory attributes such as appearance, smell, mouth feel, salt level, spicy level, pineapple flavour, melting quality and overall acceptability. Sensory data were analyzed by Friedman nonparametric statistical method in Minitab 16. Final product was stored under -18 °C and subjected to microbiological and chemical analysis during storage period and market survey was conducted using 50 school children.

Results and discussion

According to the results of sensory evaluation, water ice prepared with Kerry® F1141 showed higher ($p < 0.05$) preference with respect to all sensory attributes. Therefore, it was selected as the best flavor which impart pineapple flavor to the product. Similarly, 0.14% chili powder and 0.05% pepper powder levels were selected as the best level of spices by the panelists. Results of melting trials revealed that the melting behavior of all three samples was equivalent to the melting behavior of the control. Hence, all the tested concentrations can be used to develop water ice without affecting melting qualities.

Figure 1 indicates the sensory attributes of pineapple flavoured spicy water ice incorporated with vinegar and without vinegar.

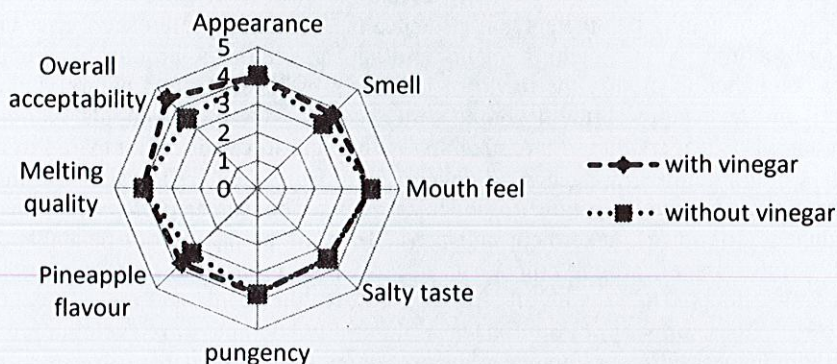


Figure 1: Sensory attributes of pineapple flavoured spicy water ice

As shown in Figure 1, preference for water ice incorporated without vinegar was higher ($p < 0.05$) than the other treatment with respect to smell, mouth feel, pineapple flavor, melting quality and overall acceptability. Perhaps, this was due to the fermented odour and acidic flavour associated with the vinegar. Panelists did not find any difference in two products with respect to appearance, salty taste and pungency. Analysis of selected product indicated that it has 25.08% total solid content.

Based on the results obtained by storage studies of selected water ice sample, there is no variation ($P > 0.05$) in pH with the storage duration (Figure 2). The average pH and titratable acidity of selected product within this period were 3.83 and 1.05 acetic acid% (w/w) respectively. This may be due to the absence of lactose and acid forming bacteria as a result of high osmotic pressure of the water ice mix.

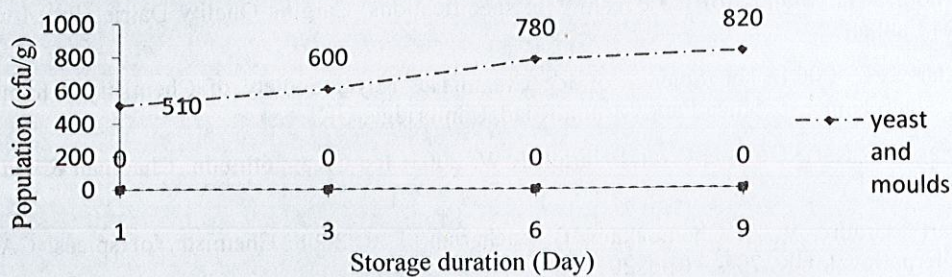


Figure 2: Change of microbial counts of the water ice over storage time

Figure 2 illustrate the variation in microbial population with the storage period. According to that changing of yeast and mould count and coliform count were not significant. Perhaps, this is due to high osmotic pressure of the water ice mix.

Results of market survey showed higher preference for pineapple flavoured spicy water ice than the existing water ice in the market (Figure 3). This may be due to the strong flavor resulted by the combination of spices and pineapple in the novel product over existing product.

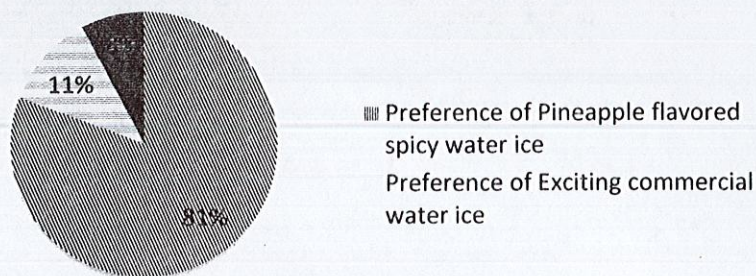


Figure 3: Consumer preference for pineapple flavoured spicy water ice and existing water ice in the market

Conclusion

Based on the results, it can be concluded that water ice developed using Kerry® F1141 pineapple flavor, 0.095% (w/w) salt concentration, 0.14% chili powder level and 0.05% pepper powder levels has highest sensory attributes and the melting quality is equivalent to existing water ice in the market. The cost of production is Rs 4.35 and it is having two year shelf life period. Hence, this product can be recommended for commercial production.

References

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