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Development and Sensory Evaluation of Dates Ice Cream

Wan Nor Hafiza Wan Sulaiman*, Alif Amsyar Ibrahim, Nor Adlina Halim, Nur Amirah Syafiqah Sulaiman, Muhammad I'zzat Mohd Nor[1]

Politeknik Merlimau, Merlimau, 77300, Melaka, MALAYSIA

*Corresponding Author Designation

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Abstract: Ice cream is the most consumed dairy product in the world because it contains nutrients that provide the body energy. However, some people may have problems with ice cream since it is dairy-based and contains lactose, a milk sugar. Therefore, low-calorie ice cream is highly in demand since sugar, which is used to produce ice cream, has a high calorie density. While, dates are an organic food with high nutritional value that are rich in fibre, protein, carbohydrates, sugars, vitamins, minerals, and substantial amounts of natural antioxidants. Dates are a possibility for improving the nutritional content of food products because of their advantages. The development and consumption of healthy ingredients are currently quite popular due to the growing public awareness of the relationship between nutrition and wellness. Observing the potential and benefits, this study was conducted to formulate a new ice cream with dates taste and study the sensory analysis, as well as to evaluate the nutritional facts of dates ice cream. Dates Ice Cream was developed as a method of reducing the risk of increasing childhood obesity. The research methodology involved organoleptic examination of taste, texture, smell, colour and overall acceptability. A number of 40 respondents were selected randomly. The hedonic scale of five points was applied in this research and descriptive analysis was performed to examine the data obtained using SPSS. According to the findings, the sensory criteria evaluated indicated that the dates ice cream was well accepted by respondents positively. Due the study, Dates Ice Cream will be able to convince the consumer to adopt this new product innovation.

Keywords: Ice cream, Dates, Sensory evaluation

1. Introduction

As ice cream contains macronutrients including carbohydrates, proteins, and lipids, which are necessary for supplying energy and ensuring a healthy diet, it may be categorised as a nutritious food. [1], [2]. Products such coffee, chocolate and ice cream are regularly taken to boost good feelings or at least to reduce the unpleasant psychological mood's implications [3]. Besides that, ice cream dairy

*Corresponding author: wan_norhafiza@pmm.edu.my

consumption has increased in recent years, resulting in the development of 240 distinct types of ice cream products [4]. Since ice cream is dairy-based and contains lactose and a milk sugar, some people could have problems with it. The main sugar in ice cream that provides taste is called sucrose. Consumers have been urged to consume reduced foods high in sucrose as their concern for their health has grown. Based on Nateghi *et al* (2022), due to the high-calorie production of sugar in ice-cream, there is a great demand for low-calories ice cream [5].

According to Roland (1999), several ice cream products without added fat have been produced by the dairy industry [6]. Unfortunately, a lot of consumers doesn't like the taste and texture of fat-free ice cream products. Ice cream products, whether fat-free or not, must meet several key aspects, one of which is that they must taste delicious. The texture and look of fat-free ice cream products must also meet customer standards. Based on Sattarova (2022), ice cream's taste, smell, texture, colour, appearance and packaging are used to determine its quality. Ice cream should have a typical taste, and oil should be odourless and tasteless. The texture and structure should be consistent, smooth, and devoid of ice crystals and sand. Ice cream is a dairy product that, when made properly, may supply calcium into the body, strengthening and promoting the growth of bones. Ice cream is more than just a tasty and sweet dessert. Ice cream is therefore appropriate for people of all ages [7].

The majority of the carbohydrates in palm dates are in the form of simple sugars. The dates are rich in natural sugars such as glucose, fructose and sucrose and it suitable for absorption and providing a high amount of energy and also suitable for children and nursing mother [8, 9]. A person's daily calorie consumption determines how much energy they produce, therefore it must be quantified. As a result, calories are used to quantify energy. Essential macronutrients like protein, carbohydrates, and fat provide the body with the calories it needs to function [10].

Based on El Hadrami and Al-Khayri (2012), dates are consumed not only as a fresh fruit for human consumption, but also as a source of a variety of by-products such as jam, jelly, juice, syrup, and fermented drinks. Due to the majority's growing awareness of the relationship between nutrition and wellness, the development and consumption of healthy ingredients are currently highly popular. Because of the great production potential of dates throughout the world, the researcher came up with fresh ice cream ideas using dates [11].

Therefore, the objectives of this study are to create new ice cream flavours with dates and also examining the nutrition facts and determine the organoleptic characteristics of Dates Ice Cream among consumers in Merlimau, Melaka.

2. Materials and Methods

2.1 Formulation for making Dates Ice Cream

The ingredients to be used in producing Dates Ice Cream are fresh dates fruit as a main ingredient, whipping cream, fresh milk and essence vanilla. Researchers have developed a formulation to produce Dates Ice Cream as shown in **Figure 1** respectively.

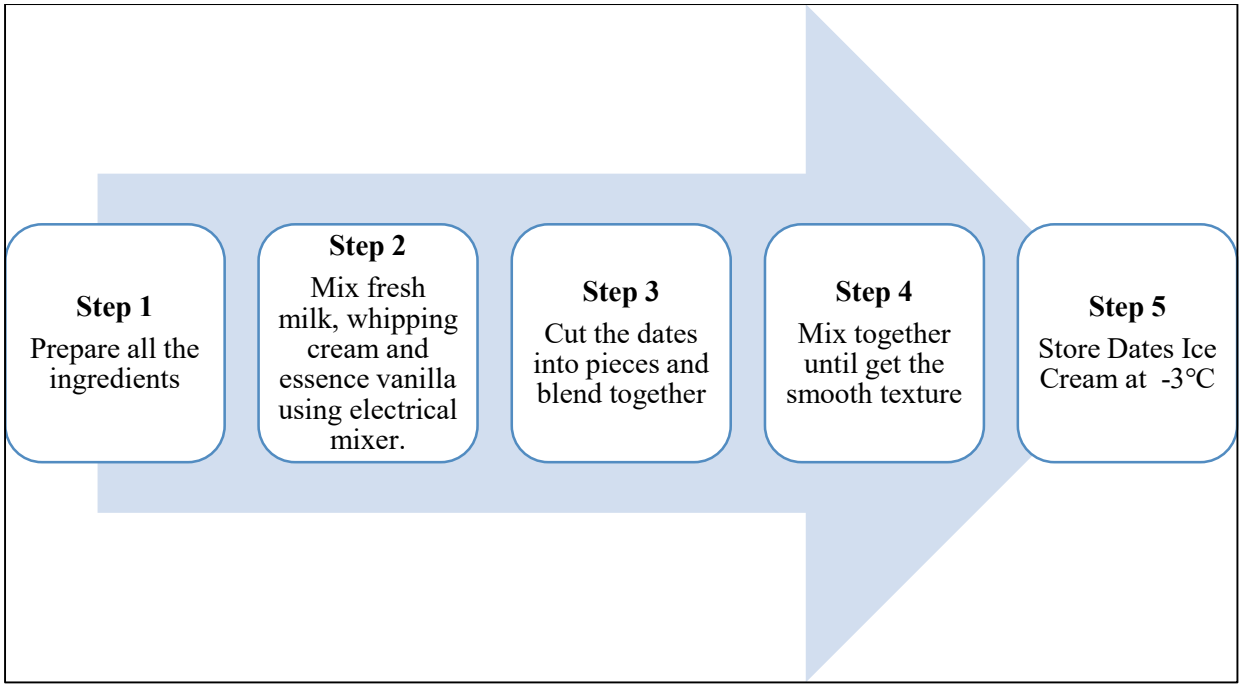

Figure 1: Process of making Dates Ice Cream

2.2 Analysis of sensory evaluation for Dates Ice Cream

Furthermore, Dates Ice Cream products require organoleptic analysis, or sensory evaluation. Utilizing a hedonic scale with values ranging from 1 to 5, organoleptic analysis was used to assess the quality of the foods. The respondents' response relates to their initial perception of the product's likeability, followed by their level of likeability. The acceptability level of the respondent was measured using a set of sensory evaluation questionnaires. The respondent was questioned what they thought of the Dates Ice Cream's smell, texture, colour, and taste. The sampling was limited to Merlimau, Melaka, and 40 respondents were chosen at random to conduct the sensory evaluation. The Statistical Package for Social Science (SPSS) was used to analyse the data from the questionnaire, and the mean score was utilised to interpret the findings. **Table 1** shown the interpretation of mean value range based on Sekaran (1992) [12].

Table 1: Mean value range interpretation (Sekaran, 1992)

Mean score	Interpretation	Level
1.00 to 2.33	Low	Weak
2.34 to 3.66	Medium	Moderate
3.67 to 5.00	High	Good

2.3 Determine the nutrition fact for Dates Ice Cream

Dates Ice Cream sample was submitted to Melaka Biotechnology Corporation for nutritional analysis. The Melaka Biotechnology Corporation used Gas Chromatography-Mass Spectrophotometry (GCMS) for the analysis to identify the amounts of carbohydrate, fat, sugar and energy.

3. Results and Discussion

3.1 Sensory evaluation

The analysis to identify the respondents' level of acceptance of Dates Ice Cream is shown below. The four questionnaires were to determine the sensory evaluation in term of colour, smell, taste and texture of Dates Ice Cream. The result of the sensory evaluation presented in **Table 2.**

Table 2: Mean score of respondents' acceptance level towards Dates Ice Cream

Characteristics	Mean value	Interpretation
Texture	4.23	High
Taste	4.47	High
Smell	4.43	High
Colour	4.27	High

According to **Table 2,** the mean acceptability level of respondents on Dates Ice Cream is very high with mean score 4.23 for texture, 4.47 for taste, 4.43 for smell and colour is 4.27. The findings indicate that the Dates Ice Cream is well-liked by respondents. Respondents can accept the taste of Dates Ice Cream because of the benefits contain in Dates Ice Cream. The absence of artificial flavourings and colorings is another advantage identified by respondents for Dates Ice Cream. El-Sayed (2018) and Abdul Samad Magsi *et al*. (2021) agreed that dates are full of natural sugars such as glucose, fructose, and sucrose and that are good for absorption and for supplying a lot of energy [8], [9]. They also determined that dates are suitable for children and nursing mothers. Ice cream's taste and texture attributes are key factors in determining consumer acceptability.

3.2 Nutriotional fact of Dates Ice Cream

The results of nutrition content for Dates Ice Cream such as the amount of carbohydrate, fat, sugar and energy was done using the Gas Chromatography–Mass Spectrophotometry (GCMS) at the Melaka Biotechnology Corporation. The analysis of the nutrition fact presented in **Table 3**.

Table 3: Nutrition content for Dates Ice Cream (per serving 100g)

Test parameter	Unit	Result
Energy	kcal/ 100g	141
Total carbohydrate	g/ 100g	9.3
Protein	g/ 100g	2.3
Total fat	g/ 100g	13.2
Total sugar	g/ 100g	3.1
Sodium	mg/ 100g	36.6

(Melaka Institute of Biotechnology, 2021)

According to analysis, each 100g sample of Dates Ice Cream has 9.3g of total carbohydrate, 13.2g of total fat, 2.3g of protein and 3.1g of protein. The results also showed that sodium content was 36.6mg/100g. Additionally, each 100g serving of Dates Ice Cream produces 141 kcal of energy.

4. Conclusion

As a conclusion, the respondents agreed that the sensory evaluation of Dates Ice Cream is acceptable in terms of texture, taste, smell, and colour. It indicates that the respondents thought the Dates Ice Cream flavour was good. Organoleptic testing has been done on the method for producing

Dates Ice Cream. In order to reduce the risk of high cholesterol and issues related to sugar, consuming ice cream in moderation or choose a low-fat and low-sugar substitute. Additionally, Dates Ice Cream was developed as a dairy substitute product that the consumer may consume in order to lower the risk of increasing obesity.

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