Development, Formulation and Standardization of Dream Cream-Ice cream

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ABSTRACT

The aim of this study is to develop, formulate and standardize the ice-cream with sensory analysis and study of Nutritional and Health benefits of the product. The panelists evaluated all samples based on parameters like flavor, texture, taste, color and overall-acceptability. The three treatments were made; i.e.T1, T2 and T3 with the ratios of Beetroot and golden-raisins (50:50), (25:75) and (15:85) respectively, out of which T1 (50:50) was selected. For the sensory evaluation the 9- Point Hedonic scale (9- liked extremely to 1- dislike extremely) was used. Thus, the T1 got the highest score by panel members in all parameters. The Nutritive value and Health benefits were the asset of the product. The product was compared with the market sample (control sample) i.e. 'Amul plain vanilla ice-cream'. The study claimed that dream cream is surplus in all parameters and was free from all preservatives, additives and artificial flavoring agents. The formulated dream cream possessed nutritional health benefits. The product is rich in macro-nutrients as well as micro-nutrients.

Keywords: Ice cream, Beetroot, Raisins, Sensory evaluation, Health benefits.

I. INTRODUCTION

Over recent years, there has been significant interest in the development of innovative food products conferring customized benefits to the consumer, i.e. improving physical and mental well-being, prevention of diet-associated health complications in addition to fulfilling basic dietary function (hunger satisfaction and fulfilment of the daily nutritional need of consumers). The increased awareness of the consumer regarding health and nutrition related issues as well as the role of several food regulatory bodies to promote the production and consumption of minimally processed, healthier and more nutritious food products, appear to be steering a transformation within the food industry. Moreover, cultural, educational, and economic effects together with food quality and safety criteria have also been highlighted as drivers of consumer demand for healthy and safe food products. Ice cream is a complex colloidal food system that in its frozen state consists of ice crystals, air cells, and partially coalesced fat droplets dispersed in a continuous freeze-concentrated aqueous (serum) phase containing polysaccharides such as galactomannans, carrageenan, cellulosic, sugars (sucrose and lactose), proteins, and minerals (especially calcium, but also sodium and potassium). Ice cream structure development and stabilization are a dynamic process where the main components, namely, bio-polymers (proteins and polysaccharides), fat droplets, and water undergo significant colloidal and physical changes such as bio-polymer hydration, fat droplet crystallization, ice nucleation, and crystallization, fat droplet partial coalescence, freeze concentration, formation of cryogels, protein-polysaccharides phase separation, formation of biopolymer entanglement. [1]. Beetroot is recognized as health promoting food due to presence of essential components such as vitamins, minerals, phenolics, carotenoids, nitrate, ascorbic acids and betalains that promote health. Betalains occur in two forms i.e. betacyanin (red-violet pigment) and betaxanthin (yellow-orange pigment) and are recognizable commercially as a food dye due to non-precarious, non-toxic, non-carcinogenic and non-poisonous nature. Beetroot is premeditated as a boon for the food industry and used as food colorant or additive in food products such as ice-cream, yogurts and other products. The beetroot extract is used to improve the redness in tomato pastes, soups, sauces, desserts, jams, jellies, sweets and breakfast cereals. Overall objective of this review is to provide a brief knowledge about the valuable phytochemicals and bioactive compounds present in beetroot and their association with health benefits, beetroot processing for food application and their effect on beetroot pigment. [2]. A review of Medline was conducted using the keywords: 'raisins, raisins and health, raisins and cardiovascular disease (CVD), raisins and cancer, raisins and diabetes, raisins and fiber, raisins and colon health, raisins and antioxidants, raisins and inflammation, raisins and dental caries' Raisins have one of the highest polyphenolic content and antioxidant ORAC levels compared to other traditional dried fruits. Many of the polyphenols in raisins are well assimilated and bioavailable. Raisin consumption reduces low density

lipoprotein (LDL) cholesterol, blood pressure and blood sugar, when compared to equal caloric carbohydrate snacks and is associated with a reduced risk of CVD. The anti-inflammatory and cancer chemopreventive effects of raisins are mixed. Raisin consumption reduces intestinal transit time and positively affects gut microbiota. Raisins produce sustained energy during long term athletic competitions equal to traditional sports energy gels, shots and jelly beans. Raisins produce a non-cariogenic oral environment and do not fit the American Academy of Pediatrics criteria to be considered a choking hazard [3].

II. FORMULATION OF INGREDIENTS

Dream Cream was manufactured by using beetroot, golden-raisins, fresh cream and milk powder by taking variation in treatment of beetroot and raisins. Beetroot (50%) and golden-raisins (50%).

Table:1 Formulation of Ingredients.

Sr. No.	Ingredients	Quantity
1.	Beetroot	7.95%
2.	Golden-raisins	7.95%
3.	Fresh Cream	8.1%
4.	Milk Powder	14%
5.	Milk	50%
6.	Sugar	12%

(T. Evstigneeva et al.,2020)

Figure 1: Beetroot

Figure 2: Raisins

III. MATERIALS AND METHODOLOGY

A. Preparation of Dream-Cream

Materials required has been procured from the local market i.e. Beetroot, Golden-raisins, milk powder, sugar and other ingredients. The proportion of ingredients are used in the standardization form for development of Dream-Cream

B. The Flow-sheet of the process

Take fresh beetroot
↓
Peel and cut in small pieces
↓
Sautee until raw taste disappears(2min)
↓
Take golden raisins
↓
Wash and chop with dash of water
↓
Pasteurize milk, (10min); add sugar to it
↓
Add milk powder
↓
Condense upto 5 minutes
↓
Take fresh cream
↓
Whip till soft peak is obtained(15min)
↓
Add whipped cream in condensed milk (place ice bath bellow)
↓
Add grinded beetroot and fig in it
↓
Mix well
↓
Refrigerate it at -19 c up to 8 hours
↓
Here you can enjoy the dream cream

(T. Evstigneeva et al.,2020)

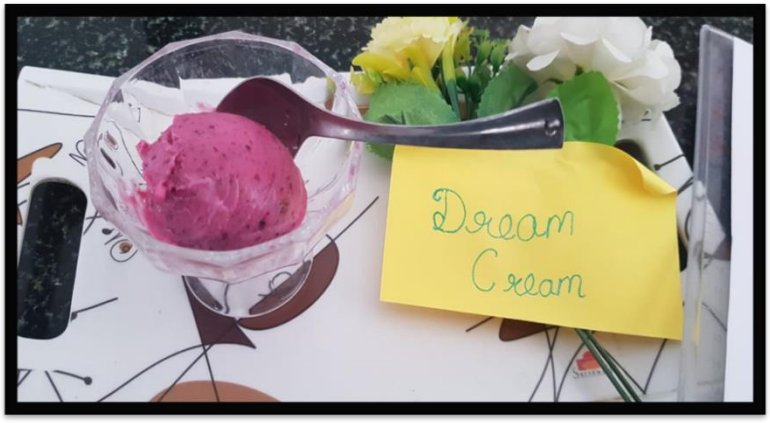

Figure 3: Dream Cream- Ice cream

IV. SENSORY EVALUATION

Sensory evaluation was carried out for three different treatments namely [T1, T2 and T3]. The panel of 10 members from teaching staff had evaluated the samples. Panellists evaluated all samples based on its flavour, texture, taste, color and overall acceptability using 9 Point hedonic scale (9 – liked extremely to 1 – dislike extremely).

Table 2: Sensory Evaluation Score

Sr. No.	Quality Attribute	Control Sample	Treatment-1	Treatment-2	Treatment-3
1.	**Color**	9	8.9	8	7.5
2.	**Appearance**	9	8.2	7.4	7.2
3.	**Aroma**	9	8	8.4	8
4.	**Flavour**	9	8.6	6.6	7
5.	**Over all acceptability**	9	8.8	8.6	8.2

A. Quality attributes

- **Color**: Color is the first parameter which influence the consumers to get attracted towards the products., Hence the result shows that the color of sample (c) as control got the highest score points (9) in comparison with other blends while in the maximum score (8.9) given to T1 (50% raisins, 50% Beetroot) than other variations (table 2) greater incorporation of beetroot decrease the attractive pink color of the product.
- **Appearance:** Appearance of the product had a direct effect on the consumers. The appearance of the ice-cream was selected by the panel member which revealed the decrease in beetroot in the product increase the good appearance of the products increase the good appearance of the products the ice-cream[T1] s variation got the maximum scores [8.2] in compassion to other two variations.
- **Aroma:** The aroma score of the ice-cream were directly related to the quality of the ice-cream thus it shows that decreasing the quality of beetroot also decrease the aroma of the product. The result revealed that [T2] variation of [75:25] proportion got the highest score [8.4] as compared to other variations.
- **Flavour:** The scores give to the flavour of the ice-cream is dependent upon the volume of beetroot which shows that the flavour of ice-cream is overlapping the thus maximum scores received by [T1] [8.6] while decrease in other variations.
- **Overall acceptability:** The (table 2) shows that the overall acceptability scores of the ice-cream T1 [50% beetroot, 50 %raisins] incorporation was mostly preferred with [8.8] as compare to [T2] [T3] by increasing the incorporation of beetroot and raisins. The sensory scores claimed that equal proportion of beetroot and raisins ice-cream [50:50] account the greater overall acceptance.

Treatment 1 [50:50] got selected by panel members rating highest score in all parameters described in Table 2. The present study claimed the sensory evaluation of ice-cream (Beetroot + Golden Raisins) was carried out by a comparing the control sample using 9 point hedonic scale.

Table 3: Nutritive analysis per 100gm of control and selected sample (Dream-Cream).

Sr. No.	Test Parameters	Nutritive Value of selected sample (T1) [Dream Cream- Ice cream]	Control sample [Amul- vanilla ice-cream]
1	Energy	194.6Kcal	219kcal
2	Carbohydrate	27.116g	21g
3	Protein	5.9125g	3g
4	Fat	7.0239g	13g
	MINERALS (mg)		
5	Iron	1.0429mg	0.09mg
6	Calcium	64.994mg	128mg
7	Sodium	78.8mg	-
8	Phosphorus	4.92mg	199mg
9	Magnesium	4.76mg	-
10	Cobalamin	0.1mg	-
11	Zinc	0.056mg	-
12	Potassium	353.37mg	-
	VITAMINS (mcg)		
13	Vitamin-A	14.6mcg	118mcg
14	Vitamin-D	0.09mcg	1.0mcg
15	Vitamin-C	0.5597mcg	0.6mcg

16	Vitamin-B1	0.02mcg	-
17	Vitamin-B2	0.016mcg	-
18	Vitamin-B3	0.09mcg	-
19	Vitamin-B5	0.01mcg	-
20	Vitamin-B6	0.4mcg	-
21	Vitamin-K	0.278mcg	-

(Source: National Institute of Nutrition)

B. HEALTH BENEFITS

The main ingredients i.e., beetroot and raisins have enhanced its nutritive value by contributing maximum micronutrients like iron, calcium, sodium, potassium, magnesium, cobalamin, zinc, {mg}; Vitamin-A, Vitamin-D, Vitamin-C, Vitamin-B1, Vtamin-B2, Vitamin-B5, Vitamin-B6, Vitamin-K. The key ingredients of dream-cream i.e., beetroot and raisins are dense and overloaded with nutrients. And mainly the ice cream is rich in iron, calcium, zinc, cobalamin and vitamin-B complexes. Selected sample is nutritionally and therapeutically more prominent. As many research and reviews claimed that beetroot is magnificent in providing health benefits like preventing cancer, lowers the blood pressure, best for diabetic patients, fights inflammation, good for brain. On the other hand, raisins help to maintain good dental health, good for anaemic, reduces constipation, controls diabetes, lowers cholesterol levels, make bones strong, lastly cure respiratory diseases. Other than this, it helps to cure chronic diseases and slows down aging process. It exhibits antimicrobial properties that stop cavities, heals tooth decay, prevents gums diseases all in all maintain the oral health. They have both soluble as well as insoluble fibers which maintains gut flora; and make your gut healthy. It ultimately prevents all digestive disorders and syndromes. As it has good amount of potassium it helps maintain body's tissues, organs, cells work well. People with accurate amounts of potassium in diet have less chances of stroke especially ischemic stroke. It prevents insulin spikes and is a natural way to control diabetes. It also controls acidosis. It has good amount of calcium which is important in strengthening and remineralizing tooth enamel. They are rich in antioxidants like, polyphenolic phytonutrients and catechins which fights cancer cells. Fibre in it helps the body to get rid of bile by flushing out toxins. It eliminates oxidative stress, prevents DNA damages, reduced LDL levels. It also works as vital antidepressant. Beetroot pigments are the natural food dyes. It also helps to purify the blood. Beets helps one to boost stamina as well.

V. CONCLUSION

Sensory quality revealed that beetroot and raisins pulp can be successfully incorporated in ice cream. 50% beetroot pulp and 50% raisins pulp are selected on the basis of 9-point hedonic scale. The blends of both nutritious ingredients have increased its nutritive and therapeutic values. For its quality and acceptability, the panel members have checked for ice-crystals, texture and consistency. Raw materials were analyzed for its nutritive values. It contributes all macro-nutrients and maximum micro-nutrients. The selected sample contains macro-nutrients like; energy, carbohydrate, protein, fat [194.6Kcal, 27.1g, 5.94g, 7.02g]/100g approximately. And micro-nutrients like; iron, calcium, sodium, potassium, magnesium, cobalamin, zinc, vitamin-A, Vitamin-B complexes, vitamin-C, vitamin-D, Vitamin-k: [1.042mg, 64.9mg, 78.8mg, 353.3mg, 4.92mg, 4.76mg, 0.1mg, 0.05mg, 14.6mcg, 0.02mcg, 0.016mcg, 0.09mcg, 0.01mcg, 0.4mcg, 0.597mcg, 0.09mcg, 0.278mcg]/100g approximately. Control and selected sample are sensory and nutritionally evaluated where it is observed that control sample have added sugar, emulsifier, stabilizers, artificial flavouring substances. Whereas selected sample have natural color of beetroot and no added preservatives. And addition of beetroot and raisins in ice cream not only prohibits diseases but also provides multiple health benefits like, lowers blood pressure, ability to prevent cancer, beneficial for diabetic, fight inflammation, good source of antioxidants, reduces constipation, lower cholesterol levels, make bones strong, maintain good dental health and lastly cure respiratory diseases. As incorporation of beetroot and raisins has enhanced its nutritive value other fruits can also be used like guava, Chiku, custard apples, berries and dry fruits like dried fig, almonds, cashews and pistachios.

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