

# Development of a Healthy and Sugar-free Ice Cream with Antidiabetic activity

Dr. Danie Kingsley J<sup>1</sup>, Shuruthi Saraswathi G<sup>2</sup>, Harini M<sup>3</sup>, Balaji Nila<sup>4</sup>, Durga Devi M<sup>5</sup>, Revathipriya G<sup>6</sup>, Aroon Saayee A<sup>7</sup>

<sup>1</sup> Assistant Professor Senior, School of BioSciences and Technology, Vellore Institute of Technology, Vellore – 632 014, Tamilnadu, India.

(<sup>2,3,4,5,6,7</sup>) School of BioSciences and Technology, Vellore Institute of Technology, Vellore – 632 014, Tamilnadu, India.

\*\*\*

**Abstract** - Ice cream, being a favorite food product, due to its less nutritional value with high sugar and fat content, is not advisable for regular consumption for all age groups including children, young adults, and in particular diabetic people. So, to develop a healthy Ice cream that is also suitable for diabetic consumers, an attempt was made using around 24 natural ingredients which include millets, legumes, jaggery powder, cardamom, and other ingredients to make a healthy and nutritious Ice cream. In flavored versions, the taste of the health ingredients dominated the flavors of vanilla and chocolate. The ingredients of made ice cream in addition to rich nutritional value, have cytoprotective, antioxidant, and anti-diabetic activities thereby making the ice-cream healthier for all age groups.

**Key Words:** natural, no added sugar, anti-oxidant, nutritious, functional

**1.INTRODUCTION:** Ice-cream has become an eye-catching food product to people irrespective of their age. It has been developing at a sound rate of 10–15 % [1]

But it is considered to be unhealthy due to its rich sugar and fat contents with less other nutritional contents. As the consumers are preferring healthier options [2], the manufacturers are pushed towards healthier alternatives to satisfy the present consumers which not only adds value to the food but also adds value to the money spent by the consumers.

So, we have many alternatives like low-calorie Ice creams and Ice creams for diabetic consumers being produced [3]

The present work was carried out to develop a functional ice cream which

- a) improves the health of the consumer
- b) is suitable for diabetic consumers
- c) uses natural ingredients for the above-mentioned purposes a) and b)

So that it satisfies all age groups.

## 2. MATERIALS AND METHODS:

### 2.1 Health powder preparation

#### 2.1.1 Ingredients and their respective quantities

**Table 1:** Health powder ingredients and their respective quantities

Table 1: Health powder ingredients and their respective quantities		
S.NO	INGREDIENTS	QUANTITY PER 100 kg OF HEALTH POWDER (In kg)
1	Samba Wheat	8.34
2	Red Rice	8.34
3	Foxtail Millet	4.17
4	Bajra	4.17
5	Finger Millet	4.17
6	Green-Gram	4.17
7	Chickpeas (White)	4.17
8	Chickpeas (Brown)	4.17
9	Groundnut	4.17

10	Soya Bean	4.17
11	Barley	4.17
12	Horse Gram	4.17
13	Little Millet	4.17
14	Barnyard Millet	4.17
15	Kodo Millet	4.17
16	Cashew Nut	4.17
17	Almond	4.17
18	Pista	4.17
19	Corn	4.17
20	White Sorghum	4.17
21	Roasted Chana Dal Gram	4.17
22	Ragi	4.17

**2.1.2 Ingredients to be sprouted and sprouting procedure**

Of the 22 ingredients in 2.1.1, the following 6 ingredients were allowed to sprout and sundried.

1. Bajra
2. Finger Millet
3. Soya bean
4. White Chickpeas
5. Brown Chickpeas
6. Green Gram

**Sprouting Procedure:**

1. Each of the above six ingredients was soaked in water for 8 hours.
  2. Then the ingredients were removed from the water and they were allowed to sprout for 2 days.
- Then they were sundried for 3-4 hours.

**2.1.3 Preparation**

Each of the above 22 ingredients was finely roasted individually, then mixed, and finally powdered to get the health powder.

**2.2 Health mixture preparation**

- a) Amount of Health powder taken – 85 kg/m<sup>3</sup> of milk (85 g/l)
- b) Amount of Jaggery powder taken– 0.2 kg
- c) Amount of cardamom powder taken – 0.0007 kg

The above ingredients a, b and c were mixed with 0.00025 m<sup>3</sup> (250 ml) of water to a uniform health mixture.

(Note that the health mixture can be prepared in any ratios based on an individual’s taste and need)

**2.3 Method of Ice cream preparation**

1. 0.001 m<sup>3</sup> (1liter) of 4.5% fat milk was allowed to boil on a medium flame.
2. Then the health mixture made in 2.2 was added.
3. Once it had reached the required state of thickness, the flame was switched off, and the 0.05 kg (50g) of butter was added.
4. It was then allowed to cool to room temperature.
5. Then it was blended to cream and frozen.

**2.4 With Flavouring agents**

**2.4.1 Vanilla**

½ teaspoon of vanilla essence added to ¼ liter (0.00025 m<sup>3</sup> / 250 ml) of the product from step 4 in 2.3 and step 5 in 2.3 was then carried out.

**2.4.2 Chocolate**

0.015 kg (15 gm) of Cadbury cocoa powder was added to another ¼ liter (0.00025 m<sup>3</sup> / 250 ml) of the product from step 4 in 2.3 and step 5 in 2.3 was then carried out.

**3. RESULTS AND DISCUSSION**

The addition of health mixture fastens the process of milk thickening in step 3 of 2.3 thereby reducing the processing time.

In both of the flavored ice creams in 2.4, the taste of the health powder dominated the taste of the flavoring agents.

Hence, for flavored versions, reducing the ratio of the amount of health powder to a specific quantity of milk is suggested.

Addition of Jaggery powder increases the cytoprotective and antioxidant activity [6]

Addition of cardamom increases the antidiabetic and antioxidant activity [5]

The other used ingredients are fiber-rich and the health benefits of each ingredient are already known.

The Barnyard millet [4], Samba wheat [8], other millets, and legumes [9] used are beneficial in the management of diabetes mellitus.

The amino acid content and nutritional value of each ingredient is available in [7]

#### 4. CONCLUSION:

This study attempted to develop a functional ice cream that adds health to the consumers including diabetic consumers. Overall, we attempted to give the public, their desired food product, in a healthy form.

#### REFERENCES

[1] J Food Sci Technol. 2015 Dec; 52(12): 7861-7871. Published online 2015 Jul 16. doi: 10.1007/s13197-015-1877-1

[2] Shaviklo GR, Thorkelsson G, Sveinsdottir K, Rafipour F. Chemical properties and sensory quality of ice cream fortified with fish protein. J Sci Food Agric. 2011;91:1199-1204. doi:10.1002/jsfa.4299. [PubMed][CrossRef][Google Scholar]

[3] Deosarkar S.S., Kalyankar S.D., Pawshe R.D., and Khedkar C.D. (2016) Ice Cream: Composition and Health Effects. In: Caballero, B., Finglas, P., and Toldrá, F. (eds.) The Encyclopedia of Food and Health vol. 3, pp. 385-390. Oxford: Academic Press.

[4] Roopashree Ugare, Bharati Chimmad, corresponding author Rama Naik, Pushpa Bharati, and Sunanda Itagi J. Food Sci Technol. 2014 Feb; 51(2): 392-395. Published online 2011 Sep 2. doi: 10.1007/s13197-011-0516-8

[5] Afnan Sh. Ahmed, Qamar Uddin Ahmed, Anil Kumar Saxena, and Parveen Jamal. Evaluation of in vitro antidiabetic and antioxidant characterizations of *Elettaria cardamomum* (L.) Maton (Zingiberaceae), *Piper cubeba* L. f. (Piperaceae), and *Plumeria rubra* L. (Apocynaceae)

[6] M.A. Harish Nayaka, U.V. Sathisha, M.P. Manoha, K.B.Chandrashekar, Shylaja M. Dharmesh Cytoprotective and antioxidant activity studies of jaggery sugar

[7] <https://fdc.nal.usda.gov/>

[8] Aisha Perveen, Shazia Jilani, Sayeda Shifa Zaidi, and Kamar Sultana. ILA] BIL GHIZA IN THE MANAGEMENT OF DIABETES MELLITUS. *ejbps*, 2017, Volume 4, Issue 11 226-229

[9] Priyali Pathak, Sarita Srivastava, Sema Grover. Development of food products based on millets, legumes, and fenugreek seeds and their suitability in the diabetic diet. *International Journal of Food Sciences and Nutrition*. Volume 51, 2000 - Issue 5