



# Formulation And Development Of Ice Cream With Spirulina And Ash Gourd

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**Abstract :** Ice cream is a frozen dairy product preferred as snacks or dessert made of milk and milk products. In the last decade, the perception of consumers have changed from ice creams as a mere enjoyment dessert to functional food with a health benefits. The present work focus on, to formulate an ice cream based on spirulina and ash gourd. Spirulina is one of the rich food source of protein, and also rich in vitamins and minerals. Ash Gourd is a low calorie vegetable contains 96% full of water with high amount of fibre and also contains antioxidant and medicinal properties. Sensory evaluation for 4 variant of ice cream incorporated with spirulina sample done and the variation III was as most acceptable ice cream. For ice cream analysis, physio chemical properties, physical properties and nutrient content were analyzed. Finally, the results show that the spirulina and ash gourd ice cream was compare to vanilla ice cream, that is rich in protein, fibre, iron, phosphorous, vitamin B6, C and E.

**IndexTerms - Physio-Chemical Analysis, materials, methodology, Sensory Evaluation**

## I. INTRODUCTION

Nutrition and health are important deciding factor when consumers purchase dairy products. In all over world, ice cream is considered a food for enjoyment, rather than a basic food. Therefore, fortification of ice cream with nutrient or other organic substances should be supported. The dairy products enriched with minerals, proteins, fibre and essential fatty acids can be manufactured using spirulina and ash gourd. Spirulina also gives natural colour to ice cream and ash gourd gives a bland taste enrich with it. Consumer acceptance of ice cream is determined by texture and taste parameters. The soft texture felt when consuming ice cream depends on the size, amount and shape of ice crystals in ice cream. This study will concern about ice cream formulate with spirulina and ash gourd during the storage period which can produce a soft texture and not easily melt at room temperature. On the sensory properties of ice cream fortified with spirulina and ash gourd can be identified through sensory analysis.

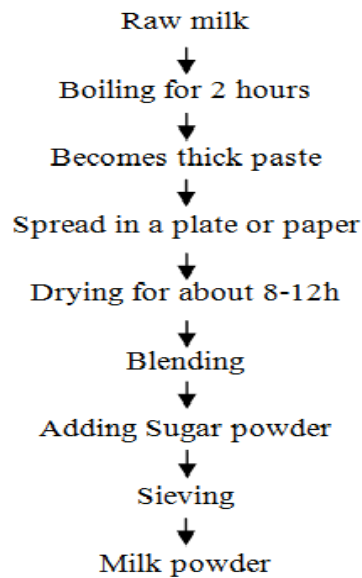
## II. MATERIALS

Milk (Cow's milk), Milk cream, Palm sugar and Ash Gourd was procured from local market. Milk powder was made by cow's milk. Spirulina powder is not available in the local market, this ingredient is been purchased through online (Amazon).

## III. METHODS

### Pre-Processing Methods

**Milk Powder-** Making milk powder at home does not destroy any minerals and vitamins in the food.



**Ash gourd** - Remove the peel and cut it into small pieces, blanched for 10 minutes. Blend it into smooth paste.

**Palm sugar** - Measured and taken the palm sugars, transferred to a blender and ground in a smooth powder. Sieved the powdered palm sugar and stored it in an airtight container.

#### IV. ICE CREAM PREPARATION

The ice cream was prepared as per standard procedure and some modifications are done to improve texture of ice cream.

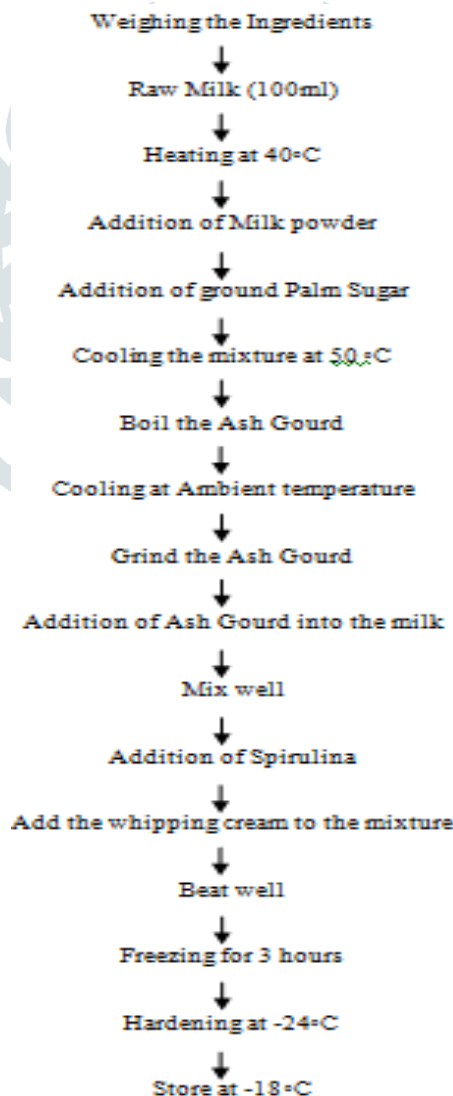


Figure 1  
Spirulina and Ash Gourd Ice cream



## V. RESULT AND DISCUSSION

### Sensory Evaluation

Sensory Evaluation was carried out by 35 panelists, they are asked to evaluate the appearance, colour, flavour, taste and overall acceptability of the product using a 9 point hedonic scale.

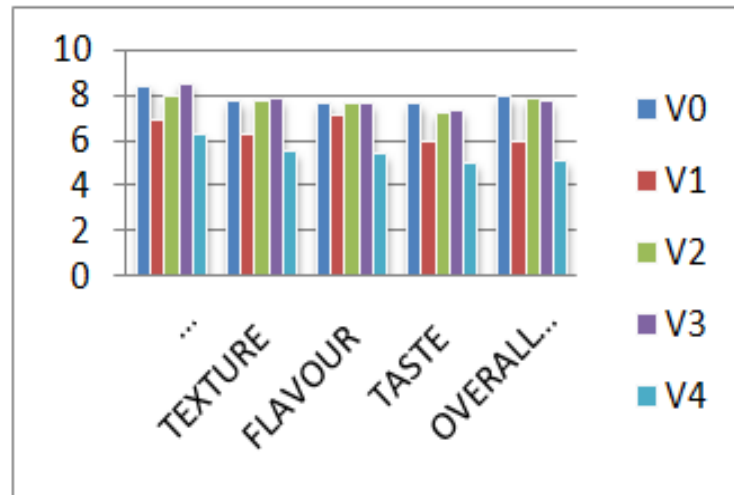
Table 1  
Organoleptic Evaluation of Ice cream

On this scale, Like Extremely – 9, Like Very much – 8, Like Moderately – 7, Like Slightly – 6, Neither Like

Criterion	Control (V0)	V1	V2	V3	V4
Appearance	8.8 ± 0.40	7.9 ± 0.93	8.5 ± 0.57	8.9 ± 0.34	7.5 ± 1.22
Texture	8.4 ± 0.68	7.2 ± 0.98	8.4 ± 0.62	8.3 ± 0.66	6.7 ± 1.14
Flavour	8.4 ± 0.72	7.3 ± 0.65	8.3 ± 0.63	8.3 ± 0.70	6.7 ± 1.28
Taste	8.3 ± 0.66	6.9 ± 0.91	8.1 ± 0.89	8.2 ± 0.85	6.3 ± 1.28
Overall Acceptance	8.5 ± 0.55	6.8 ± 0.85	8.3 ± 0.55	8.4 ± 0.72	6.2 ± 1.10

nor Dislike – 5, Dislike Slightly – 4, Dislike Moderately – 3, Dislike Very much – 2, Dislike Extremely – 1. were 7.9 ± 0.93, 8.5 ± 0.57, 8.9 ± 0.34, 7.5 ± 1.22 was observed. In sensory attributes Appearance and Colour of the control was 8.4 ± 0.40 whereas for the experimental sample V1, V2, V3, V4 the score were 7.9 ± 0.93, 8.5 ± 0.57, 8.9 ± 0.34, 7.5 ± 1.22 was observed. Texture of the control ice cream was 8.4 ± 0.68 whereas for the experimental sample V1, V2, V3, V4 the score were 7.2 ± 0.98, 8.4 ± 0.62, 8.3 ± 0.66, 6.7 ± 1.14 was observed. Taste of the control ice cream was 8.3 ± 0.66 whereas for the experimental sample V1, V2, V3, V4 the score were 6.9 ± 0.91, 8.1 ± 0.89, 8.2 ± 0.85, 6.3 ± 1.28 was observed. Apart from taste the flavour of the control ice cream was 8.4 ± 0.72 whereas the experimental sample V1, V2, V3, V4 the score were 7.3 ± 0.65, 8.3 ± 0.63, 8.4 ± 0.70, 6.7 ± 1.18 was observed. Including all, overall acceptability of control ice cream was 8.5 ± 0.55 whereas the experimental sample V1, V2, V3, V4 the score were 6.8 ± 0.85, 8.2 ± 0.55, 8.4 ± 0.72, 6.2 ± 1.10 was observed.

Figure 2  
Sensory Evaluation



#### Physio-Chemical Analysis

Fresh Cow's milk used for in making of spirulina and ash gourd ice cream was analyzed for the proximate composition like pH, Acidity, moisture, protein, fat and ash. And then prepared product was analyzed for physio-chemical constituents such as pH, Acidity, Moisture, Total solid, Protein, Ash, melting resistance and Whipping ability.

Table 2  
Physio chemical Properties of Spirulina and Ash Gourd Ice cream

pH (%)	6.79
Moisture (gm)	69.3
Ash (gm)	3.22
Acidity (%)	0.22
Total Solid (gm)	48
Melting Resistance (min)	16.5

Table 2 shows the analysis of ice cream which contains pH of 6.79, moisture content is 69.3g, the total solid is 48g, the titrable acidity at 0.22% and the highest melting resistance was counted is 16.5mins. It was observed that as the increasing level of spirulina and ash gourd was also increased in moisture, acidity, ash and decreased pH, total solid of formulated spirulina and ash gourd ice cream.

#### Nutrient Analysis

The proximate principle includes the nutrients like carbohydrates, energy, protein, fat dietary fibre, The proximate principle includes the nutrients like carbohydrate, energy, protein, fat, dietary fibre, the vitamins such as vitamin C, vitamin E, vitamin B6, and minerals are calcium, iron and phosphorous analysed for control and sample compared.

Table 3  
Nutrient Analysis for Spirulina and Ash Gourd  
Ice cream

S.No	Nutrients	V0	V3
1.	Energy	188	113.2
2.	Carbohydrate	21	21.1
3.	Protein	2	6.22
4.	Fat	10	0.23
5.	Fibre	-	2.33
6.	Vitamin B6	-	0.03
7.	Vitamin C	-	0.92
8.	Vitamin E	-	0.52
9.	Calcium	126	132
10.	Iron	-	2.92
11.	Phosphorous	-	11.2

Table 3 shows the nutrient analysis of Spirulina and Ash Gourd ice cream has more nutrients than the control. Which contains CHO is 21.1kcal, Protein is 6.22g, fat is 0.23g, Fibre is 2.33g, Vitamin B6 is 0.03mg, Vitamin C is 0.92mg, Vitamin E is 0.52, Minerals are Calcium contain 126mg, Iron contain 2.92mg, and Phosphorous contain 11.2mg compared than the Vanilla Ice cream.

#### Cost of Production of Spirulina and Ash Gourd Ice Cream

The cost of Spirulina and Ash Gourd ice cream was worked out by considering the prevailing cost of ingredients only. The data are presented in table 4.

#### Cost of Production of Spirulina and Ash Gourd Ice Cream

Ingredients	Quantity	Price
Milk	100ml	4.8
Milk Powder	5g	2.5
Palm sugar	10g	5.5
Spirulina	7g	16.7
Ash Gourd	25g	1.1
Whipping Cream	7.5g	2.2
Total	150ml	32.8

- Raw Material Cost = 32.8
- Overhead cost (40%) =  $\frac{32.8 \times 40}{100}$
- Total Cost = 45.9

Therefore, the total cost of spirulina and ash Gourd ice cream (150ml) is = **Rs. 50.00**

## CONCLUSION

The present investigation was undertaken for “Formulation And Development Of Ice Cream Incorporated With Spirulina And Ash Gourd” for proximate sensory, physio chemical and nutritional analysis. Sensory attributes was done at the same period of time. According to the sensory attributes all different treatments were accepted. Results obtained were satisfactory and the spirulina and ash gourd ice cream showed good quality characteristics on pH, Acidity, Moisture, Ash, total solid and Melting resistance. The overall acceptability was found in variation III. Ice cream can be stored for 30 days due to absence of microorganism was also lower, and it can be recommended as health food for patients due to the spirulina protein benefits.

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