A

Project Report

On

“ALMOND BEETROOT ICECREAM”

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ARTS, COMMERCE AND SCIENCE COLLEGE, SONAI, AHMEDNAGAR

In partial fulfillment of the requirements for the degree of

Bachelor of Vocational

in

FOOD PROCESSING (DAIRY TECHNOLOGY)

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CERTIFICATE

Certified that **ZIRPE VRUSHALI SUNIL and LANGHE NIKHIL DASHARATH** has carried out the project work entitled ***"Almond Beetroot Icecream"*** for the award of the degree of Bachelor of Vocational (Food Processing) from Mula Education Society's Arts, Commerce and Science College, Sonai, Ahmednagar under my supervision. The project embodies results of original work, and studies are carried out by the student himself and the contents of the project work do not form the basis for the award of any other degree to the candidate or to anybody else from this or any other University/Institution.

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Place: Sonai LANGHE NIKHIL DASHARATH

INTRODUCTION

Ice cream is a common dessert product that is produced through the pasteurization and homogenization of bl3ended dairy products, (typically milk, condensed milk, butterfat, and cream). Other ingredients such as sweetening agents, flavorings, stabilizers, emulsifiers, colorings are also added to the mix. Occasionally, fruits, nuts, variegates, candy pieces, and other condiments are added to make a desired ice cream flavor. The process then involves freezing the mixture and incorporating air. The addition of air is called overrun and contributes to the lightness or denseness of ice cream. Without air, ice cream would be similar to a frozen ice cube. The ice cream is then placed into its packaging container. Finally, ice cream is cooled down to a holding temperature of less than -13°F (-25°C) as quickly as possible.

The origins of ice cream are thought to date back to the Roman Empire (A.D. 54-86) where Nero Claudius Cesar would send runner to fetch snow in the mountains to be flavored with fruit and juices. Sherbet was brought to Italy by Marco Polo leading to the recipe being modified to ice cream sometime in the 16th century. Ice cream may have been developed in England at the same time or before the Italians. The dessert was brought to America in the late-1700s and it remained a rare item consumed by the elite through the mid-1800s. The industry soon began to grow as steam power, refrigeration, homogenizers, and new freezing technologies helped improve ice cream production and efficiency. By the 1900s ice cream was widely available in supermarkets and parlors throughout the United States, steadily growing to the current production of approximately 1.6 billion gallons per year.

Ice cream related foodborne disease is a pervasive problem caused by consuming contaminated ice cream products. Between 1990 and 2009, ice cream products were responsible for 74 outbreaks incidents and 2,594 reported illnesses. One of the earliest cases of food borne illnesses related to ice cream was traced to selected ice cream products from Schwan's Sales Enterprises of Marshall, Minnesota in 1994. This incident was reported to have occurred from *Salmonella* – related contamination, when raw unpasteurized eggs were hauled in a tanker truck that later carried pasteurized ice cream mix to the Schwan's plant. This outbreak was traced to about 740 people in 30 states. The outbreak was suspected to have sickened over 3,000 additional people in as many as 41 US states.

In 2005 a multi-state outbreak of *Salmonella* Typhimurium occurred in Cold Stone Cake Batter Ice Cream. The outbreak infected 25 people across nine states, leading to four hospitalizations and no reported death Investigation into the outbreak found that Gold Metal Super Moist cake mix that is included as an ingredient was the source of contamination, wherein 24 of the 25 cases reported eating the cake batter ice cream which shared a cream base with other flavors of ice cream. Cold Stone Creamery issued a recall of this flavor in response to the outbreak.

Types of Ice Cream

Regular ice cream – a frozen food made from a mixture of dairy products, containing at least 10 percent milk fat.

Light or lite ice cream contains at least 50 percent less total fat or 33 percent fewer calories than the referenced product.

Low-fat ice cream contains a maximum of 3 grams of total fat per serving (½ cup).

Non-fat ice cream contains less than 0.5 grams of total fat per serving.

Frozen Custard or French ice cream must also contain a minimum of 10 percent milk fat, and at least 1.4 percent egg yolk solids.

Sherbets have a milk fat content of between 1 and 2 percent, and weigh a minimum of 6 pounds to the gallon.

Sorbet and Water Ices are similar to sherbets, but do not contain dairy ingredients.

Frozen Yogurt consists of a mixture of dairy ingredients such as milk and nonfat milk that have been cultured, as well as ingredients for sweetening and flavoring.

Nutrition

Ice creams are dairy-sourced frozen foods usually consumed as snacks or desserts. Federal regulations or standards of identity stipulate that ice cream must contain a minimum of 10 percent milk fat and 20 percent total milk solids by weight.

One serving of ice cream ½ cup, which for regular ice cream contains approximately 140 calories, 7 grams of fat, 14 grams of added sugar, and 2 grams of protein. Ice cream is considered a high-calorie food due to both its high calorie and high fat content for the small serving size. In addition, ice cream is high in saturated fat; high intake of saturated fat has been associated with increased risk of developing cardiovascular disease and type 2 diabetes, however the link between dairy fat and heart disease risk is an ongoing area of debate. Ice cream is considered a good source of calcium and phosphorous, containing 10% daily value per serving. While ice cream can be part of a balanced diet, its high palatability increases the likelihood of overconsumption and increased daily energy intake.

2. MATERIALS AND METHODS.

Materials: Beetroot, Wheat Flour, Milk, Cardamom, Condensed Milk, Full cream milk, Almonds.

Equipment's Required:

1. Whisks and forks

We whip cream by hand in our store, and a balloon whisk is our whisk of choice.

2. Ice cream machine

3. Sieve

When making ice cream, you always have to be aware of texture, and I like things smooth

4. **Heat-proof silicone spoons and spatulas**

I use these to stir cream, and to mix jams and sauces at high temperatures

5. Homogenizer

6. Cooling tank

7. Aging tank

8. Continuous Freezer

9. Centrifugal Machine

10. Scoops

Procedure

Ice cream is manufactured via the following steps: blending of ingredients, pasteurization, homogenization, aging of the mix ingredients, freezing, packaging and hardening.

1.Blending and Pasteurization-

Blending consists of selecting the appropriate ingredients and corresponding amounts for a particular flavor of ice cream and blending them together using high speed blenders to create the "ice cream mix." The mix is then pasteurized using either a batch or continuous pasteurizer. In the former method, blending of ingredients is done in large jacketed vats, where the mix is heated with steam or hot water to 69° C (155°F) for about 30 minutes, or any temperature high enough to destroy pathogens and reduce bacterial count to a max of 100,000 per gram.

2.Homogenization and Aging-

Homogenization of ice cream mix is typically a two-stage process that takes place at the pasteurizing temperature. Using a high temperature allows for the formation of fat emulsion via efficient reduction of (i.e. milk, cream) globules, resulting in a thinner more easily whipped mix. A two-stage homogenizer usually requires pressure values of 2000 – 2500 psi and 500 – 1000 psi.

3.Freezing-

The freezing process consists of freezing both a portion of the water and whipping air into the frozen mix to give ice cream its characteristic lightness. Mix is pumped through a "barrel" freezer and drawn in about 30 seconds, or 10-15 minutes using a batch freezer. Ice cream is packaged and placed into a blast freezer at -30° to -40°C where most of any remaining water is frozen. At temperatures lower than -25° C, ice cream is stable for indefinite periods of time; however, ice crystal growth at higher temperatures is possible and will limit shelf life.

4.Hardening

Hardening involves rapid-rate static freezing of packaged products in blast freezers. Temperatures in this process are low, around -40°C with either enhanced convection (freezing tunnels with forced air fans) or enhanced conduction (plate freezers).

2.4 Chemical Analysis

1. **Moisture Content-** Moisture content of the eggplant flesh powder was determined using the hot air oven method (AOAC, 2000).
2. **Protein Content-** Crude protein was estimated using the micro Kjeldahl method (Pelican Equipments)
3. **Fat Content-** Fat content was estimated using soxhoplus (Pelican equipment's).
4. **Crude Fiber Content-** Crude fibre was estimated using fibroplus (Pelican Equipments)
5. **Ash Content-** The ash fraction contains all the mineral elements but it allows to nitrogen-free-extract (by difference) from dry matter
6. **Carbohydrate Content-** Carbohydrates are calculated on the basis of determination of the remaining four parameters.
7. **Iron Content-** Iron was introduced during the mixing of the cookie batter. Spectrophotometric measurement of the Iron Content of cookies was introduced in accordance with the AOAC protocol.

3. RESULT AND DISCUSSION

3.1 Analysis

3.1.1 Proximate analysis of raw material for Ice-cream preparation

Chemical properties were analysed to check the quality of raw materials. The nutritional composition of Beetroot are mentioned below in **table no. 4.2**

As beetroot are added for fortification in the product, it is analysed using various instruments to get idea about nutritional contents such as Moisture content, protein content, fat content, fibre content, potassium, magnesium

Table 3.1: Proximate analysis of raw materials

Sr. No.	Parameters / Sample	Moisture (%)	Ash (%)	Fat (%)	Fiber (%)	Protein (%)	Carbohydrate (%)
1	Beetroot	60	5.4	2	17	9.5	12
2	Wheat Flour	6.7	2.5	5	36	20	29.8

Table No. 3.2 -Chemical Analysis

4. CONCLUSION

1) Beetroot were analysed and were found to increase the fibre, Iron and Protein content of the formulated product. Betalain pigment was obtained from beetroot which is a natural source of colour.

4.1 FUTURE SCOPE

Artificial colour affects the health and so it can be replaced by natural colour (betalain pigment) to increase the nutritive value of the product.

REFERENCE

I Center for Science in the Public Interest. The Ten Riskiest Foods Regulated by the FDA [Internet]. Center for Science in the Public Interest. [cited 2020 Jul 14]. Available from: https://col.st/syJue

II Centers for Disease Control and Prevention. Multistate Outbreak of Listeriosis Linked to Blue Bell Creameries Products [Internet]. 2018 [cited 2020 Jul 14]. Available from: https://col.st/AiYOA

III Hartel RW, Rankin SA, Bradley RL. A 100-Year Review: Milestones in the development of frozen desserts. Journal of Dairy Science. 2017 Dec 1;100(12):10014–25.

IV The History of Ice Cream [Internet]. Today I Found Out. 2013 [cited 2020 Jul 13]. Available from: https://col.st/qAYaG

V 2005 Cold Stone Cake Batter Ice Cream [Internet]. The International Outbreak Museum. 2015 [cited 2020 Jul 13]. Available from: https://col.st/NyFvY