

# ICE CREAM AND FROZEN DESSERT

## **A. History, development and status of ice cream industry**

Origin of ice cream is Europe. Water ices were made in southern Europe as early as the fifteenth century. The first printed record of 'Cream ice' appeared in The Experienced English House Keeper in 1769 more than two hundred years ago. Since that time ice cream manufacture has continued to grow.

Factors contributing to the development of the ice cream industry:

- i. The perfection of mechanical refrigeration and its application to the food industry
- ii. Improved manufacturing methods and equipment such as homogenizers, overruns testers, continuous freezers, packaging machines
- iii. More and better ingredients and knowledge
- iv. Lower manufacturing cost
- v. Extensive advertising of the product
- vi. High food value
- vii. Changing economic conditions, better wages, more purchasing power and a high standard
- viii. Improved storage facility

## **B. Definition:**

Ice cream is the frozen product obtained from cow or buffalo milk or a combination thereof or from cream and or other milk products with or without the addition of cane sugar ,eggs, fruits, fruit juices, preserved fruits, nuts, chocolate, edible flavours and permitted food colours. It may contain permitted stabilizer and emulsifier not exceeding 0.5% by weight. The mixture must be suitable heated before freezing. The product should contain not less than 10% milk fat, 3.5 % protein and 36% total solids. However when any of the aforesaid preparations contain fruits or nuts or both, the content of milk fat be proportionately reduced but may not less than 8% by weight. Starch may be added to a maximum extent of 5% with a declaration to that effect on the level.

## **C. Classification of ice cream:**

Depending upon the commercial practices followed, the following classifications are used for different groups of ice cream and frozen products.

### **1. Plain ice cream**

An ice cream, in which the total amount of the colour and flavouring ingredients is less than 5% of the volume of the unfrozen ice cream. Examples are vanilla, coffee, maple and caramel

ice cream.



## 2. Chocolate

Ice cream flavoured with cocoa or chocolate. It usually contains higher sugar content *viz.*, 16 to 17%, about 2.5 to 3.5% of cocoa and stabilizer and emulsifier. Other variants of chocolate frozen product includes chocobar (where chocolate acts as a couverture), chocolate frosties (chocolate layer containing crispies), chocochips.



## 3. Fruit

Fruit Ice cream is made by adding various fruits at the time of freezing with or without additional fruit flavouring or colour. The fruits may be fresh, frozen, canned or preserved.



## 4. Nut

Ice cream containing nut meats, such as almonds, pistachio or walnut, with or without additional flavouring or colour.

## 5. Ice Milk / Milk Ice

A product similar to ice cream containing 2 -7% fat and 12-15% MSNF, sweetened, flavoured and frozen like ice cream.



### **6. Ices**

Made of fruit juices, sugar and stabilizer with or without additional fruits, color, flavouring or water and frozen to the consistency of ice cream. Usually contains 28 – 30% sugar, 15-20% overrun, and no dairy products.

### **7. Sherbets**

Sherbet is a product made of fruit juices, sugar, stabilizer, and milk products. It is similar to anise, except milk, either whole, skim, condensed, or powdered, or ice cream mix, is used in place of all or part of the water used in ices, sherbet contains 1-2% milk fat.



### **8. Sorbets**

The composition of sorbets is similar to that of ices. Sorbets have a high sugar and fruit and fruit juice content (30,30 and 50% respectively). Stabilizer and egg white are also added, and the product has an overrun of 20% or less. Exotic flavours are often included in sorbets.



### **9. Mousse**

Ice cream containing whipped cream, sugar, colour and flavouring, and frozen without further agitation. Sometimes condensed milk is added to give better consistency.



### **10. Bisque**

It is made by the addition of grape, nuts, macaroons, sponge cake or other bakery products with appropriate flavourings.



### **11. Custards**

Custard is ice cream cooked to custard before freezing. Frozen custards are also known as French ice cream or French custard ice cream. It contains whole egg or egg yolk in such a proportion that the total egg yolk solids should not be less than 1.4% of the weight of the finished frozen custard or less than 1.12% for bulky flavored products. Parfait is frozen custard with high fat content.

### **12. Cassata**

This is made in a round mold, hinged so that it may be filled with ice cream and other frozen products. The confection is built up in layers of rich, variously flavoured ice cream, some with fruits, some with liqueurs, and sometimes with chocolate or nuts. Fingers or slices of sponge cake, sometimes soaked in liqueur, may be added. The cassata is frozen for several hours, and then turned out of the mold for serving.



### **13. Variegated or rippled ice cream**

Variegated ice cream is produced by injecting approximately 10% of a prepared base into the ice cream. Most popular flavours of variegated ice cream are chocolate, butter scotch, strawberry, pineapple and caramel.



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#### **14. Novelties**

An ice cream novelty is defined as a unique single-serve portion – controlled product. Novelties include special combinations of ice cream with flavour and confections, cup items, and fancy molded items. They are usually produced by either extrusion or molding, and examples include coated ice cream bars (e.g. Mars) , Coated ice cream bars on a stick (e.g. Magnum), ice cream cake, and ice cream logs (e.g. Vienetta), ice cream sandwiches, popsicles and fudgesicles.



#### **15. Puddings**

Ice cream containing a generous amount of mixed fruits, nut meats, and raisins, with or without liquor, spices or eggs.

#### **16. Fanciful-name ice cream**

These products usually do not contain a single characterizing flavour, but the flavour is due to the mixture of several flavouring ingredients. Two or more distinct flavours in the same package.

#### **17. New york or philadelphia**

This is generally a plain vanilla ice cream with extra colour for Philadelphia and extra fat and eggs for New York Ice Cream.



#### **18. Rainbow ice cream**

It is prepared by carefully mixing six or more different coloured Ice Creams as they are drawn from the freezers to give a rainbow coloured effect when the product is hardened.



### **19. Fancy moulded ice cream**

It is moulded in fancy shapes and composed either of one colour and flavour of Ice Cream or a combination of colours and flavours or especially decorated.



### **20. Mellorine type products**

Mellorine is a product similar to ice cream in which the butter fat has been replaced by a suitable vegetable or animal fat.

### **21. Soft serve ice cream**

Soft serve ice cream is a type of frozen dessert that is similar to, but softer than the ice cream. These products are sold as drawn from the freezer without hardening. It is generally lower in milk fat (3.6%) than ice cream (10-18%) and produced at a temperature of about  $-4^{\circ}\text{C}$  compared to ice cream, which is stored at  $-15^{\circ}\text{C}$ . A warmer temperature of soft serve ice cream allows the taste buds to detect more flavour. The air introduced into soft serve ice cream may vary from 0-60% of the volume of the finished product. The ideal acceptable air content is between 33 and 45% of volume.

The premix for soft serve can be obtained in several forms

1. Fresh liquid that requires constant refrigeration until needed. It can be stored for 5 to 7 days before spoiling by bacterial contamination
2. A powdered mix: This is a dried version of liquid mix. It has several advantages of easy distribution and can be stored for longer periods of time without spoiling. Water must be added prior to being churned and frozen.
3. UHT-Mix: It is a liquid that has been sterilized and packed in sealed, sterile bags. It can last for a very long time without refrigeration and can be poured into the soft serve freezer immediately upon opening. All these should be refrigerated to  $3^{\circ}\text{C}$  prior to use to avoid bacterial contamination and spoilage.

### **22. Kulfi**

Kulfi is an indigenous frozen milk product. The method of manufacture of kulfi varies widely. The conventional method of kulfi making consists of boiling of milk, addition of sugar, concentration of milk to 2:1 level and addition of khoa, malai, flavour etc. to the concentrated cooled milk. Kulfi mix is then filled into metallic cones and the top of the cone is covered with a lid. The mixture in the moulds is frozen in large earthen vessels containing ice – salt mixture in the ratio of 1:1.

### **23. Malai-ka-baraf**

This term is applied to a variety of frozen product in which sweetened milk or malai may form the chief ingredient.

#### D. Chemical composition:

Parameter	Ice cream or <i>Kulfi</i> or Chocolate ice cream or softy ice cream	Medium Fat Ice Cream or <i>Kulfi</i> or Chocolate ice cream or softy ice cream	Low Fat Ice Cream or <i>Kulfi</i> or Chocolate ice cream or softy ice cream
Total Solids, minimum, %, (m/m)	36.0	30.0	26.0
Weight, minimum, g/l	525.0	475.0	475.0
Milk Fat, %, (m/m)	10.0 (minimum)	More than 2.5 and less than 10.0	2.5 (maximum)
Milk Protein*, minimum, %, (m/m)	3.5	3.5	3.0

\* Protein content is 6.38 multiplied by the total nitrogen determined (FSSAI, 2011)

#### E. Role of the constituents in Ice cream:

1. **Milk fat:** This is high in food value but expensive. It enriches and mellows the ice cream which imparts a full, rich and creamy flavour. The fat contributes to the body and melting resistance of ice cream while producing a smoothness of texture. Fat gives stability to the ice cream but impairs whipping ability.

##### Advantages:

- i. Enriches the flavour
- ii. Produces a characteristics smooth texture
- iii. Helps give body to the ice cream

##### Limitations:

- i. Cost
- ii. Fat slightly hinders, rather than improves , whipping
- iii. High fat content may limit the amount of ice cream consumed
- iv. High calorific value

2. **Milk solids not fat:** This consists of milk protein, milk sugar and mineral matter. They are high in food value and also in expensive. They help to improve body and texture. Milk sugar adds sweet taste. The milk protein helps to make ice cream more compact and smooth.

##### Advantages:

- i. Improve the texture
- ii. Help to give body
- iii. A high overrun without snowy or flaky texture
- iv. A comparatively cheap source of solids

##### Limitations:

- i. A high percentage causes sandiness
- ii. The condensed milk flavour may be objectionable
- iii. May cause salty and cooked flavour

3. **Sugar:** The main purpose of milk sugar is to increase the acceptability of ice cream. The desired sweetening effect is only produced by sucrose. Sugars are usually the cheapest source of total solids in the mix.

**Advantage:**

- i. Is usually the cheapest source of solids
- ii. Improves the texture
- iii. Enhances the flavour

**Limitations:**

- i. Excessively sweet
- ii. Lowers whipping ability
- iii. Requires a lower temperature for proper hardening

4. **Stabilizers:** They are used to prevent the formation of objectionably large ice crystals in ice cream, especially during storage. Since they are added in very small quantities, they have a negligible influence on food value and flavour.

**Advantage:**

- i. Very effective in smoothening the texture
- ii. Very effective in giving body to the product

**Limitation:**

- i. Excess body and melting resistance

5. **Emulsifier:** These are mainly used to improve and provide a uniform whipping quality to the mixture and to produce a drier ice cream with smoother body and texture.

**Advantage:**

- i. Improves whipping quality of mixture
- ii. Gives smoother body and texture
- iii. Reduces whipping time

**Limitations:**

- i. Homogenisation of milk is essential
- ii. Tends to favour 'shrinkage' defect
- iii. Excess body and melting resistance

6. **Flavour and colour:** Flavour increases the acceptability of ice cream and colour its aesthetic appeal.

**Advantage:**

- i. Flavour increases acceptability
- ii. Colour improves appearance
- iii. Colour aids in identifying flavours

**Limitations:**

- i. Harsh flavour less desirable
- ii. Intense flavours provide immediate satisfaction
- iii. Intense and unnatural colours reduce consumer acceptability