



PM Formalisation of Micro Food Processing Enterprises Scheme

Processing of Ice Cream



AATMANIRBHAR BHARAT

**National Institute of Food Technology, Entrepreneurship and
Management (NIFTEM) - Thanjavur**

(an Institute of National Importance under Ministry of Food Processing Industries, Government of India)

Pudukkottai Road, Thanjavur – 613005

<https://niftem-t.ac.in/>

Ph : 04362-228155, Fax:04632-227971

TABLE OF CONTENTS

	Page No.
Chapter 1: Introduction	
1.1 Scope of Starting Ice Cream Industry	3
1.2 Prepackaged Ice Cream	6
1.3 Icecream Processing Flow and Explanation	6
1.4 Types of Icecream	14
1.5 Type of Ice Cream by Shapes	15
1.6 Types of Ice Cream Cones	17
Chapter 2: Preparation of Icecream	
2.1 Composition of Ice Cream	20
2.2 2 Ice Cream Proportion	20
2.3 Functions of Ingredients Used in Ice cream and Caused Defects	20
Chapter 3: Packaging of Icecream	
3.1 Packaging of Icecream	26
3.2 Factors That Need to be Considered in Selection of Ice Cream Container	27
3.3 Types of Packaging Used for Ice Cream	28
Chapter 4: Food Safety Regulations & Standards	
4.1 Definitions and Standards	32
4.2 Food Safety	39
4.3 Labelling Standards	41

CHAPTER 1

INTRODUCTION

1.1 Scope of starting ice cream industry

Iced cream, better known as ice cream is a dairy product that is witnessing an evolution in the recent past. Growing urbanisation, rising disposable incomes, growing desire for indulgence treats, and changing customer preferences are the factors contributing to the rise in demand for ice creams and frozen desserts.

The global ice cream market is estimated to grow at a Compound Annual Growth Rate (CAGR) of 4.7 percent, reaching a staggering \$73.2 billion by 2022.

India is the world's largest producer of milk and accounts for more than one-fifth of the total milk production. In contrast, per capita consumption of ice cream remains low at 400 ml. However, led by the changing socio-economic dynamics of India, the ice cream sector is expected to register a growth of more than 50% from 2019 to 2022. The growth is driven by the availability of different varieties and flavours of ice creams such as hard ice cream, soft ice cream, low-fat ice cream, and others.

Ice cream manufacturers in India and around the world are stepping up the innovation game for meeting consumer's demands for new and exotic flavours of ice creams. Along with traditional flavours like vanilla, mango, strawberry, etc., there is a demand for exotic flavours like blueberry, kiwi, pineapple, coconut, Indian pan, watermelon, and more.

With greater discretionary spending and increasing health awareness, consumers in India are open to trying newer variants that meet their expectations. Youth under 26 years of age, accounting for more than 53 percent of the total Indian population, is considered a key demographic for the ice cream and the frozen dessert sector.

A significant percentage of the customer base is inclined towards healthy and premium options. In India, the standard fat content in ice creams has been reduced to

less than 5 percent. Diet-friendly ice creams that comprise fat-free, low sugar, probiotic, and sugar-free variants are introduced by leading ice cream brands as a part of the premium range. These incremental product innovations drive the growth of the local & global ice cream market.

The Indian market comprises a mix of Indian as well as international brands that are driving consumption in metros, mini-metros, and rural parts of India. Many unorganized players have set up ice cream businesses in rural areas which is potentially a bigger market than metro cities.

Maharashtra represents the largest market followed by Uttar Pradesh and Gujarat. International and regional players are providing impetus to the Indian ice cream market. Some of the prominent players in the market are Gujarat Cooperative Milk Marketing Federation Limited (GCMMF), Kwality Walls, Vadilal, Mother Dairy, Hatsun, and Cream Bell.

Non-dairy ice cream products, including lactose-free ice creams, are also contributing to the non-dairy ice cream industry growth. There is a demand for frozen desserts and froyo (frozen yogurts) that is attractive to consumers and considered as sector competitors in the Indian market. Frozen dessert manufacturers are at loggerheads with the ice cream makers as they are insisting that frozen dessert products should be allowed to be labelled as ice cream.

The ice cream industry in India is projected to generate a revenue of approximately \$3.4 billion by 2021. Employing more than 15 lakh people, the ice cream industry is one of the fastest-growing segments of the dairy or food processing industry. Ice-cream producers, including multinational companies in the cold chain, refrigerated transportation & packaging, etc. are all matters of concern for the ice cream industry. There is need to study topics such as emerging market trends, food safety, labelling, and regulations that affect the industry and brand strategy for expansion and market domination. CII aims to encourage such discussions to open up the market through its events for the sector.

The future of the Indian ice cream market entails innovative ways for product development, strengthening rural infrastructure for a wider value chain, and ensuring food producing standards. As Indian palate for a range of gourmet dishes grows, the ice cream industry has a promising future in the subcontinent.

India is a land of tropical weather; with summers being the longest weather in the country. Thus, in niche food businesses, the Ice Cream business seems to be the most lucrative. Over the last couple of years, ice-cream business has seen some rapid innovation. Earlier roadside carts were common among the people and were frequented by mostly children and youngsters. Nowadays, the concept of ice cream parlors is fast gaining popularity, where people can enjoy ice cream at leisure.

The reason behind this changing trend is clear – one is the increasing disposable income of the middle-class family, and secondly, the western culture is influencing the consumer habits. These macro and microeconomic factors make the ice cream business more viable and profitable in present times.

The ice cream business used to be largely unorganized in India. However, the growth of retail chains and the entry of foreign ice cream brands into India has transformed the landscape. Ice cream businesses are becoming more organized with a few players manufacturing / importing ice cream into India, supported by a large number of ice cream parlours / retail chains for selling the ice cream. Also, the choices of ice cream types available in the market have increased with the following types of ice creams now witnessing growing demand:

- Low fat ice creams
- Frozen yoghurts
- Cake ice creams
- Imported Ice Creams
- Milkshakes

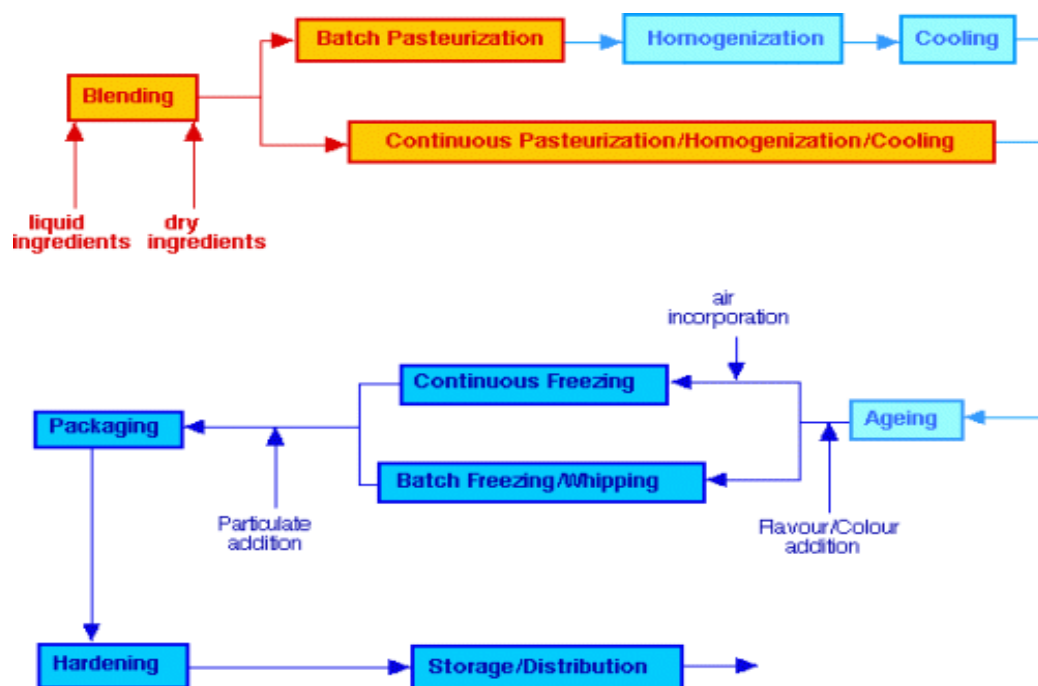
1.2 Prepackaged Ice Cream

According to researchers and developers of ice creams – changing lifestyle and the large youngster's population in India will contribute towards 9 to 12% growth in the current market for ice creams. Thereby leaving ample scope for the development of several successful ice cream brands in the country.

1.3 Icecream processing flow and explanation

The basic steps in the manufacturing of ice cream are generally as follows:

- Blending of the mix ingredients
- Pasteurization
- Homogenization
- Aging the mix
- Freezing
- Packaging
- Hardening



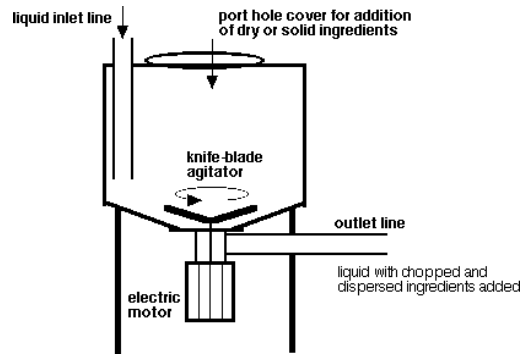
Process flow diagram for ice cream manufacture: the red section represents the operations involving raw, unpasteurized mix, the pale blue section represents the operations involving pasteurized mix, and the dark blue section represents the operations involving frozen cream



IIFPT AUTOMATED ICECREAM PROCESSING UNIT

1.3.1 Blending

First the ingredients are selected based on the desired formulation and the calculation of the recipe from the formulation and the ingredients chosen, then the ingredients are weighed and blended together to produce what is known as the "ice cream mix". Blending requires rapid agitation to incorporate powders, and often high speed blenders are used.



1.3.2 Pasteurization of Mix

The mix is then pasteurized. Pasteurization is the biological control point in the system, designed for the destruction of pathogenic bacteria. In addition to this very important function, pasteurization also reduces the number of spoilage organisms such as psychrotrophs, and helps to hydrate some of the components (proteins, stabilizers). Both batch pasteurizers and continuous (HTST) methods are used.

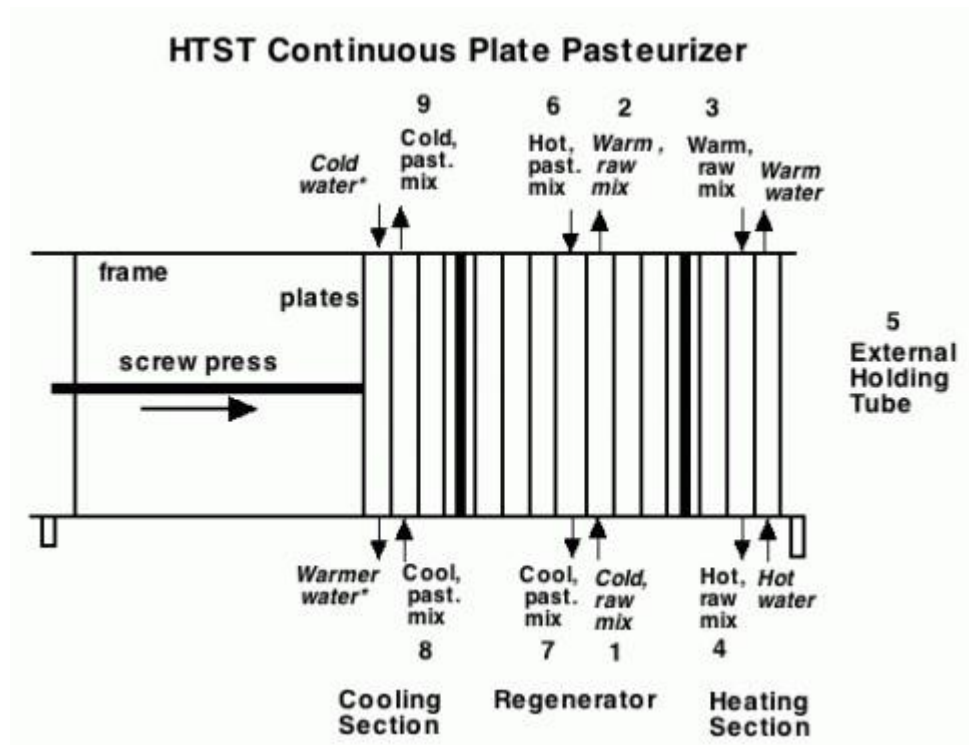
Pasteurization (Ontario regulations): 69° C/30 min. 80° C/25s

Batch pasteurizers

Batch pasteurizers lead to more whey protein denaturation, which some people feel gives a better body to the ice cream. In a batch pasteurization system, blending of the proper ingredient amounts is done in large jacketed vats equipped with some means of heating, usually steam or hot water. The product is then heated in the vat to at least 69 C (155 F) and held for 30 minutes to satisfy legal requirements for pasteurization, necessary for the destruction of pathogenic bacteria. Various time temperature combinations can be used. The heat treatment must be severe enough to ensure destruction of pathogens and to reduce the bacterial count to a maximum of 100,000 per gram. Following pasteurization, the mix is homogenized by means of high pressures and then is passed across some type of heat exchanger (plate or double or triple tube) for the purpose of cooling the mix to refrigerated temperatures (4 C). Batch tanks are usually operated in tandem so that one is holding while the other is being prepared. Automatic timers and valves ensure the proper holding time has been met.

Continuous pasteurizer

Continuous pasteurization (see schematic diagram for mix to the right) is usually performed in a high temperature short time (HTST) heat exchanger following blending of ingredients in a large, insulated feed tank. Some preheating, to 30 to 40 C, is necessary for solubilization of the components. The HTST system is equipped with a heating section, a cooling section, and a regeneration section. Cooling sections of ice cream mix HTST presses are usually larger than milk HTST presses. Due to the preheating of the mix, regeneration is lost and mix entering the cooling section is still quite warm.



1.3.3 Homogenization of Mix

The mix is also homogenized, which forms the fat emulsion by breaking down or reducing the size of the fat globules found in milk or cream to less than 1 μ m. Two stage homogenization is usually preferred for ice cream mix. Clumping or clustering of the fat is reduced thereby producing a thinner, more rapidly whipped mix. Melt-down is

also improved. Homogenization provides the following functions in ice cream manufacture:

- Reduces size of fat globules
- Increases surface area
- Forms membrane
- Makes possible the use of butter, frozen cream, etc.

By helping to form the fat structure, it also has the following indirect effects:

- makes a smoother ice cream
- gives a greater apparent richness and palatability
- better air stability
- increases resistance to melting

Homogenization of the mix should take place at the pasteurizing temperature. The high temperature produces more efficient breaking up of the fat globules at any given pressure and also reduces fat clumping and the tendency to thick, heavy bodied mixes. No one pressure can be recommended that will give satisfactory results under all conditions. The higher the fat and total solids in the mix, the lower the pressure should be. If a two stage homogenizer is used, a pressure of 2000 - 2500 psi on the first stage and 500 - 1000 psi on the second stage should be satisfactory under most conditions. Two stage homogenization is usually preferred for ice cream mix. Clumping or clustering of the fat is reduced thereby producing a thinner, more rapidly whipped mix. Melt-down is also improved.

1.3.4 Ageing of Mix

The mix is then aged for at least four hours and usually overnight. This allows time for the fat to cool down and crystallize, and for the proteins and polysaccharides to fully hydrate. Aging provides the following functions:

- Improves whipping qualities of mix and body and texture of ice cream

It does so by:

- providing time for fat crystallization, so the fat can partially coalesce;
- allowing time for full protein and stabilizer hydration and a resulting slight viscosity increase;
- allowing time for membrane rearrangement and protein/emulsifier interaction, as emulsifiers displace proteins from the fat globule surface, which allows for a reduction in stabilization of the fat globules and enhanced partial coalescence.

Aging is performed in insulated or refrigerated storage tanks, silos, etc. Mix temperature should be maintained as low as possible without freezing, at or below 5 C. An aging time of overnight is likely to give best results under average plant conditions. A "green" or unaged mix is usually quickly detected at the freezer.

1.3.5 Freezing/Whipping of Ice Cream

Following mix processing, the mix is drawn into a flavour tank where any liquid flavours, fruit purees, or colours are added. The mix then enters the dynamic freezing process which both freezes a portion of the water and whips air into the frozen mix. The "barrel" freezer is a scraped-surface, tubular heat exchanger, which is jacketed with a boiling refrigerant such as ammonia or freon. Mix is pumped through this freezer and is drawn off the other end in a matter of 30 seconds, (or 10 to 15 minutes in the case of batch freezers) with about 50% of its water frozen. There are rotating blades inside the barrel that keep the ice scraped off the surface of the freezer and also dashers inside the machine which help to whip the mix and incorporate air.

Ice cream contains a considerable quantity of air, up to half of its volume. This gives the product its characteristic lightness. Without air, ice cream would be similar to a frozen ice cube. The air content is termed its overrun, which can be calculated mathematically.

As the ice cream is drawn with about half of its water frozen, particulate matter such as fruits, nuts, candy, cookies, or whatever you like, is added to the semi-frozen slurry which has a consistency similar to soft-serve ice cream. In fact, almost the only thing which differentiates hard frozen ice cream from soft-serve, is the fact that soft serve is

drawn into cones at this point in the process rather than into packages for subsequent hardening.

1.3.6 Packaging

A good package must contain the product, protect it, provide convenience, and provide information on the product to the consumer. Food packages provide protection against physical, chemical, and biological damages. It also provides information useful to the consumer, for example, ingredient label, nutritional label, net contents, serving suggestion, and methods of preparing the product. Besides these attributes, a good food package keeps the food at nearly the same quality as when it was manufactured. During distribution, packages are subjected to physical abuses such as shocks, vibrations, compression, and, in the case of ice cream and frozen desserts, heat shock. For frozen dessert packaging, three main factors have to be considered. First, the package has to protect the product against temperature fluctuations, photooxidation, dehydration, and odor transmittance. Second, it has to take into consideration distribution-related factors such as package integrity, thermal shock, and cube efficiency. Third, municipal solid waste management factors have also to be considered.

1.3.7 Hardening

After the particulates have been added, the ice cream is packaged and is placed into a blast freezer at -30° to -40° C where most of the remainder of the water is frozen. Below about -25° C, ice cream is stable for indefinite periods without danger of ice crystal growth; however, above this temperature, ice crystal growth is possible and the rate of crystal growth is dependent upon the temperature of storage. This limits the shelf life of ice cream.

A primer on the theoretical aspects of freezing will help you to fully understand the freezing and recrystallization process.

Hardening involves static (still, quiescent) freezing of the packaged products in blast freezers. Freezing rate must still be rapid, so freezing techniques involve low

temperature (-40oC) with either enhanced convection (freezing tunnels with forced air fans) or enhanced conduction (plate freezers).

The rate of heat transfer in a freezing process is affected by the temperature difference, the surface area exposed and the heat transfer coefficient ($Q=U A \Delta T$). Thus, the factors affecting hardening are those affecting this rate of heat transfer:

- Temperature of blast freezer - the colder the temperature, the faster the hardening, the smoother the product.
- Rapid circulation of air - increases convective heat transfer.
- Temperature of ice cream when placed in the hardening freezer - the colder the ice cream at draw, the faster the hardening; - must get through packaging operations fast.
- Size of container - exposure of maximum surface area to cold air, especially important to consider shrink wrapped bundles - they become a much larger mass to freeze. Bundling should be done after hardening.
- Composition of ice cream - related to freezing point depression and the temperature required to ensure a significantly high ice phase volume.
- Method of stacking containers or bundles to allow air circulation. Circulation should not be impeded - there should be no 'dead air' spaces (e.g., round vs. square packages).
- Care of evaporator - freedom from frost - acts as insulator.
- Package type, should not impede heat transfer - e.g., styrofoam liner or corrugated cardboard may protect against heat shock after hardening, but reduces heat transfer during freezing so not feasible.

Ice cream from the dynamic freezing process (continuous freezer) can also be transformed into an array of novel/impulse products through a variety of filling and forming machines, which have been identified on a separate page.

1.4 Types of icecream

1.4.1 Hard Ice Creams

This is the traditional type of ice cream which is made using milk, sweeteners, cream, eggs, sugar, and stabilizers. These ice creams are found in shops, cafes and ice cream parlors in different ice cream flavors list. These are the regular ice creams that you eat without any special procedure or ingredient added for safety reasons. If you don't have any problems with either your digestion or eating habits, you can simply eat these ice creams without worrying about anything else.

1.4.2 French Ice Creams

These ice creams are made using custard base along with milk, cream, egg yolks, etc. These ice creams are also popularly known as custard ice creams.

1.4.3 Light Ice Creams

These are just like the regular easy ice creams with only one minute difference. The milk that is used for preparing these ice creams contains 25% less fat. As a result, the outcome is light ice cream. The people who like to maintain their body can grab a bite of these ice creams. These light ice creams are easy and convenient to digest for consumers of all age groups.

1.4.4 Organic Ice Creams

This type of ice cream contains the ice cream names that are made using only the natural and organic ingredients. These ice creams are generally considered as good ice cream as they have no side effects on the body.

1.4.5 No Sugar Ice Creams

As the name indicates, these ice creams are made by either using artificial sweeteners or sugar substitutes. Some of the latest ice creams are being made using this recipe so as to help the people taste the flavours of ice cream along with taking care of their daily diet. These ice creams can also be termed as sugar-free ice creams.

1.4.6 Soft Ice Creams

These soft ice creams are prepared at higher temperatures than the regular ice creams. The production process conducted at a higher temperature helps the ice cream mixtures to be soft, smooth and creamy for the maximum amount of time. These ice creams are generally softer than the regular ice creams and are preferred by the senior citizens who may have problems in digesting and eating the normal hard ice creams.

1.4.7 Lactose-Free Ice Creams

Lactose is a kind of sugar that is generally found in milk and most of the dairy products. There are many people who have lactose intolerance, which means that they have a problem with digesting lactose. To be specific, lactose intolerance does not mean that you are allergic to milk or dairy products, but it simply means that you will feel bad after consuming any of the dairy items. Thus, for such people, ice creams that are lactose-free are the best choice. This helps the people to enjoy these amazing ice cream desserts without feeling bad or different.

1.4.8 Gluten-Free Ice Creams

Gluten-free ice creams are for people who have celiac disease or people suffering from gluten sensitivity. The celiac diseases are hard to inspect and thus special care should be taken for these people. For people having such problems, it is important to always choose gluten-free ice creams so as to not face any problems while enjoying this dessert.

1.5 Type of Ice Cream by Shapes

Now to begin with the list of ice cream according to the different shapes, you can find several options in this category as well. There is a good number of options that can be tried as according to the different moods and needs of the consumers. Here are the different types of ice cream as per the shape:

1.5.1 Ice Cream Cones

The first and the most famous ice cream shape are the ice cream cones. Cones were invented in the year 1904 and till now they are ruling the hearts of the consumers. In simple words, the ice cream cones are edible hollow cones in which ice cream is poured and then is served. With a number of modifications being tried, these ice cream cones are also available in different flavours, which simply add to the taste of this amazing dessert.

1.5.2 Ice Cream Sticks

This is another famous type of ice cream shape. If you are not in the mood to try the ice cream cones, you must definitely try the ice cream bar. These are the type of ice creams that are frozen with a wooden stick projecting out from the bodies. These stick ice creams are quite popular throughout the world. You can simply grab an ice cream stick and can taste it while being good to go. The only problem with these ice cream sticks is that it gets a little messy when the ice cream begins to melt.

1.5.3 Ice Cream Cakes

This is the third type of ice cream categorized by its shape. These are the frozen cakes that are made to deliver full ice cream to the consumers. Different flavours of ice creams are given the shape of cakes which results in making the ice creams easy and convenient to eat.

1.5.4 Ice Cream Buckets

If you are one of those who love eating ice cream, then the ice cream buckets would make the best option for you. The ice cream is directly poured into plastic containers or buckets. The buckets can range from size to size, being available in the small size along with the large family size. This ice cream shape is generally preferred for parties or events or when you have your whole gang waiting for the ice cream.

1.5.5 Ice Cream Floats

Floats are generally the tastiest combination of liquid along with ice cream floating on the top. This type is very famous with the name of liquid dessert which makes the use of carbonated bubbles to deliver the amazing texture and taste to the consumers. It is generally one or two scoops of ice creams floating on top of a glass containing liquid. The liquid inside the glass is generally a fizzy liquid that helps in forming carbonated bubbles and thus in the floating of the ice cream. The most favourite combination in floats is that of coke and ice cream in varying flavours.

1.5.6 Ice Cream Sundae

This is the most popular and famous ice cream dessert available. It is the combination of ice cream along with different toppings and syrups that enhances the taste of this amazing dessert. In general, the ice cream sundae is made by adding some scoops of ice cream in a tall glass. Later the different flavour of ingredients, toppings, and syrups are added on the ice cream scoops. The entire combination results in the outcome that has the potential to make every heart tempt for it.

1.6 Types of Ice Cream Cones

The different flavours of ice creams, when combined with these crispy, crunchy delights, can surely enhance the overall taste.

1.6.1 Cake Cones

These cones are also known as wafer cones and are extremely light, subtly and flaky. Make sure that your cake cone isn't too bland as it may overshadow the flavour of ice cream. These cones are perfect for kids and can vary from different sizes. These cones are a just perfect combination of sweetness and crispy and as a result, enhances the taste of the ice cream. These cones are made using a mix (just like a cake mix), flour, sugar, and sweeteners. As these cones are made using cake or pastry batter, these make the best option for being used with ice creams.

1.6.2 Pretzel Cones

These cones are an alternative to the sweet ice cream cones. These are salted yet a crunchy option for an ice cream flavour and thus give a sweet and salted combination to the consumers. They add a different twist to the traditional flavors of ice creams and thus are surprisingly accepted by most of the consumers. These cones make the perfect companion for soft ice creams as well as for the homemade ice creams.

These cones are made using wheat flour, a pinch of salt along with an adequate quantity of sugar. They can also be used for handmade ice creams which have rich textures. The different varieties of pretzel cones make it easy for the users to choose their desired size as according to their mood and need.

1.6.3 Sugar Cones

These cones are classic and the traditional ice cream cones that we all love to accompany with our ice cream flavors. These cones make the perfect substitute of the cake cones without compromising with the taste and flavor of ice cream. The cones are prepared using the procedure but the process is completed by adding brown sugar, which yields the needed sweetness to the cones.

These cones are also high on strength and thickness due to the right blend mixture of flour and fiber. Further, the conical shape of the cones prevents any breakage while eating the ice cream.

1.6.4 Waffle Cones

For enhancing the flavor and taste of the sweet ice cream, there can be no better companion than the waffle cones. These cones are the latest addition with the ice creams that is loved by all. Within no time, these waffle cones have become the favorite of all the ice cream lovers. Not only these cones enhance the taste of ice cream but these also add charm to the appearance of the ice creams.

These cones deliver the crunchy and sweet flavor and thus get along with any of the milk ice creams. Some people prefer adding brown sugar to these waffle cones to

enhance its taste. The use of fiber while making these cones make sure that there occurs minimal breakage as the consumers enjoy their flavors.

All these cones are available in different varying sizes and thus satisfy each and every consumer with their varying needs and requirements. With a good number of options available in the market, you will never face any issue when choosing your favorite ice cream cone in the desired amount and quantity. You will certainly fall in love with each and every variety of cones available in the market as each one of them gives a different flavor to the original flavor of the ice cream.

1.6.5 Best Flavors in Ice Cream

There are countless numbers of ice cream flavors. Considering the popularity of the ice creams amongst the people, the makers are constantly coming up with new flavors. Along with the traditional vanilla ice cream, chocolate ice cream, mango ice cream, etc. there are now many different flavors available.

The top 10 flavors of ice cream are as follow:

- Raspberry Ice Cream.
- Coffee Ice Cream.
- Caramel Ice Cream.
- Sea Salt Ice Cream.
- Bubble Gum Ice Cream.
- Cookies and Cream.
- Mint Ice Cream with Chocolate Chip.
- Strawberry Ice Cream.
- Lemon Sorbet Ice Cream.
- Peppermint Ice Cream.

Kulfi Ice Creams are also a good option in ice cream flavors which is made using all the Indian ingredients. Kulfi is a dense, frozen dessert, and it is frozen inside of molds as opposed to churned inside an ice cream machine. It's sweet, but not overly sweet. It is made with milk, but the milk is first cooked for hours on the stove with sugar, nuts, and

spices. The trick to kulfi is to simmer and constantly stir the milk mixture. Kulfi comes in a variety of flavors that are unlike traditional American ice cream. These include rosewater, mango, pistachio, and even saffron.

CHAPTER 2

PREPARATION OF ICECREAM

2.1 Composition of ice cream

Ingredients	Quantity (%)
Sugar	15
Fat	12
MSNF	11
Emulsifier and stabiliser	0.3
Total solids	38.3

2.2 ICE CREAM PROPORTION

Ingredients	Quantity (%)
Milk fat	>10-16%
Sucrose	10-14%
Corn syrup	4-5%
MSNF	9-12%
Emulsifier	0.25%
Stabiliser	0.4%
Water	55-64%

2.3 Functions of ingredients used in icecream and caused defects

Various ingredients that affect the quality of ice cream include sugar, fat, MSNF, water, emulsifiers and stabilizers.

1. Sugar

Sugar either in liquid or solid dry form added in ice cream up to 12-20% but 14-16% is the preferable level. Corn syrup can be added to replace 45% sugar in ice cream to handle, store and economic purposes. Among various commercially available sugar blends, solids of corn syrups-low conversion preferred because they don't affect the characteristics of ice cream and enhance the total solids. Sucrose performs various functions in ice cream including;

Functions

- i. Optimum palatability
- ii. Maintain handling properties
- iii. Acceptability of ice cream
- iv. Sweetens the product
- v. Increase pleasing sweet flavour
- vi. Enhance solid contents and viscosity
- vii. Texture and body improvement

Defects

Higher sugar addition causes bad effects like;

- i. Bland taste due to lacking sweetness
- ii. Mask desired flavour
- iii. Soggy ice cream above 42% TS
- iv. Freezing point depression
- v. Freezing slow down
- vi. Hardening require low temperature

2. Total solids

Total solids includes the sum of all solid and dry ingredients of ice cream. Fat, sugar, MSNF, stabilizers and emulsifiers all contribute to total solids. Water is replaced by total

solids in ice cream mix. Properties of ice cream are specially improved by the addition of solids of buttermilk and egg yolk, sweet cream and eggs.

Functions

- i. Texture and body improvement
- ii. Whip ability improvement
- iii. Freezing point reduction
- iv. Increase overrun with increased TS

Defects

- i. Decreased cooling effect during summer associated with increased TS
- ii. Soggy and heavy structure with TS up to 40-42%

3. Water

Mostly ignored but very influential component present in ice cream air and water. Water maintains the continuous phase in ice cream either by adding as solid or liquid form. Products from dairy origin also contribute water contents. Water provided from supply source must be purified while it is expected that water of milk source has been cleaned already during its passage and excretion from mammary glands.

Functions

- i. Act as solvent
- ii. Provides liquid medium

4. Air

During ice cream preparation, overrun is created by incorporating air in mixture to enhance the volume. Quality of ice cream is influenced by amount of air incorporated. Quality of product can be controlled by uniform addition of air. Air quality itself is maintained by filters installed in freezers. Emulsifiers, fat and protein in unfrozen state

cause the stabilization of air and water interface by forming thin film. Fat globules, ice crystals and water form the emulsion and entrap the air.

Functions

- i. Increase the volume
- ii. Meeting legal standards
- iii. Increase profit
- iv. Product and quality control
- v. Affect quality

Defects

Air incorporation above certain level causes defects in ice cream;

- i. Reduced ice crystals size
- ii. Reduction in melting point
- iii. Low hardness

5. Stabilizers

Basic types of stabilizers added in ice cream are of two sources;

- i. Animal source: gelatin from bones and calf skin
- ii. Plant or vegetable source: gums (agar-agar, carboxymethyl cellulose, sodium alginate, acacia, oat, carrageenan and karaya)

Water binding capacity of stabilizers is very high and added in small quantity hence effect on flavor and product value is inconsequential. Total solids, processing machine, stabilizers properties and some other factors affect the usage of stabilizers.

Functions

- i. Smoothens the texture
- ii. Provide body to the product

- iii. Enhance viscosity
- iv. Freezing point not affected
- v. Prevent from texture coarsening
- vi. Provide resistance during melting

Defects

- i. Restrict whip ability
- ii. Heavy and soggy structure
- iii. Undesirable melting properties

6. Emulsifiers

During manufacturing of ice cream, emulsifiers are added to smoothen the texture and thorough distribution of air cells. Mono and di-glycerides are most common emulsifiers used in ice cream plants. Emulsifiers are not be used more than 0.2% on weight basis. Polysorbate and sorbitan tristearate up to 0.1% are now allowed in dairy products as safe.

Functions

- i. Stiffness to body and smoothness of texture
- ii. Reduction in time of whipping
- iii. Even whip ability properties
- iv. Smaller uniformly distributed air cells

Defects

Emulsifiers when used in excessive quantity cause defects like;

- i. Slower melting
- ii. Textural and body defects

7. Egg yolk

It is highly valuable in foods and helps in other flavours blending for desirable properties. Ice cream cost is increased by egg yolk addition. It provides desirable flavour to ice cream but if

product of egg has any off flavour that can be easily detectable in ice cream with egg. Protein and lecithin complex in egg yolks is highly preferred in mixes where total solids are lowered and prepared with butter oil or butter.

Functions

- i. Delicate characteristic flavour
- ii. Texture and body improvement
- iii. Viscosity increase
- iv. Improved whip ability

Defects

- i. Off flavour in egg yolk detectable in final product

8. Flavours

Flavour can be easily mistaken as taste or feel sensation. It is very important ice cream property and resulted from mixed flavour of all ice cream components. Individual taste of any ingredients has effect on “flavour blend” or “specific flavour” so it makes difficult in detection of specific ingredient effect on ice cream flavour. Important properties of flavour are intensity and type. They may be mild or harsh. Harsh flavours at even low concentration soon turn monotonous but mild flavour can be blended easily and at higher intensity they don't turn into monotonous. So delicate and mild flavours

are generally preferred. Flavour must be detected easily and provides refreshing taste in all conditions.

9. Properties of balanced ice cream mix

A mix is named balanced if it has all ingredients or components proportion in a way that results in fine and desirable ice cream. If defects are present, they may not be eliminated by changing proportion of constituents and not resulted from poor mix balancing. Such defects are;

- i. Flavour rancidity
- ii. Lacking of uniformity in colour
- iii. Base flavour
- iv. Some defects that resulted from poor balancing but can be corrected by alteration in mix proportion are;
- v. Insufficient fat concentration and richness lacking
- vi. Insufficient flavours percentage
- vii. Sandiness due to high MSNF
- viii. Weak body due to less stabilizers and TS

CHAPTER 3

PACKAGING OF ICECREAM

3.1 Packaging of icecream

When ice cream is drawn from the freezer, it is put into containers that give it the desired form and size for convenient handling during the hardening, storage, shipping and marketing processes.

The principal roles of food packaging are to protect food products from outside influences and distribution damage, to contain the food, and to provide consumers with ingredient and nutrition information. Package design and construction play significant roles in determining the shelf life of a food product. The right selection of packaging

materials and technologies maintains product quality and freshness during distribution and storage.

Ice-cream sticks and ice-cream cones are the most common types. Ice-cream sticks come individually in flowpack bags. The ice-cream sticks in flowpack bags are packaged into cartons which are then case-packed for distribution. In the case of ice-cream cones, subsequent to the freezing process, these are presented on trays with various units which are later packed into cartons. Once the trays have been completed they are wrapped using flowpack machinery where an inert gas may be injected to preserve the product before they are boxed.

There are 2 types of Packaging-

- Multiservice (Tinned/ Steel can)
- Single service (Carton)

3.2 Factors that need to be considered in selection of Ice Cream container

- Cost should be as minimum as possible
- Should be protective against moisture loss,
- Losses due to Temperature and contamination are as minimum as possible.
- Ease to handling and disposal (i.e. ease of opening and reclosure, if required)
- Should not effect upon the quality of ice cream
- Appearance should be neat.
- Package should provide all information as batch, date of manufacture and expire.
- Storage problem.
- Point of consumption in relation to the location of the factory.
- Size of unit desired.
- Minimum damage during transportation.

3.3 Types of Packaging used for ice cream

- Bulk containers
 - i) Fiber board containers
 - ii) Metals containers
 - iii) Plastic (Polyethylene) containers
- Wrappers
- Plastic (polystyrene) or wax-coated paperboard
- Steel cans



3.3.1 Fiber board containers

Corrugated fiberboard is a material consisting of a fluted corrugated sheet and one or two flat linerboards. It is made on "flute lamination machines" or "corrugators" and is used for making cardboard boxes. The corrugated medium sheet and the linerboard(s) are made of kraft containerboard, a paperboard material usually over 0.01 inches (0.25 mm) thick. Corrugated fiberboard is sometimes called corrugated cardboard, although cardboard might be any heavy paper-pulp based

board. Fiberboard Boxes, Cartons and Containers Paperboard is a paper-like material, usually over ten "mills" (0.010 inch) in thickness. Some types of paperboard (corrugating medium and linerboard) are used in the construction of corrugated fiberboard. Other types of paperboard are used in the manufacture of cartons, set-up boxes, partitions and other products.

3.3.2 Plastic (Polyethylene) containers

Hi-density Polyethylene, or HDPE, is a popular choice for both containers and lids. It is flexible, strong and impact resistant, and can be formulated to withstand cold temperatures very well. It is lightweight, which can be a consideration when shipping costs are considered. [Plastic tubs](#) are available for packaging ice cream, ranging in size from a few ounces for single serve portions, to several gallons for use in ice cream shops. These tubs are dimensionally stable, and work well with automated filling equipment. They can be printed in any number of ways: during the molding process; as they are going down the assembly line at the container manufacturer's facility; or at the ice cream manufacturer's facility, either with direct printing, or with a label applied during filling.

3.3.3 Cone wrappers

Step-by-step instructions to dress up any ice cream cone with wrappers

- **Print out the template of your choice.** Standard printer paper should do the trick. Just be sure to print the proper template for your ice cream cone. There are different dimensions for sugar cones versus cake cones.
- **Carefully cut your wrapper out of the desired template** guidelines.
- **Wrap the sleeve around the ice cream cone.**
- **Use double-sided tape or a dot of glue to adhere the edges.**
- **Scoop your ice cream,** add your toppings and enjoy!

3.3.4 Metals containers

A metal is a material that, when freshly prepared, polished, or fractured, shows a lustrous appearance, and conducts electricity and heat relatively well. Metals are typically malleable or ductile. A metal may be a chemical element such as iron; an alloy such as stainless steel; or a molecular compound such as polymeric sulfur nitride.

Ice cream will melt faster in metal container because it is a heat conductor so it gives heat away and absorbs heat from surroundings.

Steel cans

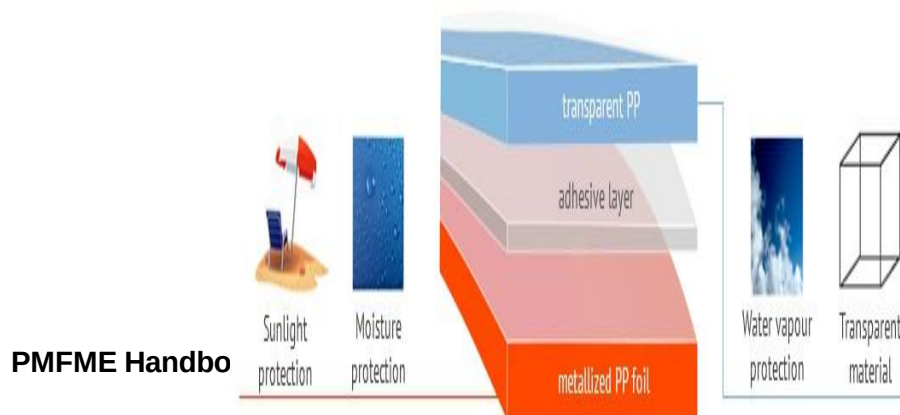
- Stainless Steel Ice Cream Cans are an excellent alternative to plastic pails or cardboard tubs or boxes.

Requirement of steel cans:

- a. 304 Stainless Steel
- b. No welds or seams to trap food
- c. Reusable and recyclable
- d. Empty cans nest together for space-efficient stacking

3.3.5 Composite combinations for ice cream packaging

There is an ample choice of composites for ice cream packaging. There will be multiple factors taken into account to select the best combination that suits both packaging needs and vision. Each packaging solution is created individually, some schemes are Composite combinations for ice cream packaging demonstrated below.



SCHEME 1

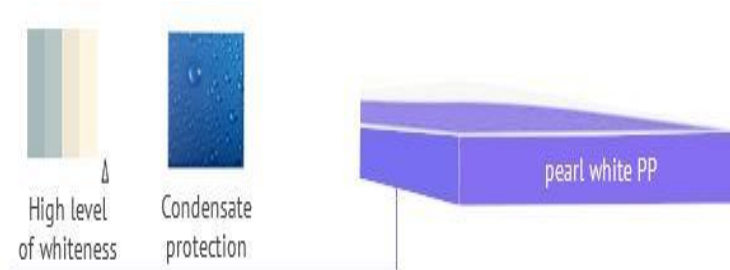
Packaging based on transparent and metallized polypropylene films offers high protection for the chocolate coating – the thin layer of aluminium foil provides good insulation from the environment, greatly improving shelf life and design options.

- oriented transparent polypropylene film (good barrier properties against water vapours, high transparency)
- oriented metallized polypropylene foil (good protection against moisture, reflects sunlight)

SCHEME 2

Pearl-white polypropylene film is ideal for ice cream packaging: it has a porous foamed structure, which is light and looks extremely white, allowing for unrestricted design concepts.

- Pearl-white polypropylene film (good water condensate blocking properties, high level of whiteness)



SCHEME 3

This is a single-layer laminate. Oriented transparent polypropylene film is used to emphasize the attractiveness of the product.

- oriented transparent polypropylene film (good barrier properties against water vapours, high transparency)



CHAPTER 4

FOOD SAFETY REGULATIONS AND STANDARDS

4.1 (2.1 DAIRY PRODUCTS AND ANALOGUES)

Definitions. –

“Composite milk product” means a product of which the milk, milk products or milk constituents shall be an essential part in terms of quantity in the final product, as consumed: Provided that the constituents not derived from milk shall not take the place in part or in whole of any milk constituent. Examples of composite milk products are:

- (i) *Shrikhand* with fruits etc.;
- (ii) Ice cream containing fruits etc.;
- (iii) Flavoured fermented milks;
- (iv) Drinks based on fermented milks

“Milk Product” means a product obtained by processing of milk, which may contain food additives and other ingredients functionally necessary for the milk product as permitted in these regulations and shall include the following, namely:-

- (i) cheese;
- (ii) *chhana*, skimmed-milk *chhana*, *paneer*;
- (iii) condensed milk-sweetened and unsweetened;
- (iv) condensed skimmed milk-sweetened and unsweetened;
- (v) cream;
- (vi) curd, skimmed milk curd, *dahi*;
- (vii) *ghee*, butter oil;
- (viii) ice-cream;
- (ix) infant milk food;
- (x) *khoa*;
- (xi) *malai*;
- (xii) milk derivatives such as whey proteins, casein, lactose etc.;
- (xiii) milk ices, milk lollies, *kulfi*;
- (xiv) milk powder, skimmed milk powder, partly skimmed milk powder;
- (xv) processed cheese;
- (xvi) table butter and white butter;
- (xvii) yoghurt;
- (xviii) any other product as may be specified in these regulations:

Provided that milk products shall not contain any substance not found in milk unless specified in these regulations;

2.1.14 Standard for Ice Cream, *Kulfi*, Chocolate Ice Cream, Softy Ice-Cream, Milk Ice, Milk Lolly and Dried Ice Cream Mix

This Standard applies to Ice Cream and *Kulfi* and their variants, milk ice and milk lolly, and dried ice-cream mix in conformity with the definitions given in item 1 of this sub-regulation.

1. Description

(a) Ice-Cream, *Kulfi*, Chocolate Ice Cream or Softy Ice-Cream means the frozen milk product conforming to the composition specified in entry (i) of sub-item (c) of item 2, obtained by freezing a pasteurized mix prepared from milk or other products derived from milk, or both, with or without addition of nutritive sweeteners and other permitted non-dairy ingredients. The said product may contain incorporated air and shall be frozen hard except in case of softy ice-cream where it can be frozen to a soft consistency.

(b) Milk Ice or Milk Lolly means the product conforming to the composition specified in entry (ii) of sub-item (c) of item 2, obtained by freezing a pasteurized mix prepared from milk or other products derived from milk with or without the addition of nutritive sweeteners and other permitted non-dairy ingredients. The said product shall be frozen hard.

(c) Dried Ice-Cream Mix means the product in a powder form which on addition of prescribed amount of water and freezing shall result in a product similar in characteristics to the respective product described in the sub-item (a) of item 1.

2. Essential Composition and Quality Factors. –

(a) Raw Material. - Milk and milk products

(b) Permitted ingredients.-

(i) sugar and other nutritive sweeteners (e.g. *jaggery*, dextrose, fructose, liquid glucose, dried liquid glucose, high maltose corn syrup, honey etc.);

(ii) potable water;

(iii) starch, provided it is added only in amounts functionally necessary as governed by Good Manufacturing Practice, taking into account any use of the stabilizers or thickeners as specified in Appendix 'A' of these regulations.;

(iv) other non-dairy ingredients - fruit and fruit products, eggs and egg products, coffee, cocoa, chocolate, confectionary, condiments, spices, ginger and nuts; bakery products such as cake or cookies.

(c) Composition. -

The product shall conform to the compositional specifications provided in the table below:

(i) Ice cream, *Kulfi*, Chocolate Ice cream and Softy Ice Cream

PARAMETER	ICECREAM OR KULFI OR CHOCOLATE ICE CREAM OR SOFTY ICE CREAM	MEDIUM FAT ICE CREAM OR KULFI OR CHOCOLATE ICECREAM OR SOFTY ICE CREAM	LOW FAT ICE CREAM OR KULFI OR CHOCOLATE ICECREAM 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)	100 (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

Note(s):

(i) In case where coating, base or layer of non-dairy ingredients forms a separate part of the product, only the Ice Cream portion shall conform to the respective composition.

(ii) When any type of ice cream, *kulfi*, chocolate ice cream or softy ice cream is offered for sale in contravention of the requirements of sub-item (b) of item 6, the standards prescribed for the type ice cream, *kulfi*, chocolate ice cream or softy ice cream as per this sub regulation shall apply.

(ii) Milk Ice or Milk Lolly.-

Parameter	Milk ice or Milk lolly
Total Solids, minimum, %, (m/m)	20.0

Milk Fat, maximum, %, (m/m)	2.0
Milk Protein*, minimum, %, (m/m)	3.5

* Protein content is 6.38 multiplied by the total nitrogen determined

Note: In case where base or layer of non-dairy ingredients forms a separate part of the product, only the milk ice or milk lolly portion shall conform to the above composition.

(iii) Dried Ice Cream Mix.-

The said product on addition of water shall give a product conforming to the composition, except the 'weight', as specified in the entry (i) of sub-item (c) of item 2 for the respective product described in sub-item (a) of item 1. The moisture content of the dried product shall not be more than 4.0 % (m/m).

3. Food Additives. –

(a) For products covered under this standard, specific food additives specified in Appendix 'A' of these regulations may be used and only within the limits specified.

(b) The food additive use level specified in Appendix 'A' of these regulations shall apply to the product after reconstitution in respect of dried Ice Cream Mix.

4. Contaminants, Toxins and Residues. -

The products shall comply with the limits stipulated in the Food Safety and Standards (Contaminants, toxins and Residues) Regulations, 2011.

5. Hygiene.-

(a) The products shall be prepared and handled in accordance with the requirements specified in Schedule 4, as applicable, of the Food Safety and Standards (Licensing and Registration of Food Businesses) Regulations, 2011 and such other guidelines as specified from time to time under the provisions of the Food Safety and Standard Act, 2006.

(b) The products shall conform to the microbiological requirements specified in Appendix 'B' of these regulations.

6. Labelling.

(a) Name of the Food.-

(i) The name of the product covered by sub-item (a) of item 1 shall be 'Ice Cream', '*Kulfi*', 'Chocolate Ice Cream' or 'Softy Ice Cream'.

(ii) The name of the product covered by sub- item (b) of item 1 shall be 'Milk Ice' or 'Milk Lolly'.

(iii) The name of the product covered by sub- item (c) of item 1 shall be 'Dried Ice Cream Mix'.

(b) The type, as per item (i) of sub- item (c) of item 2, of ice cream, *kulfi*, chocolate ice cream or softy ice cream shall always be indicated on the label of the product. For softy ice cream offered for sale directly from the freezer without prepackaging, the type of product shall be displayed in a manner and at a place that is clearly visible to the consumer.

(c) Every package of ice cream, *kulfi*, chocolate ice cream and softy ice cream containing starch shall have a declaration on its label as specified in sub- regulation 2.7.1 (2) of Food Safety and Standards (Packaging and Labelling) Regulations, 2011.

(d) In addition to the above mentioned labelling requirements, the provisions of the Food Safety and Standards (Packaging and Labelling) Regulations, 2011, shall apply to pre-packaged product.

7. Method of Sampling and Analysis.-

The methods of sampling and analysis mentioned in the manuals as specified by the Food Safety and Standards Authority of India from time to time shall be applicable.

Table-2A Microbiological Standards for Milk and Milk Products –Process Hygiene Criteria

Sr. No.	Product Description ¹	Aerobic Plate Count				Coliform Count ⁴				Staphylococcus aureus (Coagulase positive)				Yeast and Mold Count				Escherichia coli			
		Sampling Plan		Limit (cfu)		Sampling plan		Limit (cfu)		Sampling plan		Limit (cfu)		Sampling plan		Limit (cfu)		Sampling plan		Limit (cfu)	
		n	c	m	M	n	c	m	M	n	c	m	M	n	c	m	M	n	c	m	M
1	Pasteurized/boiled Milk/ Flavored Milk	5	3	3x10 ⁴ /ml	5x10 ⁴ /ml	5	0	<10/ml	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	Pasteurized Cream	5	3	5x10 ⁴ /g	7.5x10 ⁴ /g	5	0	<10/g	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3	Sterilized milk /UHT milk / Evaporated Milk	NA																			
4	Sterilized / UHT Cream	NA																			
5	Sweetened Condensed Milk	5	3	5x10 ² /g	1x10 ³ /g	5	0	<10/g	NA	5	0	<10/g	NA	5	0	<10/g	NA	NA	NA	NA	NA
6	Pasteurized Butter ²	5	3	2.5x10 ⁴ /g	5x10 ⁴ /g	5	2	10/g	20/g	5	2	10/g	50/g	5	3	20/g	50/g	5	0	Absent/g	NA
7	Milk Powder ; SMP, Partly SMP ; Dairy Whitener ; Cream Powder ; Ice Cream Mix Powder ; Lactose ; Whey based Powder ; Butter	5	2	3x10 ⁴ /g	5x10 ⁴ /g	5	2	10/g	50/g	5	2	10/g	1x10 ² /g	5	0	50/g	NA	NA	NA	NA	NA
8	Infant Milk Food, Infant Formulae, Infant Milk Substitute ⁴	5	2	5x10 ² /g	5x10 ³ /g	NA	NA	NA	NA	5	0	<10/g	NA	5	0	<10/g	NA	NA	NA	NA	NA
	Follow Up Formula	5	2	1x10 ³ /g	1x10 ⁴ /g	10	0	<10/g	NA	5	0	<10/g	NA	5	0	<10/g	NA	10	0	Absent/g	NA
	Cereal Based Complimentary food	5	2	1x10 ³ /g	1x10 ⁴ /g	10	0	<10/g	NA	5	0	<10/g	NA	5	0	<10/g	NA	10	0	Absent/g	NA
9	Ice Cream, Frozen Dessert, Milk Lolly, Ice Candy	5	3	1x10 ⁵ /g	2x10 ⁵ /g	5	3	10/g	1x10 ² /g	5	2	10/g	1x10 ² /g	NA	NA	NA	NA	5	0	Absent/g	NA

Version-XII (08.09.2020)

4.2 Food Safety

Part I - General Hygienic and Sanitary practices to be followed by Petty Food Business Operators applying for Registration (See Regulation 2.1.1(2))

SANITARY AND HYGIENIC REQUIREMENTS FOR FOOD MANUFACTURER/PROCESSOR/HANDLER

The place where food is manufactured, processed or handled shall comply with the following requirements:

1. The premises shall be located in a sanitary place and free from filthy surroundings and shall maintain overall hygienic environment. All new units shall set up away from environmentally polluted areas.
2. The premises to conduct food business for manufacturing should have adequate space for manufacturing and storage to maintain overall hygienic environment.
3. The premises shall be clean, adequately lighted and ventilated and sufficient free space for movement.
4. Floors, Ceilings and walls must be maintained in a sound condition. They should be smooth and easy to clean with no flaking paint or plaster.
5. The floor and skirted walls shall be washed as per requirement with an effective disinfectant the premises shall be kept free from all insects. No spraying shall be done during the conduct of business, but instead fly swats/ flaps should be used to kill spray flies getting into the premises. Windows, doors and other openings shall be fitted with net or screen, as appropriate to make the premise insect free The water used in the manufacturing shall be potable and if required chemical and bacteriological examination of the water shall be done at regular intervals at any recognized laboratory.
6. Continuous supply of potable water shall be ensured in the premises. In case of intermittent water supply, adequate storage arrangement for water used in food or washing shall be made.

7. Equipment and machinery when employed shall be of such design which will permit easy cleaning. Arrangements for cleaning of containers, tables, working parts of machinery, etc. shall be provided.
8. No vessel, container or other equipment, the use of which is likely to cause metallic contamination injurious to health shall be employed in the preparation, packing or storage of food. (Copper or brass vessels shall have proper lining).
9. All equipments shall be kept clean, washed, dried and stacked at the close of business to ensure freedom from growth of mould/ fungi and infestation.
10. All equipments shall be placed well away from the walls to allow proper inspection.
11. There should be efficient drainage system and there shall be adequate provisions for disposal of refuse.
12. The workers working in processing and preparation shall use clean aprons, hand gloves, and head wears.
13. Persons suffering from infectious diseases shall not be permitted to work. Any cuts or wounds shall remain covered at all time and the person should not be allowed to come in direct contact with food.
14. All food handlers shall keep their finger nails trimmed, clean and wash their hands with soap, or detergent and water before commencing work and every time after using toilet. Scratching of body parts, hair shall be avoided during food handling processes.
15. All food handlers should avoid wearing, false nails or other items or loose jewellery that might fall into food and also avoid touching their face or hair.
16. Eating, chewing, smoking, spitting and nose blowing shall be prohibited within the premises especially while handling food.
17. All articles that are stored or are intended for sale shall be fit for consumption and have proper cover to avoid contamination.

18. The vehicles used to transport foods must be maintained in good repair and kept clean.

19. Foods while in transport in packaged form or in containers shall maintain the required temperature.

20. Insecticides / disinfectants shall be kept and stored separately and away from food manufacturing / storing/ handling areas.

4.3 LABELLING

Labeling Requirements

All food products sold in India that are prepackaged are required to comply with the Food Safety and Standards (Packaging and labelling) Regulations, 2011. The Food Safety and Standards Regulation, 2011 is a notification issued by the Food Safety and Standards Authority of India under the Ministry of Health and Family Welfare. In this article, we look at the regulations pertaining to food labelling in India.

Applicability of Food Labelling Regulations

The food labelling regulations require all “Prepackaged” or “Pre-packed food” to comply with the labelling regulations in India. As per the rules, prepackaged food means food, which is placed in a package of any nature, in such a manner that the contents cannot be changed without tampering it and which is ready for sale to the consumer.

General Labelling Requirements

The following labelling requirements must be complied with by all prepackaged food sold in India:

- The label must be in English or Hindi or Devnagri language. In addition to the above, the label can contain information in any other language, as required.
- The label must not contain information about the food that could be deemed to be false, misleading, deceptive or otherwise create an erroneous impression regarding the product.

- The label must be affixed to the container in such a manner that it would not easily be separated from the container.
- The contents or information presented in the label should be clear, prominent, indelible and readily legible by the consumer.
- If the container is covered by a wrapper, then the wrapper must contain necessary information or make the label of the product inside readily legible by not obscuring.
- The name of the food must be mentioned along with the trade name and description of the food contained. In case the food contains more than one ingredient, then a list of ingredients must be presented in descending order of their composition by weight or volume, as the case may be, at the time of its manufacture.

Nutritional Information

Nutritional Information or nutritional facts per 100 gm or 100ml or per serving of the product must be given on the label along with the following information:

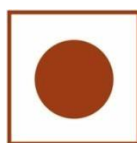
- energy value in kcal;
- the amounts of protein, carbohydrate (specify the quantity of sugar) and fat in gram (g) or ml;
- the amount of any other nutrient for which a nutrition or health claim is made:
- It is important to note that any “health claim” or “nutrition claim” or “risk reduction” claim made in the label will be thoroughly scrutinized by the FSSAI authorities. Hence, any such claim must be validated by test data. As per the rules, the following is the definition for “health claim”, “nutrition claim” and “risk reduction” claim:
- “Health claims” means any representation that states, suggests or implies that a relationship exists between a food or a constituent of that food and health

and include nutrition claims which describe the physiological role of the nutrient in growth, development and normal functions of the body, other functional claims concerning specific beneficial effect of the consumption of food or its constituents, in the context of the total diet, on normal functions or biological activities of the body and such claims relate to a positive contribution to health or to the improvement of function or to modifying or preserving health, or disease, risk reduction claim relating to the consumption of a food or food constituents, in the context of the total diet, to the reduced risk of developing a disease or health-related condition;

- “Nutrition claim” means any representation which states, suggests or implies that a food has particular nutritional properties which are not limited to the energy value but include protein, fat carbohydrates, vitamins and minerals;
- “Risk reduction” in the context of health claims means significantly altering a major risk factor for a disease or health-related condition;

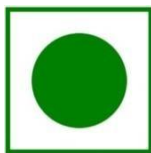
Veg or Non-Veg Symbol

All packaged food that is “Non-Vegetarian” must have a symbol that is a brown colour filled circle inside a square with a brown outline. If a food contains only egg as a non-vegetarian ingredient, then the manufacturer may provide a declaration that the product contains only egg and add the non-vegetarian symbol.



Non-Veg Symbol

Packaged vegetarian food should have a symbol that consist of green colour filled circle inside a square with green.



Veg Symbol

Information Relating to Food Additives, Colours and Flavours

Food additives contained in the food product must be mentioned along with class titles along with the specific names or recognized international numerical identifications. Addition of colouring matter should be mentioned on the label along with certain statements like “CONTAINS PERMITTED NATURAL COLOUR(S)”, just beneath the list of the ingredients on the label. In case of addition of extraneous flavouring agent, then it should be mentioned in a statement like “CONTAINS ADDED FLAVOUR” just beneath the list of ingredients on the label.

Name and Complete Address of the Manufacturer

The name and complete address of the manufacturer must be mentioned on every package of food. In the case of imported food, the package must contain the name and complete address of the importer in India.

Net Quantity

All packaged food must carry the net quantity by weight or volume or number, as the case may be. The net quantity of the commodity contained in the package must exclude the weight of the wrappers and packaging materials.

Lot Number or Batch Identification

A lot number or batch number or code number must be mentioned on all packaged food so that it can be traced while manufacturing and distribution. Only bread and milk including sterilised milk are not required to comply with this regulation.

Date of Manufacture or Packing

The date, month and year in which the commodity is manufactured, packed or pre-packed must be mentioned on the label. In the case of food products having a shelf life of more than three months, then the month and the year of manufacture can be given with the “Best Before Date”. In case of products having a shelf life of fewer than three months, the date, month and year in which the commodity is manufactured or prepared or pre-packed must be mentioned on the label with best before date.

Country of Origin for Imported Food

For imported food, the country of origin of the food should be declared on the label of the food. In case a food product undergoes processing in a second country which changes its nature, the country in which the processing is performed should be considered to be the country of origin for the purposes of labelling.

Instructions for Use

Instructions for use, including reconstitution, should be included on the label, if necessary, to ensure correct utilization of



Contact Us

National Institute of Food Technology, Entrepreneurship and Management (NIFTEM) - Thanjavur

(an Institute of National Importance under Ministry of Food Processing Industries, Government of India)

Pudukkottai Road, Thanjavur – 613005, Tamil Nadu, India

Ph: 04362-228155, Fax:04362-227971

Email: director@iifpt.edu.in Web: <https://niftem-t.ac.in/>

