

JUDGING OF DAIRY PRODUCTS



B. Tech. (Dairy Technology) ► DT-8 ► Resources ► Lesson 22. DESIRABLE AND UNDESIRABLE CHARACTERISTICS OF ICE-CREAM, SENSORY EVALUATION OF ICE CREAM

Module 7. Frozen dairy products

Lesson 22

DESIRABLE AND UNDESIRABLE CHARACTERISTICS OF ICE-CREAM, SENSORY EVALUATION OF ICE CREAM

22.1 Introduction

Many different kinds of frozen products are available for sale in the market. Some of the common ice cream varieties are: Plain, fruit, nut, bisque, parfait, mousse, pudding, lac to ices, sherbet, etc. The scorecard used and technique for scoring the different varieties is same, the scoring being different only in the standards of perception for the several flavored products.

22.2 Ice Cream Score Card

Table 22.1 Score card for ice cream

Score card for Ice cream					
Name		Date			
Attribute		Sample No.			
		1	2	3	4
Flavour -45	Identified criticism				
	Score				
Body and Texture -30	Identified criticism				
	Score				
Colour -15	Identified criticism				
	Score				
Container -10	Identified criticism				
	Score				
Total -100					

22.3 Technique of Ice Cream Scoring

22.3.1 Tempering the samples

Before scoring ice cream, it is necessary to hold the samples at a uniformly low temperature so the ice cream retains its physical properties. Yet, the temperature maintained must not be so low that the ice cream is intensely cold and unnecessarily hard. When ice cream is too cold, the recovery of the sense of taste from temporary anesthesia requires longer period than expected for satisfactory and efficient work. Generally, temperature from 5 to 10 F (-15 to -12 C) are satisfactory for tempering the ice cream for judging. This can best be done by taking the ice cream out of hardening room and placing it in a dispensing cabinet several hours prior to judging. Exposing the stored ice cream to room temperature for tempering purposes is very unsatisfactory as the ice cream melts along the edge of the container while the center remains too hard for dipping.

22.3.2 Sequence of Observations

22.3.2.1 Examine the container

Observe the type (i.e. paper/metal) and condition of the container, the presence or absence of a liner and cover and any package defect that may be present.

Note the colour of the ice cream: Observe the colour of the ice cream, its intensity and uniformity and whether the hue is natural and typical of the flavour of the ice cream being judged.

22.3.2.2 Sample the ice cream

During the actual dipping of the ice cream, note carefully the way the product cuts and the feel of the dipper as its cutting edge passes through the frozen mass. The "feel" of dipping, i.e. the resistance offered, the evenness of cutting, the presence of spiny ice particles, and whether the ice cream is heavy or soggy, or light and fluffy should be noted. The way the sample responds to dipping often gives a fairly accurate impression of its body and texture characteristics.

22.3.2.3 Begin Judging

Soon after securing the sample, examine it for body and texture characteristics, for flavour and for melting quality.

Take a dipper full of ice cream in a flat bottom dish and observe its melting quality. High quality ice cream should show little resistance towards melting when exposed to room temperature. Observe whether the ice cream has retained its form and approximate size, even though some of the liquid has oozed out; whether the melted liquid is creamy, curdled, foamy or watery.

By placing a small portion of frozen ice cream in mouth and pressing it against the root of the mouth (to melt the sample quickly), the smoothness, the coarseness, the coldness and the presence of sandiness and the relative size of the ice crystals may be determined.

22.3.2.4 Sense of flavour

While manipulating the sample about the mouth to ascertain some of its body and texture characteristics, the flavour will soon manifest itself in a taste sensation. The first flavour suggested will be one of the fundamental tastes if present, and in the order of salt, sweet, sour and bitter. As the sample is warmed in the mouth, any volatile, flavour-contributing substance will soon give rise to a reaction of smell. Since sweetness is always noted prior to the volatile, odour contributing substances, its characteristics should be studied at once. Observe whether the ice cream is pleasantly sweet, intensely sweet, lacking in sweetness or unnatural. By the time the quality of sweetness is judged, other flavours should be also noted, particularly whether the flavour is coarse or delicate, mild or pronounced, and whether the flavour is creamy, pleasantly rich or possesses a pronounced, unnatural taste and whether the mouth "cleans Lip " after the sample has been expectorated.

The melting quality of ice cream shall be correlated with the properties of body and texture.

Tabulate the records of observations in the ice cream score card chart & classify the result.

22.3.2.5 Requirements of high quality vanilla ice cream

The colour should be attractive, uniform, pleasing and typical of the flavour represented.

(Usually vanilla ice cream is not coloured although some manufacturers do add colour), the ice cream should have a colour in harmony with the flavour used. Colour defects may include gray (dull), not uniform, too high (vivid), too pale (chalky, laching) and unnatural.

The package or container should be clean, neat, attractive, full and protective. The containers should be free of dents, rust, paint, ink smears, battered edges or rough surfaces. The common defects encountered in package are: soiled, rusty or damaged containers; ice cream shrunken from container or ill-shaped package; and lack of parchment on containers.

22.3.2.6 Melting quality

High quality ice cream should show little resistance toward melting when a dish is exposed to room temperature. During melting the mix should drain away as rapidly as it melts and form a smooth, uniform, homogeneous liquid in the dish. The defects in melting quality observed in ice cream are: does not melt/delayed melting/ high melting resistance; flaky', scummy, lacks uniformity, foamy, frothy, large air bubbles; whey -off, curdled and watery/ low melting resistance.

22.3.2.7 Body and texture

The desired body in the ice cream is that which is firm, has substance, responds readily to dipping and melts down at ordinary temperatures to a creamy consistency. The desired texture is that which is fine, smooth, velvety and carries the appearance of creaminess throughout. The body defects commonly encountered in ice cream are: crumbly/ brittle/ short/ gummy/ pasty/ sticky/elastic, shrunken, soggy/ heavy/ doughy, and weak/ watery. The texture defects are: Buttery/ greasy/ coarse/ grainy/ icy/ flaky/ snowy, fluffy/ foamy, lumpy and sandy.

22.3.2.8 Flavour

Vanilla ice cream should be pleasantly sweet, having a creamy, leaving only a very pleasant after taste. Neither the vanilla (or any other flavour depending upon variety of ice cream), the sugar, nor the dairy products should be so pronounced that when first tasted one is more striking than the others. All the ingredients should blend to yield a pleasant, balanced flavour. Off flavours in ice cream may come through several sources- e.g. (1) ingredients used- such as dairy products (cooked, feed, old ingredient, rancid, salty, etc.), flavouring (coarse, lacks fine flavour, too high! excessive, deficient, unnatural) and other ingredients (egg stabilizer, other solids than milk solids): (2) due to bacterial growth in the mix (cheesy, musty, sour); (3) due to chemical changes in the mix (flat, metallic, stale, oxidized, storage); (4) due to other causes (neutralizer. foreign).

22.4 Sensory quality of Ice-cream

Uniform good quality ice cream must be one of the biggest assets in the continued

expansion of the ice cream industry. So far no such grades and standards have been developed in the ice cream industry. Different score cards and other systems of measuring quality have been suggested from time to time, but none of these have become standardized. In view of the fact that ice cream is now included in the Educational Students Dairy Products Judging Contest at the Eastern States Exposition and that serious consideration is being given towards including ice cream in the National Contest.

According to this score card, the factors that make up quality in ice cream are: Flavor, body and texture; bacteria color and package. The score card measures these quality factors by assigning to each a certain value which is as follows:

Percent

Flavor	50
Body and texture.....	25
Bacteria.....	20
Package and color	5

In general a sample receiving a score of 90 per cent may be considered excellent, while a score of 80 to 90 would be representative of a good quality of ice cream. Score card or yard stick for measuring quality similar to the above, has now been used for two years at the Eastern States Dairy Products Judging Contests and also at the Educational scoring.

22.4.1 Flavor

The quality of the flavor of ice cream may be classified from the standpoint of palatability under four general groups:

1. Highly pleasing and desirable: Flavors rating 45 to 50 points.
2. Desirable flavors: Flavors rating 40 to 44.9 points.
3. Objectionable flavors: Flavors rating 35 to 39.9 points.
4. Foreign (off) flavors: Flavors rating 25 to 34.9 points.

1. Highly pleasing and desirable flavors: Rating 45 to 50 points

Ice cream that is especially fresh, clean, sweet and well blended in flavor, having the proper degree of sweetness and flavoring and having a certain creaminess or richness in flavor characteristic of the pleasing flavor and aroma of fresh sweet cream, shall receive a rating of 45 to 50 points.

Descriptive terms: Fresh, clean, creamy, well blended.

2. Desirable flavors: Rating 40 to 44.9 points

Ice cream that is fresh, clean, creamy and sweet in flavor, but high or low in sweetness or flavoring material shall be given a rating of 40 to 44.9.

Descriptive terms: Too sweet, lacking sweetness, too high flavoring, lacking flavoring.

3. Objectionable flavors: Rating 35 to 39.9 points

This class includes ice cream that is free from foreign, (off) flavors but shows objectionable flavors, such as old cream, old butter, bitter, cooked, condensed or powdered milk, gelatin or unnatural flavoring or unnatural flavoring such as pronounced glucose. Such ice cream shall receive a rating for flavor of between 35 and 39.9 points.

Descriptive terms: Old cream, old butter, old egg butter, cooked condensed milk, powdered milk, gelatin, unnatural flavoring, unrecognizable.

4. Foreign (off) flavors: Maximum rating 25 to 34.9 points

These include flavors, ordinarily termed foreign flavors (off) flavors which are distinctly disagreeable to the taste. Ice cream showing salty, rancid, garlic, gasoline, disinfectant, unclean utensils or any other foreign (off) flavor distinctly disagreeable to the taste, shall be given a score of 25 to 34.9 points.

Descriptive terms; Salty, rancid, garlic, gasoline, disinfectant, unclean utensils, unrecognizable.

Ice cream with pronounced sour or other flavors bad enough to make it unsalable, shall be score 0 on flavors .

Note : Ice cream is never scored perfect in flavor, as no one knows what perfection is and 2 to 4 points leeway must be allowed. A score of within 2 to 4 points of perfect may therefore be considered excellent.

22.5 Body and Texture

Class I: Rating 23 to 25: Ice cream receiving the rating of 23 to 25 must be firm, smooth and velvety in body and texture. Descriptive terms: Firm, smooth, velvety.

Class II: Rating 20 to 22.9: Ice cream that is slightly fluffy, crumbly, icy, coarse, buttery, weak i. e. (no resistance), or soggy shall receive a rating of 20 to 22.9. Descriptive terms: Fluffy, crumbly, icy, coarse, buttery, weak, soggy.

Class III: Rating 15 to 19.9: Ice cream that is sandy, pronounced soggy, buttery, icy, coarse, crumbly, weak, gelatin lumps, shall receive a rating of 15 to 19.9. Descriptive terms: Sandy, soggy, crumbly, buttery, icy, coarse, weak, gelatin lumps.

22.6 Package and Color

A. Colour

The suggested standard color for vanilla ice cream is the color of Guernsey or Jersey cream during the month of June or July with allowance for deeper shades of color when eggs are used in the mix. However the different markets vary greatly regarding the degree of color desired in ice cream. In the case of vanilla ice cream these requirements vary from almost white to a deep egg yellow: In order to meet these requirements for color in ice cream the following shall be used as a basis of rating on color:

1. Ice cream in order to receive the full rating of 5 points must be free from specks, unnatural or uneven colours.
2. Ice cream showing dirt specks, unnatural colours or uneven colours shall be cut not exceeding 2 points according to the degree of the defect. Descriptive terms: Dirt specks, unnatural, uneven.

B. Package

Ice cream receiving the full rating of 5 points must be neatly and solidly packed in clean, non-rusty cans and tubs, the cans being provided with parchment paper circles over the top. Ice cream packed in unclean, rusty cans, or not provided with parchment circles shall be cut not exceeding 2 points according to the degree of the defect. Descriptive terms: Unclean, rusty cans, no parchment. With this exposition before you the following are some of the many questions that might be raised and discussed:

22.7 Defects in Ice-cream

22.7.1 Flavour Defects

1. **Cooked:** Caused by using milk products heated to too high a temperature or by using excessively high temperatures in mix pasteurization. It can dissipate with time, the same as cooked defect in fluid milk. Caramel-like, scalded milk, oatmeal
2. **Egg:** Caused by using too much egg in an ice cream not specified as a custard ice cream. French vanilla ice cream - resembles cooked
3. **Unnatural Flavouring:** Caused by using flavours which are not typical of the designated flavour i.e. Wintergreen flavour on vanilla ice cream. esp. vanillin
4. **High Acid :** Use of dairy products with high acidity or holding mix too long and at too high a temperature before freezing.
5. **Lacks Fine Flavour:** May be caused by using harsh vanilla. Good but falls short of ideal. Last resort in trying to describe flavour defect.

6. Lacks Freshness: Stale flavour caused by permitting ice cream to remain in hardening room or cabinet too long before sale. Minor, more major-becomes old ingredient or storage

7. Metallic: Sometimes develops from oxidized flavour and usually caused by copper or iron contamination. Poor grade of vanilla has been known to cause this flavour.

8. Neutralizer: Results from the use of too much neutralizer in the mix. Soda flavours usually more objectionable than lime flavours.

9. Old Ingredient: Caused by the use of inferior dairy products in the preparation of the mix. Powders made from poor milk or butter made from poor cream will contribute to old ingredient flavour.

10. Oxidized: Caused by oxidation of the fat or lipid material such as phospholipids, similar to fluid milk oxidation . Induced by the presence of copper or iron in the mix. Mono-and-di-glyceride, Polysorbate 80. Various stages - card boardy, metallic.

11. Rancid: Caused by rancidity of certain fats. May be due to use of rancid dairy products or to insufficient heat before homogenization of mix. Egg yolk powder may also be the cause. Lipolysis, especially of butyric acid.

12. Salty: Ice cream too high in milk solids-not-fat. Too much salt may have been added to the mix. Whey powder, maybe salted butter, whey flavour graham cracker like

13. Storage: Usually develops from "Lacks Freshness" and is most pronounced on ice cream which has been held in a stale storage atmosphere. May be described as an "old ice box" flavor.

14. Unnatural Sweetener may be confused with a cooked flavour which sometimes produces a caramel taste. May be caused by too much corn syrup especially if corn syrup has strong flavor. Some vanillas also produce a caramel flavour.

22.7.2 Body and Texture Defects

22.7.2.1 Course Texture

Due to the presence of ice crystals of such a size that they are noticeable when the ice cream is eaten and may be caused by:

- Insufficient total solids, serum solids, sugar, stabilizer or poor stabilizer.
- High acid mix
- Insufficient homogenizing pressure, homogenizer not functioning properly.
- Insufficient aging of the mix.

- Slow freezing because of mechanical condition of freezer.
- Incorporation of air as large cells because of physical characteristics of mix or type of freezer used.
- Fluctuating hardening room temperatures and re-hardening soft ice cream.
- Pumping ice cream too far from continuous freezer.

22.7.2.2 Crumbly body

A flaky or snowy characteristic caused by:

- High overrun.
- Low stabilizer and Low total solids.
- Coarse air cells.

22.7.2.3 Fluffy texture

A spongy characteristic caused by:

- Incorporation of large amount of air as large air cells.
- Low total solids and low stabilizer content.
- Freezing ice cream too soft in freezer.

22.7.2.4 Gummy Body

This defect is the opposite of Crumbly in that it imparts a pasty or putty-like body. It is caused by:

- Too low an overrun, too much stabilizer and poor quality stabilizer.

22.7.2.5 Icy Texture

This defect is caused by many of the same factors which cause coarse texture, except that defect is much more pronounced.

22.7.2.6. Sandy Texture

One of the most objectionable texture defects but easiest to detect. It is caused by Lactose crystals which do not dissolve readily and produce a rough or gritty sensation in the mouth. This can be distinguished from "iciness" because the lactose crystals do not melt in your mouth. This defect can be prevented by:

- hardening the ice cream quickly
- maintaining low hardening room temp.
- preventing temp. fluctuations, from manufacturer to consumer
- lactose crystal formation is further discussed in the Dairy Chemistry and Physics section.

22.7.2.7 Soggy Body

Caused by:

- High total solids, high sugar content , high stabilizer content
- Low overrun.

22.7.2.8 Weak Body

Ice cream lacks "chewiness" and melts quickly into a watery liquid. Gives impression of

Lacking richness. May be caused by:

- Low total solids.
- High overrun.
- Insufficient stabilizer.

22.7.3 Melting Quality Characteristics

22.7.3.1 Curdy melt-down

Due to coagulation of the milk proteins so is affected by factors which influence. The protein stability such as:

- High acidity and Salt balance.
- High homogenizing pressures.
- Over-freezing in the freezer.

22.7.3.2 Does not melt

May be caused by:

- Over stabilization.

- Wrong stabilizer.
- High fat.

Excessive fat clumping in the mix due to homogenization at too low a temperature or single-stage homogenizer.

- Freezing to too low a temperature at freezer.
- Use of calcium neutralizers.

22.7.3.3 Wheying off

The salt balance, protein composition, carrageenan all are factors.

22.8 Colour Defects

22.8.1 Colour Uneven

Applies usually to ice cream in which colour has been used, but may be noticed in vanilla ice cream under some circumstances.

22.8.2 Colour Unnatural

Wrong shade of colour used for flavoured ice cream.

Too much yellow colouring used in vanilla ice cream.

Greyish color due to neutralization.

Table 22.2 Score card for Ice cream

Score card for Ice cream					
Name		Date			
Attribute		Sample No.			
		1	2	3	4
Flavour -45	Identified criticism				
	Score				
Body and Texture -30	Identified criticism				
	Score				
Colour -15	Identified criticism				
	Score				
Container -10	Identified criticism				
	Score				
Total -100					

Key for recording

Flavour	
-	Fine, Fresh, Sweet delicate, Creamy with characteristics of designated flavour
+	Slightly cooked, very slightly acid.
++	Lacking fine flavour freshness, flat, acidic, very high flavour, slightly metallic or oily.
+++	Unnatural flavour, unclean, very high acid, oxidized, state, metallic
Body & Texture	
-	Firm, fine & smooth.
+	Slightly heavy, coarse or short, soft. Slightly crumbly
++	Coarse, crumbly, weak, fluffy, slightly spongy.
+++	Sandy, icy, jumpy, flaky and buttery.
Colour	
-	Attractive, pleasing and typical uniform.
+	Slightly pale or dull, slightly high lacking natural.
++	Unattractive, lack of uniformity, chalky
+++	Unnatural, very high or excessive
Container	
-	Clean, attractive, with suitable cap
+	Slightly damaged, slightly shrunken ice cream
++	Slightly soiled or rusty, damaged, ill shaped, improper filing and capping
+++	Soiled, rusty, damaged too much, not capped, poor quality metal

You are logged in as **e-Course NAIP** (Logout)

DT-8