JUDGING OF DAIRY PRODUCTS

Module 8. Concentrated and dried products

Lesson 24
CONCENTRATED MILKS: DESIRABLE ATTRIBUTES AND DEFECTS, JUDGING AND GRADING OF EVAPORATED AND CONDENSED MILKS

24.1 Introduction

Critical quality assessment of all classes of concentrated milk challenges both the dairy products judge and the manufacturer of these products. A thorough understanding of the sensory attributes of concentrated milk and their routine examination is imperative, not only to assure improvement of the product, but also for ensuring that the product reaches the consumer in good condition.

24.2 Evaporated Milk

When judging or grading evaporated milk, the judge must keep in mind the desirable qualities and standards for the product. It must be noted that, in addition to meeting the legal chemical requirements for the product high quality evaporated milk must be white to creamy in colour, have a relatively viscous body, be uniformly smooth in texture and possess a mild, pleasant flavour.

A complete examination of evaporated milk includes test and observations on colour, container, if fat separation, fill of container, film formation (protein break), flavour, gelation, sedimentation, serum 'separation, viscosity and whipping ability.

Some of the subjective tests, based on organoleptic examination, make use of the hedonic scale or variations of it. For example, the flavour of evaporated milk may be given a hedonic rating on a 9 -point scale. A narrow band hedonic scale say, a 5-point one, may be used in rating organoleptic quality factors other than flavour.

24.2.1 Procedure for examination

A routine in examining cans of evaporated milk facilitates judging of the samples. The following steps have been found to be of material aid in going over a lot of samples.

24.2.2 Precaution

Avoid undue agitation when transporting the cans to the laboratory.

- Examine the cans for appearance, notice the upper end of the can for polish; observe the neatness of the label.
- Open the can in such a way that both the can and contents may be examined.
- Notice the colour of the milk which should be uniformly white to cream colour. Intensity of darkening may be noted for its degree e.g. none, slight, distinct and pronounced.
- Study the body and texture. Smooth,relatively viscous evaporated milk pours like a thin cream without marked splashing. Allow the can to drain well. Look for any deposit which may be present in the bottom of the can.
- Should milk lack uniformity try to determine whether the chief factor is fat, protein, salts or foreign material? In case the fat is responsible, the defect will appear at the top of the can as a cream layer or as buttery particles. Defect due to protein will appear as various size curds distributed throughout or as different intensities of gelation.
- Observe the condition of the container looking for splangling, blackening of the seam and rusting of the container. Splanging appears as clean, bright, dark, overlapping blotches on the surface as though the tin were attacked by acid.
- Determine the colour reaction in coffee. It should be a rich, golden brown colour. Off flavour may be associated with rust formation in the container.
- Note the miscibility with coffee.Feathering in hot coffee appears as finely divided, serrated curds shortly after the evaporated milk has been added slowly to the hot coffee.

24.2.3 Defects in evaporated milk

1. Flavour: The flavour defects which may occur in evaporated milk are usually unlike those commonly occurring in fresh milk. Probably the most common flavour defect in evaporated milk is that which seems to be associated with progressive age darkening or browning of the product.Terms such as slightly acid,'stale coffee, old, sour 'and strong suggest the nature of the defect. The caramel flavour connotes a pleasant, appetizing taste sensation which is definitely lacking in the defect associated with age-darkening of evaporated milk. This flavour defect is easily detected.

The off-flavour is accompanied by only as light odour suggesting staleness. The underlying taste reaction of the age darkened evaporated milk is acid.

2. Body and texture: Fresh evaporated milk is remarkably free of body and texture defects. However, when evaporated milk is held for a long period of time or under adverse conditions,the following body and texture defects may be encountered:

3. Buttery/fat separation: This defect appears as a layer (up to 1 cm or more thick) of heavy cream at the top of the can. Among the causes of this defect are inadequate homogenization,high storage temperature, long storage period and improper handling while in

storage.

4. Curdy: Curdy evaporated milk may be noted by the presence of many coagulated particles interspersed throughout the milk or by a continuous mass of coagulum. It is chiefly associated with the protein rather than the fat. It is a serious economic defect. This condition is due mainly to the abnormally low heat coagulation point of the end product and could not withstand the sterilization process.

5. Feathering: The feathering of evaporated milk in hot coffee cannot be foretold by macroscopic examination but by actually testing the milk in hot coffee.' It has been postulated that the formation of curd when evaporated milk is added to coffee is due entirely to an excess of viscosity.

6. Gassy: Gassy evaporated milk is rather uncommon. The defect is manifest by bulged can sand sometimes by a hissing sound of escaping air when the can is punctured.

7. Grainy: A grainy evaporated milk is the one lacking smoothness and uniformity throughout. Such milk seems coarse. It is often associated with an excessively heavy, viscous body. The judge must bear in mind that grainy evaporated milk does not actually contain "grams"of sediment settled in the container. Neither does such milk contain curds or lumps of butter.

8. Low viscosity: A low viscosity evaporated milk may be noted by its milk like consistency. This defect is discriminated against as it denotes inadequate condensation.

9. Sediment: The sediment resulting from settling of leukocytes, disintegrated cells,denatured 'protein and foreign material of more or less of a colloidal nature is usually darker in colour than the evaporated milk since this sediment is readily miscible it may be seen only when a can, undisturbed for sometime, is emptied slowly.

The other type of sediment noted in evaporated milk is the result of the crystallization of some of the calcium and magnesium salts as Ca_3Po_4 and Mg_3 (PO_4). This gritty sediment formation accompanies ageing of the evaporated milk. They are found in the bottom of the container where they may be noted especially when the contents are emptied.

10. Colour: In judging evaporated milk two possible colour defects may be encountered, viz. too light in colour and too dark in colour. Too light colour is not it serious defect although it is not desired. The brown discolouration in evaporated milk associated with high sterilization temperature, high storage temperature and age is a serious defect in evaporated milk.

24.3 Sweetened Condensed Milk

Since sweetened condensed milk contains a sufficiently high percentage of sugar for its preservation, the flavour is pronouncedly sweet. Beyond this intense sweetness, the flavour should be clean and pleasant with a slight trace of mild caramel as an aftertaste.

24.3.1 Procedure for examination

1. A definite routine enables the judge to make the best use of the available time with the assurance that the examination is complete when finished.

2. Appearance of the container should be as bright as new tin as the can has not been subjected to the high heat treatment of sterilization.

3. The surface of the product should have the same intensity of colour as the under layer and should be uniform inconsistency with no indication of lumps, free fat or screen formation.

4. Colour of the product should be uniform throughout. Observe if the milk has a greenish white creamy or a brownish colour.

5. Viscosity desired is one which is obviously not "thin" but resembling to a marked degree that of medium to heavy molasses. In grading sweetened condensed milk, the judge must bear in mind that a desirable sweetened condensed milk pours like molasses and, when poured, seeks its own level leaving no trace of the folds on the surface.

6. Flavour should be observed both for the textural and taste sensations. Register the relative smoothness of the product as a whole and the fineness of the grain by pressing the sample against the palate with the tongue.

24.3.2 Defects of sweetened condensed milk

24.3.2.1 Flavour

a) **Metallic:** The metallic flavour in sweetened condensed milk is chemical rather than bacterial in nature and is usually traceable to copper contamination.

b) **Rancid:** Itoccurs rather infrequently and resembles butyric acid. Rancid flavour increases in intensity with age.

c) **Strong:** It is a flavour defect, which is suggestive of caramelized sugar and is usually accompanied by browned tint to the natural colour.

24.3.2.2 Body and texture

Condensed milk, having a high percentage of sugar has a relatively heavy body somewhat like normal molasses. Also, it usually has a smooth, uniform texture. However,the product may have certain body and texture defects such as buttons or lumpiness, fat separation, gassiness, sandiness, sediment, thickening etc.

a) **Buttons/lumpy:** It is a body defect which is characterized by the presence of round and rumlumps, with stale odour, at the surface of the product. Buttons result from enzymatic reactions following mould growth.

b) **Sandy, rough, grainy, granular:** These terms are used to describe sweetened condensed milk which contains oversized lactose crystals. The solid particles are of such size that the

product lacks smoothness and grittiness is noticeable as the sample is being tasted.

c) **Settled:** It is used to describe the condensed milk in which a definite settling of sugar crystals has occurred.

d) **Thickened:** This defect is manifest by a gel formation which gives the product the appearance of a solid rather than a liquid. The defect varies markedly in itsintensity from a slight jelly to a firm custard consistency.

Table 24.1 Score card for Sweetened Condensed Milk

Name **Date**----------

Code No. **Time** ----------

A)Score the sample for different characteristics. Indicate the degree of defects, if any, encircling the applicable one and deduct accordingly from the characteristic score.

Characteristic	Maximum score	Minimum score	Sample Score
(1)	(2)	(3)	(4)
Package appearance	5	3	
Colour and appearance	15	9	
Body and Texture	35	21	
Flavour	45	27	

NOTE: If the sample scores less than the minimum for any characteristic, it is to be rejected.

B) **Degree of defects**

Table 24.2 Degree of defects

Characteristic	Defect	Degree of defect		
		Suspicion	Definite	Pronounced
(1)	(2)	(3)	(4)	(5)
Package appearance	Improper seal/ rust spot/ soiled/ dull surface	1	2	3
Colour and appearnce	Browning	1	2	3
	Mould Buttons	2	5	10
	Fat separation	1	3	5
Body and Texture	Thickened	2	10	16
	Sandy/coarse/ mealy/ heavy	2	5	10
	Settled	1	2	3
Flavour	Caramalized	1	2	5
	Rancid/ tallowy	2	4	8
	Metallic	2	5	10
	Fruitiness	2	5	10

Grading: After computation of data, recorded in the above table by the panelists, the following grade should be award

Score	Grade
90 and above	Excellent
80 -89	Good
60-79	Fair
59 and below	Poor

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