

# JUDGING OF DAIRY PRODUCTS



Jump to...



**B. Tech. (Dairy Technology) ► DT-8 ► Resources ► Lesson 26. KHOA: DESIRABLE AND UNDESIRABLE CHARACTERISTICS OF DIFFERENT TYPES OF KHOA. SENSORY EVALUATION OF KHOA**

*Module 9. Heat desiccated Indian milk products*

## Lesson 26

### **KHOA: DESIRABLE AND UNDESIRABLE CHARACTERISTICS OF DIFFERENT TYPES OF KHOA. SENSORY EVALUATION OF KHOA**

#### **26.1 Introduction**

Khoa or mava, the traditional Indian indigenous dairy product, is mostly used as a base for a variety of Indian sweets. Khoa is a partially desiccated whole milk prepared in open pans by direct application of heat.

According to PFA Khoa should be made from cow, buffalo, sheep or goat or combination of these milks by rapid drying and should not contain less than 20% fat in the finished product. However, the Indian Standard specifications in addition specify the quality of milk to be used for its manufacture as well as the sensory quality of the product. It also requires that Khoa must have not less than 37% fat (on dry basis).

In general, three types of Khoa are made in this country viz., Pindi, Dhap and Danedar depending on end use and basic composition

**Table 26.1 Types of Khoa**

Type of Khoa	Fat %	Moisture %	End – use
Pindi	21 - 26	31 - 33	Burfi, peda etc.
Dhap	20 - 23	37 - 44	Gulabjamun, pantoa etc.
Danedar	20 - 25	35 - 40	Kalakand etc.

In order that the sensory panelists are made aware of the desirable/undesirable characteristics of khoa, they need to be exposed to various types of khoa. The panelists should first be trained to identify good quality product made from cow and buffalo milk.

#### **26.2 Sensory Requirement of Khoa**

### 26.2.1 Flavour

A typical mildly cooked flavors similar to that perceived from boiled milk is most acceptable. The taste should be pleasantly sweet.

### 26.2.2 Body & texture

Soft & uniform body and granular texture is most desirable. Pindi khoa should have smooth, compact, homogenous texture with very fine grains. Dhap khoa shall have a granular texture with a slightly soft body. Danedar khoa shall have big grains with brown colour.

### 26.2.3 Colour & appearance

Good quality khoa should be a compact mass of very small uniformly size dgranules which should not show any signs of fat or water leakage and should not develop grittiness after 24 h storage. Cow milk khoa is pale yellow with a tinge of brown having a moist surface.

**Table 26.2 Desirable sensory qualities of cow and buffalo milk khoa**

Quality attribute	Cow milk khoa	Buffalo milk khoa
Colour	Straw / pale yellow with a tinge of brown.	Whitish (dull), light greenish white with tinge of brown
Appearance	Moist surface	Slightly oily / greasy surface
Body	Slightly hard	Soft.
Texture	Slightly sandy	Smooth, granular
Odour	Rich nutty	Rich nutty
Taste	Slightly salty	Slightly sweet

### 26.3 Undesirable Sensory Attributes in *Khoa*

Thereafter, the panelists should be trained in recognizing the defects commonly associated with khoa and its degree by providing them with good quality products containing various levels of individual defects. Some of these common defects observed in khoa can be simulated as stated below:

#### 26.3.1 Flavour defects

**Table 26.3 Flavour defects**

Barny	The typical cowy/barny smell in khoa can be simulated by exposing the milk or khoa to a bam or where cows assemble.
Bitter	Bitter aftertaste generally obtained on account of hydrolysis of proteins under adverse conditions of storage can be simulated by the addition of few drops of quinine hydrochloride solution to the milk before khoa manufacture.



	homogenizing raw milk at 32° C and allowed to stand till desired intensity of defect has been obtained and then converting the milk to khoa. Alternatively, the rancid defect can be obtained by the addition of C-9 or C-10 aldehyde in minute quantities.
Salty	Pronounced salty taste can be obtained by mixing salt to the milk (0.5 %) or by adding a few drops of concentrated salt solution to the khoa.
Smoky	Identifiable as smoky flavour in the product the defect can be simulated by making the khoa in an open pan over cow dung cake fire.
Spicy	Spicy flavour can be incorporated either by exposing the khoa to spices or storing the product in containers, which had previously held spices.
Stale	This flavour is generally found in khoa that has been stored for sometime; hence the defect can be simulated by storing the product at 5 to 10° C.
Sunlight	Slightly cheesy flavour defect in khoa can be simulated by exposing the khoa contained in a glass vessel to direct sunlight for 1 to 2 h.

### 26.3.2 Body and Texture Defects

**Table 26.4 Body and texture defects**

Hard body	The khoa which requires greater effort to chew can be obtained by either, using low-fat milk for khoa manufacture or by keeping the moisture content: lower than required or by adding 1 % starch to milk before making khoa.
Coarse texture	Khoa containing large particles can be made by using milk that has high lactic acidity or has been subjected to higher heating temperatures than normally used particularly during the large stages of dehydration, or by reducing the rate of stirring while making khoa.
Gritty texture	Due to the presence of sand-like particles of crystallized lactose, this defect can therefore be simulated by the development of lactose crystals by cooling the semisolid mass before pat formation for 2 to 3 h.
Pasty	Pasty khoa is produced when the moisture content is higher or when it contains added starch or flour.
Grainy	Consequent to excessive dehydration while slow working results in a khoa that has a granular texture hence samples can be similarly obtained.

### 26.3.3 Colour and appearance defects

**Table 26.5 Colour and appearance defects**

Dry surface	Gloomy surface without the typical brightness is obtained when khoa is made from low fat milk.
Unclean	Khoa made without straining the milk results in a product, which contains extraneous particles such as dirt, feed particles etc. The simulated product can be made by incorporating fine feed particles or by making khoa under open and windy conditions.
Browning	Brown colour or burnt particles can be obtained by heating the product at high temperatures with low stirring speed and irregular scraping.
Mouldy surface	Mouldy surface in khoa can be obtained by storing high moisture product in high humid conditions.
Leaky fat / water leakage	When khoa is given high heat treatment during dehydration without proper stirring or working it results in a product that shows free fat or water droplets on the surface of the product. Hence, this method can be followed for obtaining the defects in the samples.
Wavy	Uneven colour shows up when cow or buffalo milk khoa are not mixed properly. This defect can be simulated by uneven mixing of cow and buffalo milk khoa.

The defects caused by packaging have not been discussed since in general khoa whether in large or small scale is delivered in consumers own container or at most in polyethylene bags.

In order to unify the scoring system for khoa, a 100-point scale scorecard is being suggested. Since flavour is the most important attribute it is usually assigned the maximum score of 45, followed by 35 for body and texture, 15 for colour & appearance and 5 for package. It is also necessary to assign a minimum score for each sensory attribute below which the product is automatically rejected. For this purpose 60 % of the individual attribute score has been generally proposed and accepted. Hence, any product sample scoring less than 27 for flavour, 21 for body and texture, 9 for colour & appearance or 3 for package should be rejected.

After having trained the panelists for recognizing the various defects and their degrees, the use of scorecard. They will then be ready to evaluate samples of khoa. Khoa should be evaluated by deducting points for each defect/ intensity of defect from the total score of that attribute and final score on the card. The composite scores can then be analyzed statistically to arrive at the best product/ process etc. under test.

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