



Characteristic	Defect	Degree of defect		
		Suspicion	Definite	Pronounced
(1)	(2)	(3)	(4)	(5)
Appearance of package	Soiled surface Unsealed	1	2	3
Appearance of Dry product	Caked/brown particles	2	5	10
Appearance of reconstituted milk	Lumpy brown	1	2	5
Flavour	Oxidized/stale/rancid	2	3	10
	Chalky/acid/neutralizer/salty	2	5	10
	Metallic/cooked/scorched	1	2	5
	weed/bitter/foreign	5	10	15

Source: Method for Sensory Evaluation of Milk Powder Indian Standard IS:10030-1981

**Table 14.2 Suggested scoring guide for flavour for milk**

Score card for judging of Gulabjamun							
Name :				Date :			
Attribute		Sample No.					
		1	2	3	4	5	6
Flavour 35	Identified Criticism*						
	Score						
Body and texture 30	Identified Criticism*						
	Score						
Appearance 20	Identified Criticism*						
	Score						
Colour 15	Identified Criticism*						
	Score						
Total 100							

**\*please put appropriate symbol against identified criticism as per the key given for each attribute**

### 14.3 Grading

After computation of data the following grades should be awarded. Any attribute showing pronounced defect should be graded poor and rejected

Flavour	
-	Typical heated, fresh, moderately sweet
+	Pronouncedly burnt, lack of moderate sweetness
++	Slightly oxidized, abnormal after taste
+++	Oxidized, rancid, foreign taste
Body & Texture	
-	Smooth, granular, soft and thin crust
+	Slightly hard, slightly coarse, slightly fragile
++	Hard, slightly pasty, thick and hard crust, fragile
+++	Very thick and hard crust, very much fragile, heavy body
Appearance	
-	Spherical / round shape, smooth and glossy surface, of moderate size
+	Slightly irregular shape / flat, slight cracks at the surface, uneven surface
++	Flat / irregular in shape, cracks at surface
+++	Broken surface, flat, yeast and / or mould growth
Colour	
-	Light brown with glossiness at the surface
+	Slightly more brownish
++	Brownish, slightly blackish
+++	Blackish, dark, not uniform

## 14.4 Milk Scoring Techniques

### 14.4.1 Preparation of samples for evaluation

This depends on the purpose or objective of evaluation, number of participants and the quality criteria to be assessed. If several persons are to judge the milk samples for flavour, container and closure and other criteria then several containers of each individual lot of milk must be provided.

### 14.4.2 Order of examination and scoring

#### a) Closure

Closure should be carefully observed. Now a days bottles or cartons (not used in India) are not the usual packaging material. The milk is being packaged in polyethylene sachets. Hence the evaluator must see that the packaging properly sealed to prevent leakage/pilferage.

#### b) Container

Container as stated above, since plastic bags are now in vogue; these should be examined for extent of fullness, cleanliness and freedom from cuts/nicks/pinholes from leakage.

### c) Evaluation of milk flavour

The milk should be properly tempered between 13 to 18°C preferably 15.5°C. Milk samples should be poured into clean, odourless glasses paper/plastic cups. 10 to 15 ml milk should be poured and a sip taken, rolled around the mouth and flavour sensation noted and then expectorated. Sometimes, any aftertaste may be enhanced by drawing a breath of fresh air very slowly through the mouth and then exhaling through the nose slowly. A full whiff of air should be taken soon after the sample is placed in the container for any off-odour that may be present.

Typically the flavour of milk should be “Pleasantly Sweet and Posses Neither a Fore Taste Nor an After Taste” other than that imparted by the natural richness due to milk fat and milk solids. When milk clearly exhibits the so-called Taste there is usually something WRONG with the flavour of the milk sample. Thus milk is considered to have a defect if it has an odour, fore or after-taste and does not leave the mouth in clean, sweet pleasant condition following tasting. The scoring guide lists most frequently observed off-flavours. The defects should be described while scoring.

#### 14.4.3 Undesirable flavours

a) **Acid:** Sour detected by taste and smell-due to microbial conversion of lactose to lactic acid which imparts a tingling effect.

b) **Astringent:** Not common in milk

c) **Barny:** Transmitted off- flavour due to poor ventilation, foul smelling environment. Perceived by sniffing and tasting. Characteristic aftertaste.

d) **Bitter:** Associated with other defects like astringency, rancidity due to weeds and microbial (psychrotrophs) growth.

e) **Cooked:** Heat-induced. Appears when milk is heated to 76°C or more. There are 4 types of heat-induced flavours: cooked/sulphurous; heated or rich; caramelized and scorched. Heated and cooked flavours are easily identified, reaction time is quick, sensation remains after expectoration. Cooked flavour may also be noted through smell.

f) **Cow (acetone):** Distinct, persistent unpleasant, medicinal chemical aftertaste with acetone bodies in milk i.e. ketosis in cows.

g) **Feed:** Imparts aromatic taints to milk when fed ½ - 3 h prior to milking. The off-flavour is aromatic sometimes pleasant (e.g. alfa-alfa), detected by smell varies with feed. To prevent such feeds should not be fed 3 h prior to milking.

h) **Fermented/Fruity:** Resembles vinegar, pineapple and apple. Found in old pasteurized milk, due to growth of *Pseudomonas* spp. (*P. fragii*).

j) **Foreign:** Can be detected by smell or taste due to chemicals/detergents, disinfectants, sanitizers, exposure to fumes of petrol, diesel, kerosene, insecticides, ointments, medication to cows etc.

- k) **Garlic/Onion (weedy):** Pungent odour and persistent aftertaste.
- l) **Lacks freshness (stale):** Taste reaction indicates loss of fine pleasing taste, slightly chalky. May be 'forerunner' of either oxidised or rancid off-flavour or off-flavour caused by psychrotrophs.
- m) **Malty:** Flavour definite or pronounced, suggestive of malt caused by the growth of *S. lactis* var *maltigenes* at  $> 18.2^{\circ}\text{C}$  for 2-3 h can be smelled or tasted. Bacterial population in millions, followed by acid/sour taste.
- n) **Metal-induced oxidised off- flavour:** Due to lipid oxidation-metal catalyzed. Metallic, oily, cardboardy, happy, stale, tallowy, painty and fishy are used to describe this off-flavour. The off-flavour is quickly perceived in the mouth and has a relatively short adaptation time.
- o) **Light-induced oxidized off-flavour:** Described as burnt, burnt protein, burnt feathers, cabbagy, medicinal or chemical-like, light-activated or sunlight flavour or sunshine flavour, light catalyzed lipid oxidation as well as protein degradation both are involved. It requires riboflavin which is naturally present in milk. Homogenized milk is more susceptible but is resistant to oxidized off-flavour (due to lipid oxidation) the opposite is true for non-homogenized milk.
- p) **Rancid:** Extremely unpleasant, due to volatile fatty acids formed through enzymatic hydrolysis of fat. Soapy, bitter and unclean aftertaste. Flavour is nauseating and revolting.
- q) **Salty:** Perceived quickly in the mouth
- r) **Unclean:** Due to the growth/ activity of psychrotrophs at  $>7.2^{\circ}\text{C}$ .

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