



Butter Defects

Introduction

- Defects in butter can be classified as defects related to flavour, body and texture and colour.
- These defects may also be classified as defects related to cream and defects related to faulty methods of manufacturing. All these defects are discussed in detail in this lesson.

FLAVOUR DEFECTS

1. CREAM-RELATED OFF FLAVOURS 2. PROCESS-RELATED OFF-FLAVOURS

1.1. Feed and Weed flavours and odours

- The feed and weed flavours that appears in freshly drawn milk are more or less readily soluble or absorbed by the milk fat.
- They, therefore, are often more intense in the cream than in the original milk and they appear in the butter churned from such cream.

1.2 Cowy and Barny flavour

- This type of defect is due to contamination of milk with manure or stable air or both.
- The Cowy flavour may be due to cows with unclean udders and to milking with wet hands, to the handling and prolonged exposure of the milk and cream in poorly ventilated stables.

Prevention:

1. Sanitation and cleanliness in the production of cream/milk such that there is no · Contamination with manure, stable, dust and impure stable air.
2. Milking with clean dry hands.
3. Prompt removal of milk from the farm.
4. Handling and storing milk/cream in a place free from stable air.

1.3. Unclean or utensil flavor

- The task suggests contact of cream with utensils incompletely washed such as **unclean strainers**, cream cans or separator bowls or faulty sanitary conditions of factory equipments such as vats, pumps, conveyors, pipes, churns or packing equipments.
- Unclean flavour may be the direct result of contamination of the cream with milk remnants from unclean utensils or of absorption of their odours; it may also be the indirect result of the activity of m. o. contained in the milk remnants of unclean utensils.

1.4. Musty, Smothered flavour

Causes:

1. When warm cream from the separator is held in a tightly sealed can, it often acquires a peculiar smothered musky flavour and odour which may follow it into the butter.
2. Storing of cream in a damp, musky smelling cellar, or other poorly ventilated room.
3. Empty, sealed cans that have been out of service for a considerable period.

Prevention:

- Prompt and proper cooling of the freshly separated cream.
- Storage in a properly ventilated place.
- Rinsing and clean cans before use.

1.5. Bitter flavour

Causes:

- Abnormal physical condition of certain cows.
 - Feeds and weeds.
 - Protein and clean cans before use.
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- ✓ Some cows in late lactation regularly yield milk that has a bitter flavour.
 - ✓ Such feeds and weeds as lupines, ragweed, bitter weed, beet tops, raw posture, raw potatoes, diverse decayed if feed stuffs, moldy oat and barley straws have been found to be the cause of bitter flavour.
 - ✓ Bitter flavour also occurs due to the action of yeasts on proteins resulting in formation of **peptones and amino acids**.

1.6. Yeasty flavour and odour

- It is caused by the **fermentation of the cream** by certain species of yeasts (*Torula Cremoris* and *Torula sphaerica*).
- In early stages of yeast fermentation of cream, the odour usually is not unpleasant, aromatic and nutty character.
- Prolonged yeasty form generally gives the butter a disagreeable bitter yeasty taste. In many cases, the yeasty flavour and odour are accompanied by **profuse foaming of the cream**.

Prevention:

- i) Wash utensil after each use.
- ii) Cool the cream to as low a temperature as possible as soon as it leaves the separator.
- iii) Do not allow the cans to stand on the station platform exposed to the sun in hot weather.

1.7. Cheesy flavor

- It denotes a very low grade of raw material.
- The cheesy flavour in such case is usually of the cheddar cheese character.
- It is the result of very **old cream** that has been produced and held under conditions that cause **high acidity, curdiness and curd decomposition.**

1.8. Metallic flavour

The causes for this defect can be classified as

- i. contamination of cream with metallic taste and
- ii. action of certain species of bacteria.

- ✓ The absorption of metallic salts by the cream is probably the most common cause of metallic flavour in butter made from **sour farm skimmed cream**.
- ✓ This is attributable chiefly to the condition of the utensils in which the cream is held on the farm and of the cream shipping cans.
- ✓ Exposed surfaces of **copper such as in copper vats**, fore warmers, pasteurizers, cream pipes etc with defective in coating also surface of alloys containing **considerable copper such as white metals** are potential **sources metallic flavour in butter**.

1.8. Metallic flavour

- Metallic flavour is also caused **by bacterial activity**.
- The starters at certain advanced stages of fermentation may and often do become metallic and may cause metallic flavour in the cream inoculated with them.
- **High acidity** is practically always a factor in the combination of conditions that produces this flavour defect.
- **Cream rich in butter fat**, likewise, is more susceptible to the tendency to develop metallic flavour than cream low in butter fat.

Preventions:

- ✓ Keep fat % less than 35.
- ✓ Encourage use of cans that are clean and not rusted.
- ✓ Keep all copper surfaces in plant equipment properly, tinned.
- ✓ Efficient CIP (Clean in place)/Cleaning of equipments.
- ✓ Do not over ripen the cream as don't hold it excessively long.

2. PROCESS-RELATED OFF-FLAVOURS

a) Surface Taint, Limburger or Putrid Flavour

- The defect is called surface taint because it first develops at the surface taint because it first develops at the surface. However the putrid flavour is not confined to the surface, it rapidly involves the whole mass or package of butter.
- The putrid flavour defect is also called as Limburger flavour suggesting the flavour and odour of Limburger cheese.
- The putrid flavour defect is mostly found in butter made from unripened or sweet cream and light salt butter.

Causes

- Protein decomposition by putrefactive bacteria *Achromobacter putrafaciens*, *Pseudomonas fluorescens* and *B. liquefaciens*.
- Contamination of butter cream after pasteurization. (Efficient pasteurization destroys all putrefactive bacteria)

Prevention

1. Efficient pasteurization.
2. Sanitation between pasteurizer and churn.
3. There should be no contamination from churn.
4. At the time of draining buttermilk it should be kept in mind that no buttermilk should flow back to the churn as the bottom line is seldom clean and it usually contains milk remnants with putrefactive bacteria.
5. Water supply.
6. Precaution in packing water.

b) Cheddar and Roquefort Flavours

- * Found mostly in light salted and unsalted butter.
- * Absent in butter held in commercial cold storage.
- Cheddar cheese type flavour is caused by **Proteolysis and lipolysis** by several species of bacteria.
- Roquefort cheese flavour is usually associated with mold growth which involves both proteolysis and fat hydrolysis.

Prevention

1. Good sanitation practices throughout the process.
2. Cream ripening with good starters.

Rancid Flavour

- It is a common flavour defect of butter made from raw cream.
- Rancid flavour in butter resembles the pungent respecting taste and odour of such volatile fatty acids a butyric, caproic and caprylic acids.
- It is caused by hydrolysis of fat which splits the butter fat into FFA and glycerol.
- Hydrolysis of fat is brought about by the action of m. o. or enzymes or both.

Prevention

1. Proper pasteurization
2. Efficient sanitation in plant
3. Clean water supply.

c) Tallowy flavours

The tallow flavour of butter resembles the flavour and odour of mutton tallow. In severe cases of tallowiness, the butter usually also bleaches in colour. It is caused by oxidation of the fat, involving the unsaturated fatty acids in butter such as the oleic acid. Some investigations suggested that oleic acid combined with free glycerol (produced by fat hydrolysis) forms glycolic acid ester of oleic acid. This product is responsible for tallow flavour.

Causes

1. Air, light and heat

Exposures to air cause oxidation of fat. This is accelerated in the presence of light and heat.

2. Metals

The presence in butter of certain metals, their salts or oxides, greatly hastens reactions that lead to tallowy flavour. (Cu, iron)

3. Neutralization

Over neutralization aggravates the tendency of tallowy flavour as an alkaline condition promotes fat hydrolysis and oxidation.

4. Diacetyl

Diacetyl is capable of causing tallowy flavour and bleaching of butter fat in the presence of air. Excessive fortification with diacetyl thus causes tallowiness.

Diacetyl in butter should not be more than 4 ppm.

5. Absence of bacteria

Bacteria utilize oxygen in their metabolism and thus retard tallowiness.

Prevention

1. Uses if air and light proof liners and wrappers, treatment of wrappers with harmless antioxidants such as Oat flour solution.
2. Surfaces should be properly tinned SS should be used.

d) Fishy flavour

- Butter has a flavour and odour characteristic of fish.
- It is very serious defect of butter.

Causes

Certain feeds and feeding areas cause fishy flavour fish. It is very serious defect of butter.

ii) Activity of microorganisms

3. DEFECTS IN BODY AND TEXTURE

Crumbly, Brittle body

The proportion of high and low melting fats present is controlled by the composition of the butter fat and this in turn is primarily affected by the season of the year i. e. the feed.

Winter – decreased amount of low melting point fats.

Summer – increased amount of low melting point fats.

Thus the winter butter fat is often accompanied by excessive hardness, crumbliness and stickiness of butter. Winter butter fat contains large coarse fat crystals that will continue to grow in size after manufacture, has a hard, friable, crumbly texture.

Prevention

- i) Avoid low cream cooling temperature and prolonged holding of cream at low temperature.
- ii) Chilling granular butter with cold wash water.

Sticky Butter

This defect refers to butter that doesn't cut clean. It sticks to knife or trier.

Prevention

- i) Same as for crumbly.
- ii) Churning immediately after cooling.
- iii) Wash the butter with wash water at a temperature of 30 to 40 F below that of the bottom.

Weak Body

It lacks the desired firmness and standing up property.

Causes

- i) Incomplete fat crystallization.
- ii) Faulty adjustment of cooling temperature of cream or holding time.
- iii) Low proportion of high melting point glycerides.

Greasy Texture

This defect occurs when butter is worked excessively while in soft condition. The danger of greasiness is usually greatest in the case of abnormally rich cream insufficiently cooled, and churned and worked while too warm.

Prevention

- i) Proper cooling of cream.
- ii) Chilling the butter granules thoroughly with very cold water (ice water) before working.

Leaky butter

Usually appears wet to the eye. When bored, it shows small droplet of moisture on the plug and the back of the trier looks wet.

Butter suffers excessive shrinkage and loss of weight in storage.

Causes

- i) Incomplete or improper working.
- ii) Lack of fine dispersion of moisture in butter.

Gummy butter

Butter when placed in mouth does not melt readily. It sticks to the roof of the mouth and gives the impression of gumminess.

Causes

- Presence of an excess of high melting triglycerides.

Mealy butter

- Mealiness is most likely to occur in butter made from sour cream that is improperly neutralized with lime.
- Lime particles combine with the sour casein, forming minute particles of insoluble calcium caseinate.
- In subsequent pasteurization these casein lime particles contract and harden giving both the cream and butter, a disagreeable rough graining as mealy character.

4. Colour Defects in Butter

The ideal color of butter ranges between a straw color and a golden yellow color. It must be uniform churning to churning and the colour must be solid that is it must be of the same shade or intensity throughout the body of the butter.

- i) Bleached butter due to oxidation of fat.
- ii) Mottled – Unevenness of colour in the body of butter is shown in the form of streaks, waves and mottles.

Causes

- i) The whitish opaque dapples in mottled butter are due to localized sections of innumerable, very minute droplets.
- ii) Salting out action of the salt.
- iii) Uneven working of different portions of butter of one and the same churning.

Prevention

- i) Keep working rolls in good mechanical condition.
- ii) Do not overload the workers/churn.
- iii) Dissolve the salt completely.

Other defects

Yellow specks, white specks, green discoloration, Pink color and Moldy butter

Thank You