Concentrated milk defects:

- Microbial defects
  - Condensed milk
  - Evaporated milk
- Non microbial defects
Microbial defects of sweetened condensed milk
(blown, thickening, buttons, rancidity)

1- Blown cans
Common in worm months
- Caused by CO2 or H2 or mixture (Microorganism dependent)
- Contents (highly odorours)

Osmotolerant gas producing yeast
( torula latis condensei, saccharomyces spp, candida)(alcohol & gases)

Coliforms
(poor sanitary conditions)
(Acid flavour & gas)

Bacillus lactis aerogenes

Control
- Using good sugar quality
- Efficient plant sanitation and canning condition
- Not store in hot place
2- Thickening

-Bacillus subtilis
- Bacilis micoids
- B. stearothermophilus
- Micrococcus strains

Rennin like enz. → Clotting & aggregation for milk casein

So, can be detected by souring & cheesy texture due to curd formation

Control

-Low storage temp.
- Improve plant sanitation
- Bactofugation (???)

Acidity & cheesey odour
3- Buttons

Small masses of mould mycelium & coagulated casein usually colored white to brown may be found in the surface or subsurface layers

- Pencillum
- Asperigillus

Clotting enzyme cause localized coagulation

bad taste cheesy consistency

Detected by presence of mould mycelium, coagulated casein, hard cheesy consistency & colored curd

Control

- Canning under a septic conditions (vacuum package)
- Improve plant sanitation (CIP)
- Storage below (12-15°C)
- Inversion (↓ gasses)

4- Rancidity

- Contamination of milk by lipase producing bacteria.
Microbial defects of unsweetened evaporated milk

**Sources**

- **Insufficient heat treatment**
  - B. coagulans & B. Stearothermophilus → cause acid coagulation & cheesy odor.
  - B. subtilis → cause non acid curd then digested to brownish liquid with bitter taste.
  - B. megaterium → cause cheesy odor curd with some gases.
  - Closterdia spp → cause gas production with puterifaction and H2S.

- **Post heat treatment contamination (leakycans)**
Non- Microbial defects of concentrated milk (industry)

Grittiness  Gelation  lumpiness  Brown disc  Rancidity  Blown can

Sweetened & un sweetened
Selection & preparation of milk
- Color & flavour abnormalities
- Spore & thermotolerant bacteria
- Clarification by centrifugal separator
- Milk standardization (fat %)

Cooled, clarified, and standardized milk at 4°C

Stabilization (Sodium citrate)
- Preheating

Addition of sugar
- Milk standardization (sugar index)
- Concentration under vacuum

Preheated, standardized, stabilized, concentrated milk

Rabid cooling
- Package (filling & canning)

Unsweetened concentrated milk

Small hard crystals due to:
1. Slow cooling after heating
2. Insufficient dissolving of sugar
stabilization (Sod citrate)
Selection & preparation of milk

Color & flavour abnormalities

Small clots float on milk surface & cheesy consistency due to selection of mastitic milk with abnormal high albumen & globulin
Due to the effect of high temperature during processing result in charring of lactose.
Selection & preparation of milk

Chemical abnormalities

Selection of milk contain high lipase enz. or cystic ovary or milk at the end of lactation and presence of cupper residues.
Due to overfilling of can by cold milk which under heating expands or due to chemical action on the metal of the cans.
1- Block milk
Product derived from concentrated milk with sugar addition
T.S% = 84-90%  Water% = 16%  Can be cut by a knife

2- Caramelized condensed milk
Market mostly as a paste or in powder or tablet form. Produced by concentrating & caramelizing milk with 18 to 20% sucrose or glucose with or without flavour supplement.
3- Condensed skim milk

Obtained by a simple concentration of skim milk by vacuum evaporation or RO consider more cheaper — with protein ratio 50-80%.

4- Recombined concentrated milk

Used as substitution of whole milk in area where there is shortage in supply. It prepared from milk powder.
Thank you for attention
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