

Topic - Microbiology of Indigenous milk products  
Khoa

(Course - Microbiology of Milk products)

Indigenous milk products refer to those dairy products of a particular region or country. In the present context, these are products of Indian origin. The word India pertains to undivided India (India, Bangladesh & Pakistan).

According to available statistics (Anonymous 1976) nearly 47% of total milk produced in India converted to various indigenous milk products (Khoa 5.3%).

Khoa is known as various names like Khava, Khova, mawa, halkhoa.

According to PFA rules 1955 - Khoa is the product obtained from cow or buffalo (or goat or sheep) milk or combination thereof, by rapid drying. The milk fat content should not be less than 20% of the finished.

Microbiological Test standards

Test	Count
1. Coliform	790/gm
2. Yeast & Mold	790/gm
3. Total Count	-

## Geotrichum spp

— G. Candidum

## Mucor spp

— M. mycedo

— M. plumbeus

## Rhizopus spp

— R.

## Fusarium spp

## Cladosporium spp

Bhat et al (1948) had shown that a number of pathogens like *Salmonella typhi*, *Shigella dysenteriae*, *Vibrio cholerae* & *E. coli* are able to survive for long periods during storage.

(Mandokhat & chandiramani 1983) have shown that occurrence of staphylococci especially those of coagulase positive type of Khoya. The staphylococci have been known to produce heat stable enterotoxins in these products which causes food poisoning.

Vasudharaj & Nambudripad (1984) examined the heat stability of staphylococci cells which could survive during Khoya making.

Guha et al (1983) shows that *Dough* resistant *Coliform* & enteropathogenic *E. coli* have also been isolated from Khoya.

In general the presence of *E. coli* & enterococci in the product denotes the sewage or faecal contamination.

### Control & Prevention

Post processing contamination (unclean utensil & water supply) should be minimized.

### 3 Mold growth

Storage of kheer at low temperature might favour the growth of molds which impart off flavour & may also produce mycotoxins.

### Control & Prevention

Proper sanitation of environment could be control.

The moisture of, should not be allowed to exceed the prescribed limit.

Kheer should be stored in air tight packages. Treatment of wrapping material with antifungal agents.

### Reference Prepared from

A Comprehensive Dairy Microbiology

J. S. Yadav, Sunita Grover, V. K. Batish

Metropoliten New Delhi - 110002

Microbiological quality of Khoa, influenced by the variety of factors during production, processing, handling, storage & distribution. Some of the common factors influencing the microbiological quality of Khoa are as follows

- (i) Quality of milk
- (ii) Method of Khoa Making
- (iii) Production hygiene
- (iv) Effect of packaging
- (v) Effect of storage conditions

## Microbiological defects in Khoa

### 1 Rancidity -

The fat component is degraded by the action of microbial lipase and lipase is produced by certain bacteria, yeast & molds. Hydrolytic & ketonic rancidity might be produced by the microbial activity.

#### Prevention & Control

1. storage of Khoa below  $10^{\circ}\text{C}$
2. Maintain hygiene during production.

### 2 Stale & Sour Flavour

The off flavour are produced by activity of proteolytic & acid producing organism at low storage temperature.

various type of bacteria (acid producers, proteolytic, lipolytic, aerobic spore former, psychrophilic, thermophilic, pathogens), yeast and mold have been reported in Kheo.

Psychrophilic bacteria mainly Pseudomonas, Achromobacter, Flavobacterium and Alcaligenes have been isolated (Kamat et al 1974).

Ghodkar et al (1980) reported that Kheo contained higher population of yeast & molds than broaf and loda. The following types of yeast & molds were isolated from these products -

### Yeast

~~Saccharomyces~~ Saccharomyces spp.

- S. Cerevisiae

- S. fragilis

Candida spp

- C. lipolytica

- C. pseudotropicalis

Rhodotorula spp

Torulopsis sp

Debaryomyces spp

Cryptococcus spp

### Molds -

Penicillium spp

- P. expansum

- P. nigriticans

Aspergillus spp

- A. niger

- A. glaucus

Khoa, a partially dehydrated milk product, is prepared from whole milk (Cow, buffalo) by continuous heating in an Karahi (iron pan) over a direct fire or in steam Kettle. It is constantly stirred and scraping during heating till a semi-solid consistency is obtained. The final consistency is achieved when the product shows sign of leaving the bottom & sides of Karahi. After removing from fire, the content are worked up in a solid mass which is now called Khoa.

Depending on the method of preparation three varieties of Khoa are available

- (1) Pindi
- (2) Dhap
- B) Dandor

Khoa can serve as a favourable medium for the growth of variety of micro-organism because of high moisture content & good nutritive value. The market Khoa usually keep well for 48 hours usual in Indian conditions of handling & storage. However, storage beyond this period often results into deterioration due to microbial action. These micro-organism gain entered into Khoa from different sources of contamination.

The rapid spoilage of Khoa is attributed to contamination with molds from external sources.