Ministry of Food Processing Industries
Government of India

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PANEER PROCESSING

AATMANIRBHAR BHARAT

PM Formalisation of Micro Food Processing Enterprises Scheme (PM FME Scheme)

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INTRODUCTION

- ✓ Paneer is a very common indigenous dairy product, which is used in the preparation of a variety of culinary dishes and snacks.
- ✓ It is obtained by heat and acid coagulation of milk, entrapping almost all the fat, casein complexes with denatured whey proteins and a portion of salts and lactose.
- ✓ Paneer is marble white in appearance, having firm, cohesive and spongy body with a close-knit texture and a sweetish-acidic-nutty flavour.
- ✓ Paneer blocks of required size are packaged in laminated plastic pouches, preferably vacuum packaged, heat sealed and stored under refrigeration.

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INTRODUCTION

As per Food Safety and Standards Regulations (FSSR), 2011 Paneer is the heat assisted coagulated product resulted from the coagulation of cow or buffalo milk or a combination thereof with the help of lactic acid or citric acid. The paneer must have the moisture content less than 70%. The fat per cent of paneer shall be greater than 50% of the dry matter.

According to Bureau of Indian Standards (IS 10484:1983), paneer shall contain a minimum of 50% fat on dry matter basis but the moisture content shall not go beyond 60%.

INTRODUCTION

The India paneer market is expected to register a significant CAGR of 13% during the forecast period of 2021-2026.

KEY PLAYERS IN THE INDIA PANEER MARKET

- ✓ Gujarat Co-operative Milk Marketing Federation Ltd
- ✓ Mother Dairy Fruits & Vegetables Pvt Limited
- ✓ Karnataka Co-operative Milk Producers Federation Limited
- ✓ Tamil Nadu Cooperative Milk Producers Federation Ltd (TCMPF)
- ✓ Pradeshik Cooperative Dairy Federation Ltd (PCDF)
- ✓ Ananda Dairy Ltd
- ✓ Parag Milk Foods Limited
- ✓ Hatsun Agro Product Limited
- ✓ Others

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CHEMICAL COMPOSITION OF PANEER

Product	Moisture (%)	Fat (%)	Protein (%)	Lactose (%)	Ash (%)
Paneer made from Buffalo Milk	52.3	27.0	15.8	2.2	1.9
Paneer made from Cow Milk	52.5	25.0	17.3	2.2	2.0

Source: (R.P.Aneja et al., Technology of Indian milk products, Dairy India publication.

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Chemical/Physical criteria of Paneer

Description	Standard
Smell + taste	Fresh creamy to slightly fresh sour
Colour	White to light yellow
Appearance + texture	Solid dices or blocks
Foreign particles	No foreign particles
Fat	Minimum 50% in the DM
Moisture content	52 – 53 %
Friability	Good
Acidity	20 - 23% LA or 22 - 25,5 ºN
Phosphatase test	Negative

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Microbiological criteria of Paneer

Microbes	Minimum	Maximum
TPC	150,000/gm	350,000/gm
Coliform (cfu/gm)	10/gm	100/gm
Yeast and mould (cfu/gm	50/g	150/gm
E. coli	Less than 10/gm	
S. aureus	10/gm	100/gm

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PANEER MANUFACTURING PROCESS

Milk Reception

↓

Filtration (to remove if any extraneous matter)

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Standardization

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Standardization (Fat:SNF 1:1.65 using skim milk powder)

Heating (85 to 90 Deg. C for 5 min)

↓

Cooling (70 to 75 Deg. C)

↓

Addition of coagulant (1 % Citric acid solution)

↓

Continuous stirring till whey separates out and hold for 10 min

↓

Draining of whey

↓

Pressing the coagulum after filling in muslin cloth

↓

Removal of blocks and cutting into desired size

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Immerse the Paneer blocks in chilled water (4 Deg. C)

↓

Packaging and storage at 4 Deg. C

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Standard Operating Procedures (SOP's) of Paneer

i) **Raw Milk Reception**: Milk is received in a clean and sterilized Stainless Steel (SS-304) multi-purpose vat. Milk is standardized for Fat and SNF (fat: SNF 1:1.65). Then milk is heated to 85-90^{0}C and hold it for 5 minutes, maintaining the same temperature. This process is also referred to as batch pasteurization.

ii) **Preparation of coagulant:** Prepare 1% citric acid solution with respect to the milk, which is used as a coagulant. The temperature of coagulant is maintained at 70^{0}C, which is same as the temperature of milk at the time of addition of coagulants.

Standard Operating Procedures (SOP's) of Paneer

iii. **Addition of coagulant:** The coagulant is added in optimum quantity and stir them slowly, so that a clear whey separation shall be achieved. The green colour of the whey indicates proper coagulation. Stirring should not be intense otherwise this will lead to the break up the curd mass.

iv. **Maintaining the pH of whey:** Once the pH of whey reached in the range of 5.7 to 6.0, allow the curd mass to be settle for about 5 - 10 minutes. Allow the whey to be drained out through a muslin cloth and the coagulated curd remains in the vat/cloth.

Standard Operating Procedures (SOP's) of Paneer

v. **Hooping:** The curd mass shall be filled in the SS hoops lined with muslin cloth and pressed for 15- 20 min. Pressing can be achieved through a manual press or pneumatic press.

vi. **Pressing:** Immersed the pressed paneer blocks in chilled water (4- 6 deg. C) or 5% brine solution (4- 6%) for 2 - 3 hours to achieve firmness. Further the paneer blocks were cuts and dried to remove extra free water.

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Standard Operating Procedures (SOP's) of Paneer

vii. Slicing and Packaging of Paneer

At last, the paneer slices were packed in a vacuum-package made of high-density polyethylene (HDPE) and stored at 5-8^{0}C for further sales/distribution.

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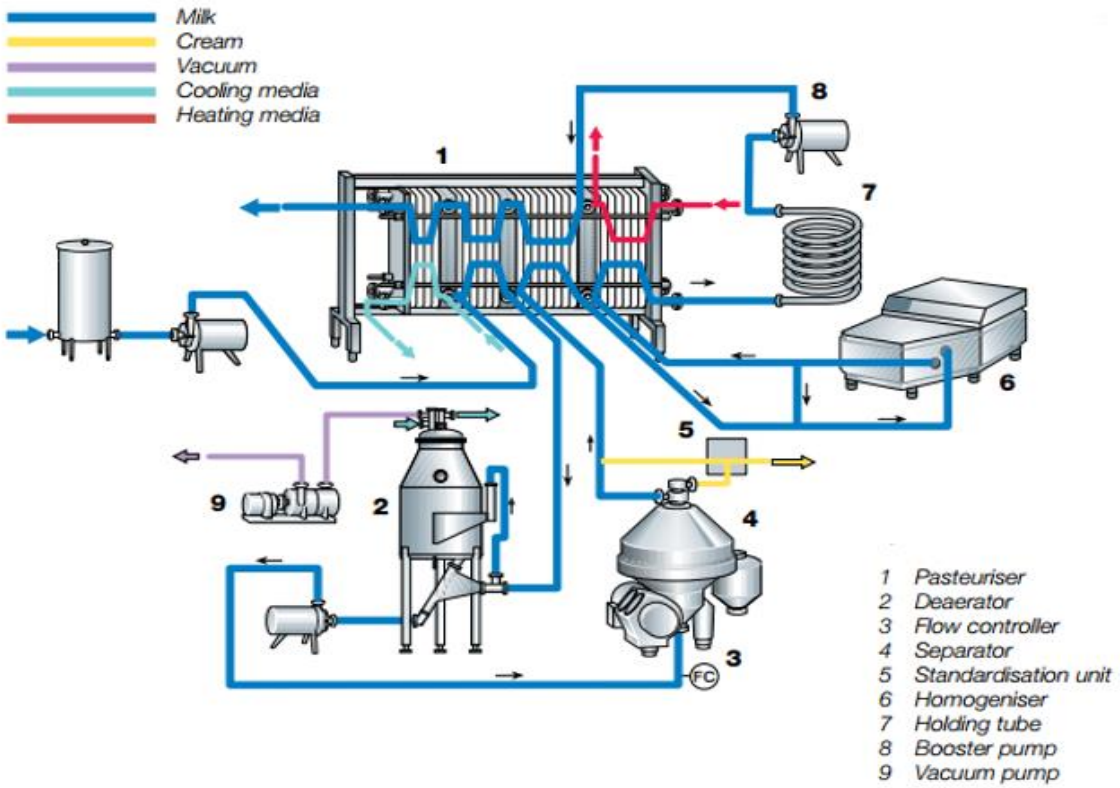
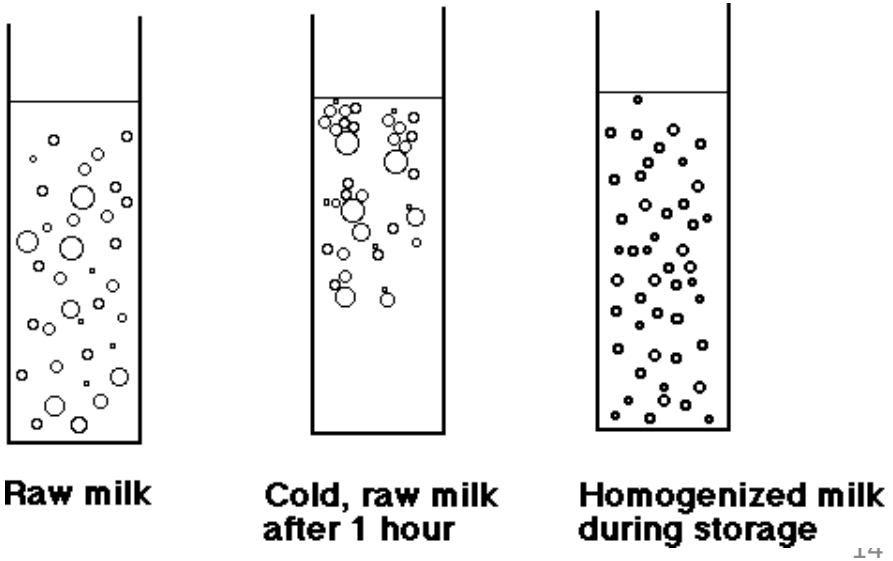
MILK PASTEURIZATION PROCESS (WITH CREAM SEPARATION AND HOMOGENIZATION)



Homogenization

- ✓ Homogenization is the process of reducing the size of fat globules in milk.
- ✓ It prevents the formation of a cream layer and easy digestion.
- ✓ Homogenized milk has a uniform flavour throughout.
- ✓ It tastes richer, smoother and creamier than unhomogenized milk due to an increase in the surface area of the fat globules which are uniformly distributed in milk



Paneer VAT

Available in various shapes such as round and square by processed milk.

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Paneer Press (Pneumatically operated)

Paneer Slicer

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Vacuum Packaging machine for Paneer

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Sterilizer for Paneer (for extended shelf life)

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IQF for frozen Paneer

Frozen Paneer

Paneer slabs are cut into small cubes of about 1cm^3 or 1.5 cm^3 and then cubes are kept in deep freezer or pass through freezing tunnel to freeze them to -18^{0}C or below. These frozen cubes are packed in a metalized laminates and vacuum packed.

Advantages of this method are;

✓Less time consumption while thawing

✓After thawing one can directly use for preparation of various dishes

✓Quickly freeze to -18^{0}C or below

SHELF LIFE OF PANEER

Shelf life

Paneer is a highly perishable product. It was reported that the freshness of paneer remains intact only for 3 days at refrigeration temperature.

- At room temperature paneer does not keep good for more than one day.
- In order to increase the shelf life of paneer, additives, modification in paneer manufacturing process, surface treatments and packaging materials have been recommended.

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YIELD OF PANEER

- **Yield:** A yield of around 21–23% for paneer containing 51–54% moisture can be obtained from buffalo milk, while yield from cow milk is about 17–18%.
- Homogenization increased the yield of paneer significantly.
- Paneer made from reverse osmosis retentate (25 and 33 TS%) resulted in higher moisture retention, culminating in higher yield by 2–3% on original milk quantity basis compared to traditional method.

QUALITY OF PANEER

The quality of paneer depends on the following factors:

a) type and quality of milk used,

b) heat treatment of milk,

c) type, strength and amount of coagulant used,

d) coagulation temperature and

e) pH of coagulation

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PACKAGING MATERIAL FOR PANEER

- Packaging of Paneer is mainly done to protect the products from outside environment especially after the completion of process so that products can retain moisture, flavor, freshness for a longer period of time.

Vacuum packaging

- Paneer is high in fat compare to milk and subjected to decrease in quality.
- The shelf life of paneer is normally 1 day in an ambient temperature but the same may be enhance significantly with the help of vacuum packaging.
- A laminated or co-extruded pouch along with vacuum also helps in enhancing the shelf life further.
- Shelf life of paneer packed in an oxygen barrier film along with vacuum and heat treatment at 90 °C for one min may reaches up to 90 days under refrigeration.

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