Butter Manufacturing

Agenda

1	Butter- Introduction
2	Types of Butter
3	Regulations and Standards
4	Butter Production Process
5	Conclusion

1. Butter

1.1 Introduction

- Butter is a fat rich dairy product obatained by churning out the milk fat dispersed in it.
- Industrialisation during second world war caused the rapid growth
- Butter contains a fat % of 80-83%.

1.2 Composition

Constituents	Quantity (%w/w)
Fat	80-83
Moisture	15.5-16.0
Salt	0-3
Curd	1-1.5

2. Regulation and Standards

FSSAI Definition and Standards

- Butter means the fatty product derived exclusively from milk of cow and/or buffalo or it's products principally in the form of water-in-oil type of emulsion.
- The product may be with/without common salt and starter cultures of harmless lactic acid and/or flavour producing bacteria.
- It shall be free from animal body fat, vegetable oil fat, mineral oil and added flavour.

Product	Moisture	Milk Fat	Milk SNF	Common Salt
Table Butter	16.0%	80%(w/w)	1.5%(w/w, max)	3.0% (w/w, max)
Cooking Butter	--------	76%(w/w)	--------	----------

3. Types of Butter

Parameter	Types	
Acidity	Sweet cream butter (pH>6.4)	Sour cream butter (pH<5.1)
Salt	Salted butter (0-3% salt)	Unsalted
End Use	Table butter (Salt and colour added)	White butter (Used for preparation of ghee)
Manufacturing Practice	Pasteurized cream butter (Sweet cream used)	Desi/Cooking Butter (prepared by churning Dahi (curd))

3. Types of Butter

3.1 Based on acidity of cream

Sweet Cream Butter

- Made from non-acidified cream
- No bacterial culture added
- pH of 6.4(acidity not greater than 0.2%)

Mildly acidified Butter

- Made from ripened cream which has more than 0.2% acidity
- pH < 5.1

Sweet Cream Butter

- Made from partially acidified cream
- pH of 5.2 to 6.3

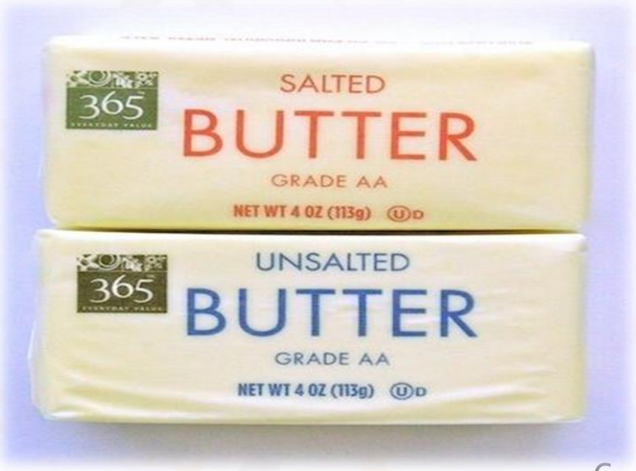
3.2. Based on salt content

3.2.1 Salted Butter

- Salt is added.
- Added to improve flavor and keeping quality.
- 0-3% salt is generally added

3.2.2 Salted Butter

- No salt
- Used to prepare butter oil and ghee



3.3 On the basis of end use (BIS)

Table Butter

- From pasteurized cream
- With/without ripening
- With/without Colour

White Butter

- From pasteurized cream
- Without ripening
- Without colour
- Without any amount of salt or others

3.4 On the basis manufacturing practice (FSSAI)

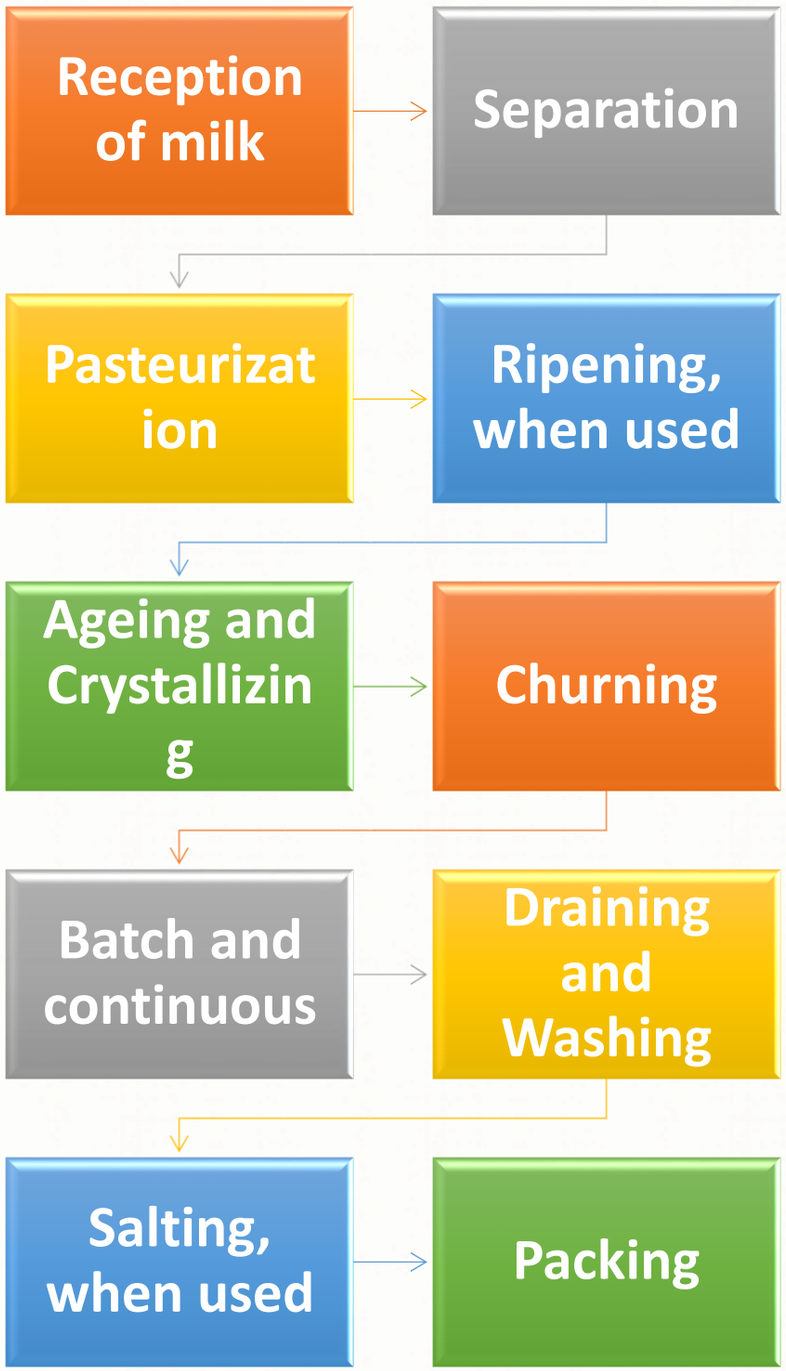
Pasteurized cream butter

- Made from pasteurized Sweet Cream
- Milder Flavor

Desi/Cooking butter

- Traditional Indian method
- Prepared from curd

4.Butter production Process

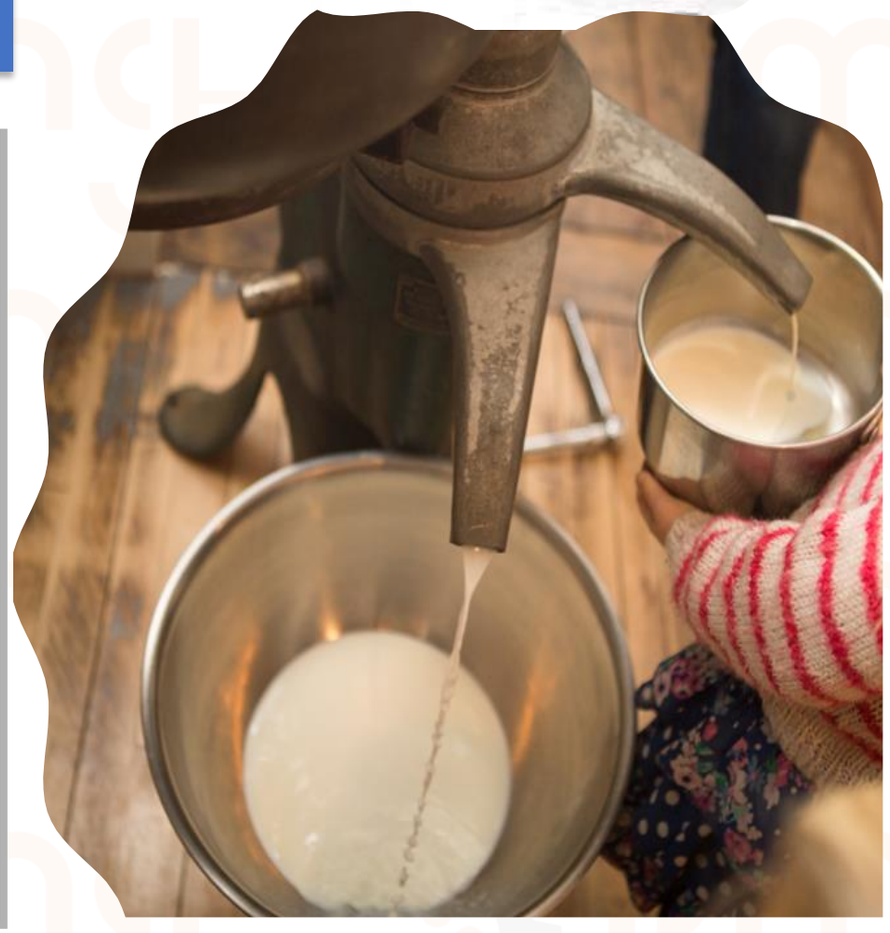


4.1. Reception of Milk

- Milk is received and samples are analyzed, and the quality is confirmed.
- If the quality is acceptable, milk is stored in silos.

4.2. Separation

- The whole milk is preheated to 630C before separation.
- The warm cream is then usually routed to an intermediate storage tank before being pumped to the cream pasteurizer.
- The whole milk is then separated to cream and skim milk.
- The skim milk is then pasteurized and cooled before being pumped to the storage.



4.3 Ripening

- After pasteurization, the cream is transferred to the ripening tank.
- It is done to add flavour and aroma to butter by adding starter culture.
- Produces Butter with higher diacetyl content.
- Amount of starter added : 0.5-2.0% of the Cream weight.

4.4. Ageing and Crystallization

- Cream is transferred to ageing tanks.
- Controlled Cooling is done in the ageing tank.
- This process crystalises the milk fat.
- Done for around 8 hrs at 140 C.

4.5. Pasteurization

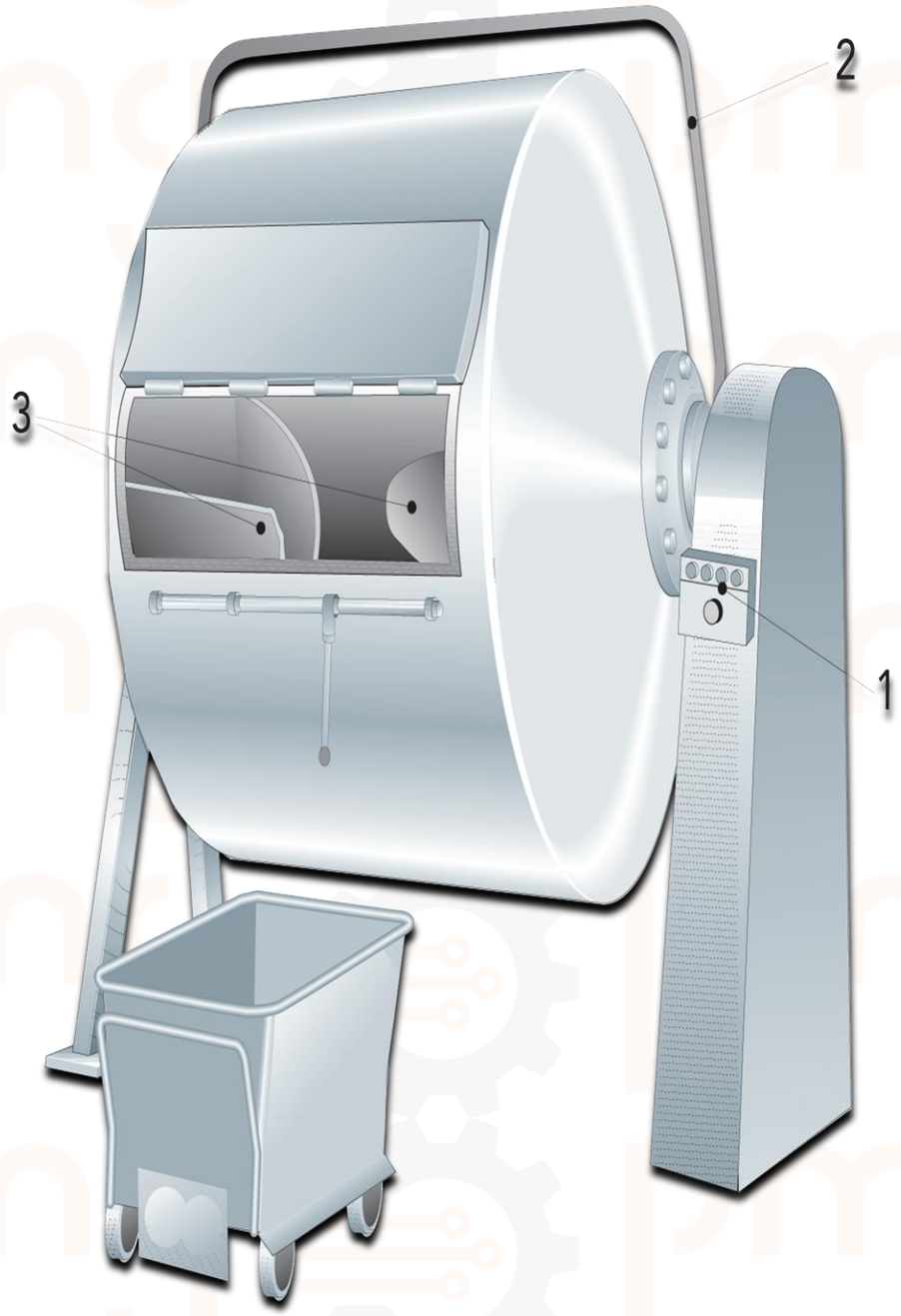
- The Cream is heated to 95oC or higher temperature
- Destroys enzymes and microorganisms that would deplete the quality of the product.

4.6 Churning

- Churning is done either as Batch Process or Continuous Process

4.6.1. Batch Process

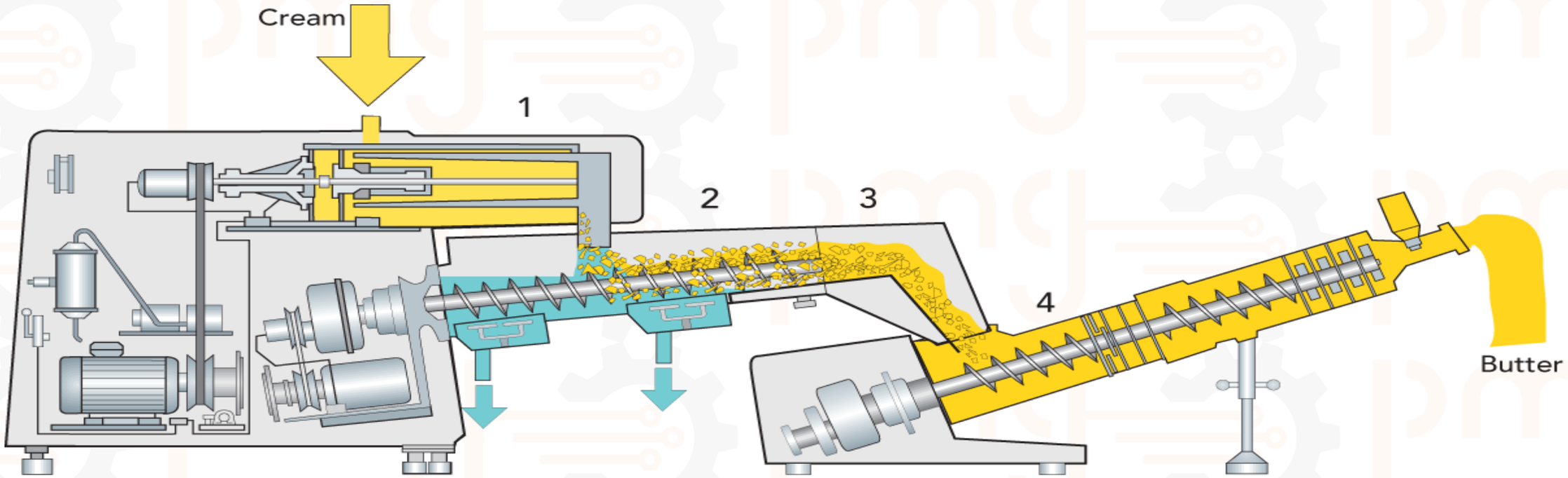
- Usually done in large horizontal cylindrical drums like churns.
- They are usually filled to 40-50% to allow the space for foaming.
- Buter churning turns oil in water emulsion cream to water in oil emulsion butter and butter milk.
- Generally violently agitated for 90 mins at 6-140C to break down the fat globules.
- Chilled water is sprayed over the churn to maintain the temperature



1.Control panel
2.Emergency stop
3.Angled baffles

4.6.2 Continuous Process

- It has 3 processes : Churning, Centrifugation, and Concentration or Emulsifying
- Predominates in the western Europe.
- The butter produced is basically, the same except that is somewhat matt and denser.



1.Churning cylinder
2.Separation section
3.Squeeze-drying section
4.Second working section

4.7 Draining and Washing

- Butter is washed off with wash water and the buttermilk is collected.
- Buttermilk is often used to prepare starter for cream ripening and also been used to prepare cultured buttermilk.

4.8 Salting

- The butter is transferred to a blending tank and it is mixed with salt (max3%)
- Salting improves flavour, body, and texture.

4.9 Packaging and Storage

- Butter is washed off with wash water and the buttermilk is collected.
- The butter is transferred to a blending tank and it is mixed with salt (max3%)
- It is then usually pressed into rectangular blocks and then wrapped with wax papers
- It is stored in cold room.
- The butter fat crystallises here further to make the butter firm.

Conclusion

- Butter is a product derived from cream
- It should contain a minimum fat % of 80%.
- The churning process is the crucial player in the butter making process.
- If churning goes wrong, the whole batch go wasted.
- Modern butter making processes are incorporated with de-aerators.
- They remove false odours, improve texture, and reduces free moisture, to improve the quality of final product.

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