Butter

Definition, Specification, Requirements, Classification

INTRODUCTION:

- Butter is a dairy product made by churning fresh or fermented cream.
- It is generally used as a spread and a condiment, as well as in cooking applications, such as baking, sauce making, and pan frying.
- Butter is a water-in-oil emulsion resulting from an inversion of the cream, an oil-in-water emulsion; the milk proteins are the emulsifiers.
- Butter remains a solid when refrigerated, but softens to a spreadable consistency at room temperature, and melts to a thin liquid consistency at 32-35 °C.
- It generally has a pale yellow color, but varies from deep yellow to nearly white.
- Its unmodified color is dependent on the animals' feed and is commonly manipulated with food colorings in the commercial manufacturing process, most commonly annatto or carotene.

DEFINITION:

- Butter may be defined as a fat concentrate, obtained by churning cream, gathering the fat into compact mass and then working it.
- ✓ As per FSSAI (2011), Butter means the fatty product derived exclusively from milk of cow and/or buffalo or its products principally in the form of water-in-oil type of an emulsion.
- ✓ The product may be with or without added common salt and starter cultures of harmless lactic acid and/or flavour producing bacteria.
- ✓ Table butter shall be obtained from pasteurised milk and/or other milk products which have undergone adequate heat treatment to ensure microbial safety.

DEFINITION:

- It shall be free from animal body fat, vegetable oil and fat, mineral oil and added flavour.
- It shall have pleasant taste and flavour free from off flavour and rancidity.
- It may contain food additives permitted in these Regulations (Table).

Additive	Quantity		
Colors (natural: singly or in combination)			
Curcumin	100 ppm max.		
Beta carotene	100 ppm max.		
Carotene (Natural extract)	100 ppm max.		
Annatto extract on Bixin/ Nor bixin basis (50:50 ratio)	20 ppm max.		
Beta apo-8 carotenal	35 ppm max.		
Methyl ester of Beta apo-8 Carotenoic acid	35 ppm max.		
Acidity regulaotrs			
Sodium and Calcium hydroxide	2000 ppm max.		

Permitted food additives in butter as per FSSR

FSSAI standards for butter

Product	Moisture	Milk Fat	Milk solids not fat	Common salt
Table Butter	16.0% (w/w,	80.0% (w/w,	1.5% (w/w, max.)	3.0% (w/w, max.)
	max.)	min.)		
Desi/cooking		76.0% (w/w,		
butter		min.)		

Note: Where butter is sold or offered for sale without any indication as to whether it is table or desi butter, the standards of table butter shall apply.

It shall conform to the microbiological requirements of the regulation (Table).

Microbiological parameter	Sampling Plan	Count
Tatal Plata Count	m	10,000/g
Total Plate Count	М	50,000/g
Coliform Count	m	10/g
Colliorm Count	М	50/g
E.Coli	М	Absent/g
Salmonella	М	Absent/25g
Staphylococcus aureus	m	10/g
	М	50/g
Verster 1 meller unt	m	20/g
reast and mold count	М	50/g
Listeria monocytogenes	М	Absent/g
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Note: m, M denotes standard sampling procedure as given by FSSAI, 2011

Microbiological requirements of pasteurized butter (FSSAI, 2011)

Characteristic	Table Butter	White Butter	
Milk fat, percent by mass, Min	80.0	82.0	
Moisture, percent by mass, Max	16.0	16.0	
Acidity (as lactic acid), percent by	0.15	0.06	
mass,max.			
Curd, percent by mass, Max.	1.0	1.5	
Common salt, percent by mass, Max.	2.5		
Coliform count, per ml, Max	5	5	
Total yeast and mould count, per ml, Max	20	20	

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BIS standards for pasteurized butter

Composition and Classification of Butter

INTRODUCTION:

- By the nature of its production principle, butter is a product containing predominately fat (~80%) and a little quantity of SNF besides added ingredients such as salt.
- However, compositional variations can occur depending on the type of butter, which may be covered under various classification schemes.

COMPOSITION OF BUTTER:

- Butter is principally composed of milk fat, moisture, salt and curd.
- It also contains small amount of fat, lactose, acids, phospholipids, air, microorganisms, enzymes and vitamins.
- The proportion of principal constituents in butter is largely controlled by the method of manufacture and this is turn is chiefly regulated to conform to the standards of butter prescribed by regulatory authorities such as codex and FSSAI.
- General composition of butter is given in table.

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

- Butter is considered as high calorie food as 100 g of butter provides almost 700 Kcal.
- Butter is extremely rich in minerals like Calcium, Phosphorus and Potassium.
- It has good amount of sodium and small amounts of fluoride, selenium, zinc and magnesium.
- It is also rich in Vitamin A, Vitamin E, Riboflavin, Niacin and Pantothenic acid.
- It also has Vitamin K, Folate and Vitamin B12 in small amounts.

Nutritional composition of butter is given in Table

Constituents	Per 100g
Energy (Kcal)	744
Fat (g)	82
Saturates	52.1
Monounsaturates	20.9
Polyunsaturates	2.8
Trans fatty acids	2.9
Protein (g)	0.6
Carbohydrate (g)	0.6
Thaimin (mg)	Trace
Riboflavin (mg)	0.07
Niacin (mg)	Trace
Vitamin B6 (mg)	Trace
Vitamin B12 (µg)	0.3
Folate (µg)	Trace
Pantothenate(mg)	0.05
Biotin (µg)	0.2
Vitamin C (mg)	Trace
Retinol (µg)	958
Carotene (µg)	608

Vitamin D (µg)	0.9
Vitamin E (mg)	1.85
Sodium (mg)	606*
Potassium (mg)	27
Calcium (mg)	18
Magnesium (mg)	2.0
Phosphorus (mg)	23
Iron (mg)	Trace
Copper (mg)	0.01
Copper (mg) Zinc (mg)	0.01
Copper (mg) Zinc (mg) Chloride (mg)	0.01 0.1 994
Copper (mg) Zinc (mg) Chloride (mg) Selenium (Ig)	0.01 0.1 994 Trace
Copper (mg) Zinc (mg) Chloride (mg) Selenium (Ig) Manganese (mg)	0.01 0.1 994 Trace Trace

*Unsalted butter contains 9 mg Sodium per 100g

- Butter's fatty acid composition is also important for several reasons.
- The proportion of low melting triglycerides and high melting triglyceride largely determines the body and texture of butter.
- The significant amount of short-chain fatty acids contributes to butter's quality as a softer fat with a lower melting point.
- This, in turn, ensures a quick flavor release when melting, which is desirable in numerous foods.
- Fatty acid composition of butter is given in Table

y Acids	Average (g/100g)	Saturated Fatty Acids	
turated	L	4:0 Butyric Acid	3.226
ounsaturated Fatty Acids	21.021	6:0 Caproic Acid	2.007
	0.071	8:0 Caprylic Acid	1.19
:1 Palmitoleic Acid	0.961	10:0 Capric Acid	2.529
1 Oleic Acid	19.961	12:0 Lauric Acid	2.587
lyunsaturated Fatty Acids	3.043	14:0 Myristic Acid	7.436
2 Linoleic Acid	2.728	16:0 Palmitic Acid	21.697
3 Linolenic Acid	0.315	18:0 Stearic Acid	9.999

Saturated Fatty Acids	
4:0 Butyric Acid	3.226
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8:0 Caprylic Acid	1.19
10:0 Capric Acid	2.529
12:0 Lauric Acid	2.587
14:0 Myristic Acid	7.436
16:0 Palmitic Acid	21.697
18:0 Stearic Acid	9.999

CLASSIFICATION OF BUTTER:

Butter may be classified based on treatment given to cream, salt content, method of manufacturing and end use.

- I. Classification based on acidity of cream used for butter making:
- 1. Sweet cream butter: Sweet cream butter (made from non-acidified cream; this includes butter in which no bacterial culture have been added to enhance diacetyl content) having pH of ≥6.4 (acidity of the churned cream does not exceed 0.2%).
- 2. Mildly acidified butter (made from partially acidified sweet cream) having pH in the range of 5.2 to 6.3 and
- 3. Sour cream butter (made from ripened cream which has more than 0.2% acidity) having $pH \le 5.1$ from cream.

II. Classification based on salt content

1. Salted butter: Butter to which salt has been added. It is added to improve flavour and keeping quality of butter.

2. Unsalted butter: This type of butter contains no salt. It is usually prepared for manufacturing other products such as ghee and butter oil.

III. Classification based on end use (as followed by BIS):

- 1. Table Butter: the product made from pasteurized cream obtained from cow or buffalo milk or a combination thereof with or without ripening with the use of standard lactic culture, addition of common salt, annatto or carotene as colouring matter and diacetyl as flavouring agent.
- 2. White Butter: the product made from pasteurized cream obtained from cow or buffalo milk or a combination thereof without ripening and without addition of any preservative including common salt, any added colouring matter or any added flavouring agent.

IV. Classification based on the manufacturing practice (as followed by FSSAI):

1. Pasteurized cream butter/ Pasteurized Table butter: This is made usually from pasteurized sweet cream. Such butter usually has a milder flavour than that made from similar cream not pasteurized.

2. Desi butter: The butter obtained by traditional process of churning dahi or malai as practiced at domestic levels.