

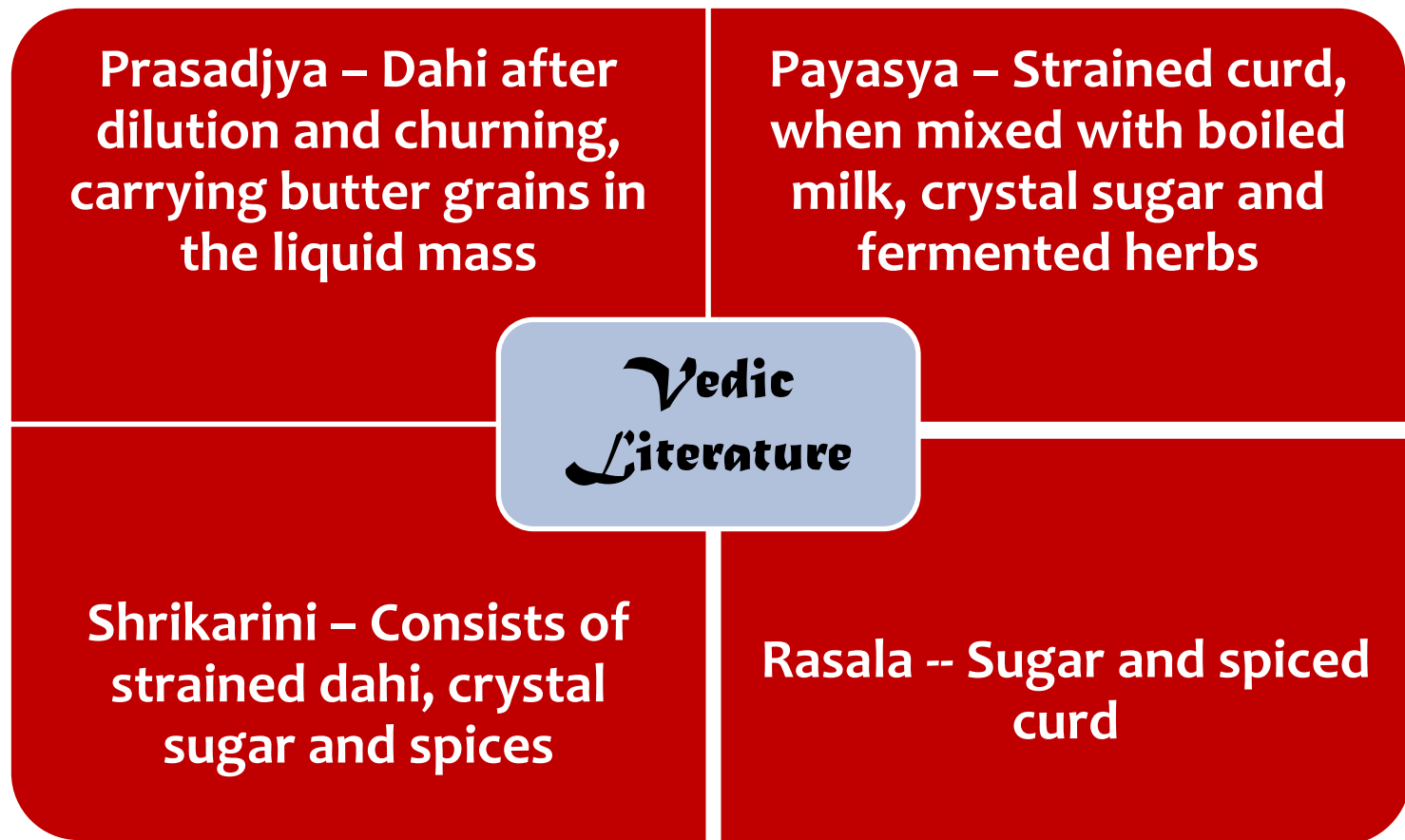


DAHI

Preparation, quality of dahi,
packaging, shelf-life and defects



- ❖ **Fermentation: Preserve milk constituents for human consumption, gives an acid taste to milk refreshing in warm climate, imparts certain therapeutic benefits originally absent in milk.**
- ❖ **Fermentation leads to partial breakdown of milk constituents and increases digestibility of cultured milk products.**



Indian Fermented Milk Products



Description of Product

Dahi is produced from heat treated milks after inoculation with lactic acid bacteria added to milk in form of starter culture. Lactic acid bacteria added multiply, grow and produce lactic acid, acetic acid and carbon dioxide by utilizing lactose present in milk. Some bacteria uses citric acid of milk to produce certain volatile organic compounds mainly

diacetyl (responsible for flavor of dahi). Combination of acid producing and flavour producing microorganisms helps in production of dahi with firm body and good flavour.

Semi solid product, obtained from pasteurized or boiled milk by souring, using harmless lactic acid or other bacterial cultures, may contain additional cane sugar, should have same minimum percentage of fat and solids-not-fat as milk from which it is prepared.

Chemical Composition:

Components	Whole milk Dahi (%)	Skim milk Dahi (%)
Water	85-88	90-91
Fat	5 – 8	0.05 - 0.1
protein	3.2-3.4	3.3-3.5
Lactose	4.6-5.2	4.7-5.3
Lactic acid	0.5-1.1	0.5-1.1
Ash	0.7-0.75	0.7-0.75

Characteristics	FSSR(2011)	BIS
Acidity % lactic acid	-	0.6 - 0.8
Total Plate count	Not more than 1000000/g	
Coliform count	10 per g max	10 per g max
<i>Escherechia coli</i>	Absent in 1g	
Salmonella	Absent in 25g	
Shigella	Absent in 25g	
<i>Stephylococcus aurius</i>	Not more than 100/g	
Yeast and Mould	100 per g max	100 per g max
Anaerobic spore	Absent in 1g	
<i>Listeria monocytogenes</i>	Absent in 1g	
Phosphatase test		Negative
Other requirements	It should have the same minimum percentage of fat and SNF as the milk from which it is prepared. If no standards declared then standards prescribed for dahi from buffalo milk shall apply	Dahi shall conform to the requirements of milk fat and MSNF, as laid down in FSSR, 2011

Traditional Method of Preparation

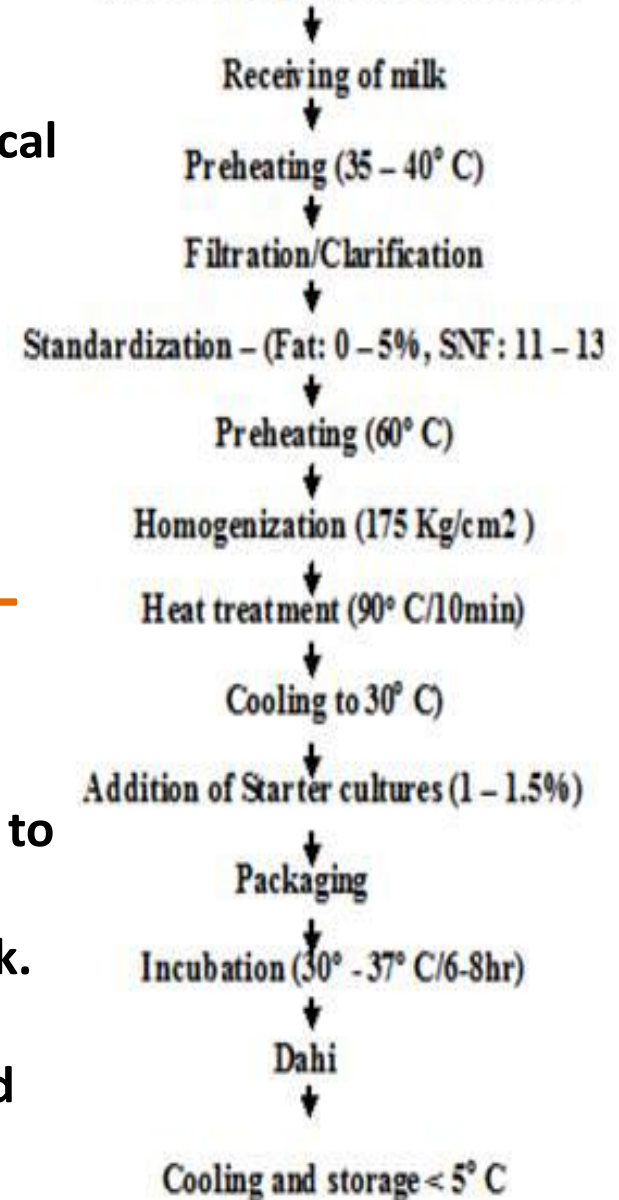
- Milk is heated intensively to boil for 5 to 10 min and then it is cooled to room temperature.
- Cooled milk is added with previous day's curd or buttermilk, stirred and allowed to set undisturbed usually for overnight.
- At halwai's shop milk is considerably concentrated before being inoculated with starter culture.
- Total solid content of milk gets increased, particularly increase in protein content of milk.
- Concentration of milk results in custard like consistency of dahi and keeps the product from wheying off.



Industrial method of making dahi

- **Selection of raw material:** Demands high quality raw materials with respect to physical, chemical and microbial standards.
- **Filtration/clarification:** Fresh raw milk is heated to 35 to 40 C to aid clarification or filtration process then it is filtered to ensure that, milk is free from extraneous matter.
- **Standardization: Fat: 0 – 5%, SNF: 11 – 13%** Fat is standardized based on type of product ranging from fat free to full fat and SNF level is increased by min. 2% than that of milk. It is common to boost the SNF content of milk to about 12% with the addition of skim milk powder or condensed skim milk. Increased SNF in turn increases protein, calcium and other nutrients and resulted with improved body and texture, custard like consistency. Higher milk solids prevent wheying off of the product during storage.

Method of preparation – Flow Chart



- **Homogenization: 175 Kg/cm²** Standardized milk is subjected to homogenization after heating to 60 C to increase the efficiency. Homogenization reduces cream layer formation during incubation, Single stage homogenization with 175 kg/cm² pressure would be sufficient to improve texture of dahi.
- **Heat treatment:** Milk intended for dahi is given severe heat treatment i.e. 90 C for 10 min. Following are the benefits of high heat treatment:
 - ✓ Denatures and coagulates milk albumin and globulins which enhance viscosity and produce custard like consistency
 - ✓ Kills contaminating and competitive microbes
 - ✓ Development of relatively sterile medium
 - ✓ Removal of air form medium – more conducive for growth of bacteria
 - ✓ Effective thermal breakdown of protein releasing peptones and sulfhydryl groups, this inturn provide nutrients to starter bacteria

Packaging and fermentation: Heat treated product mix is cooled to 37 C and it is inoculated with specific dahi culture at rate of 1 to 1.5%. Starter culture is most crucial component in production of high quality fermented milks. Proper selection of culture strains decides good quality of product. Dairy cultures are available in various forms like freeze dried, liquid and frozen forms. After product mix is inoculated with dahi culture it is thoroughly mixed and filled into plastic cups, sealed properly to avoid any contamination and spillage of product. Dahi is packed in food grade polystyrene and polypropylene cups in 100 g, 200 g and 400 g pack sizes. Various packaging machines of upto 400 cups/min speed are available to package cultural dairy products in different sizes. Packaged product should be stored at <5 C for extended shelf life. Packed product is arranged in cases and transferred to incubation room maintained at 37-42 C. Product mix is incubated till its pH reaches 4.4 to 4.5 and then it is cooled rapidly to less than 5 C by exposing cups to high velocity cold air.

Storage: Dahi is normally stored at 4-5 C. Storage area should be maintained clean and tidy to avoid any cross contamination.

PACKAGING



Common defects in dahi

Sl No.	Defect	Probable Cause	Remedy
Flavor defects			
1	Insufficient Flavor	Low citrate level in milk, Low diacetyl content	Add 0.02 – 0.05% Sodium citrate prior to mixing the starter culture. Cool rapidly after culturing
2	Oxidized flavor	Copper contamination Exposure to fluorescent light Exposure to sunlight	Avoid usage of copper utensils Protect product from direct exposure to Sunlight/ UV light
3	Yeast/cheesy	Contaminating yeast growth	Sanitation check
4	Rancid flavor	Lipolytic activity	Do not mix pasteurized and raw dairy ingredients prior to homogenization
5	High acid	Addition of more culture, Increased incubation time Use of sour milk	Optimum culture addition Blast cool the product immediately after optimum pH is reached Use good quality fresh milk
Body and textural defects			
1	Weak body	Insufficient heat treatment to the mix Too low milk SNF Severe agitation after fermentation	Heat treatment should not be less than 85°C/30min Homogenize the dahi mix prior to homogenization Increase the MSNF content to 11% by adding Skim milk powder
2	Grainy texture	High acidity Improper dispersion of Skim milk powder	Rapidly cool the product to <5°C after attaining optimum acidity Use in line screen/filter
3	Syneresis	Insufficient heat treatment to the mix Improper standardization and too low milk SNF Agitation/disturbances during fermentation	Heat treatment should not be less than 85°C/30min Increase the MSNF content to min. of 11% by adding Skim milk powder Do not disturb the cups during fermentation
4	Ropiness	Contamination of milk with psychotropic microorganisms Culture contamination/impure culture	Proper heat treatment of milk, Avoid cold storage of milk before pasteurization/thermization Use of pure culture