Dairy technology3 (Fermented Milks and By-Products) (Code FS 0705)

- Practical lesson 5, for Food safety program, level 3, 2019-2020
- By:

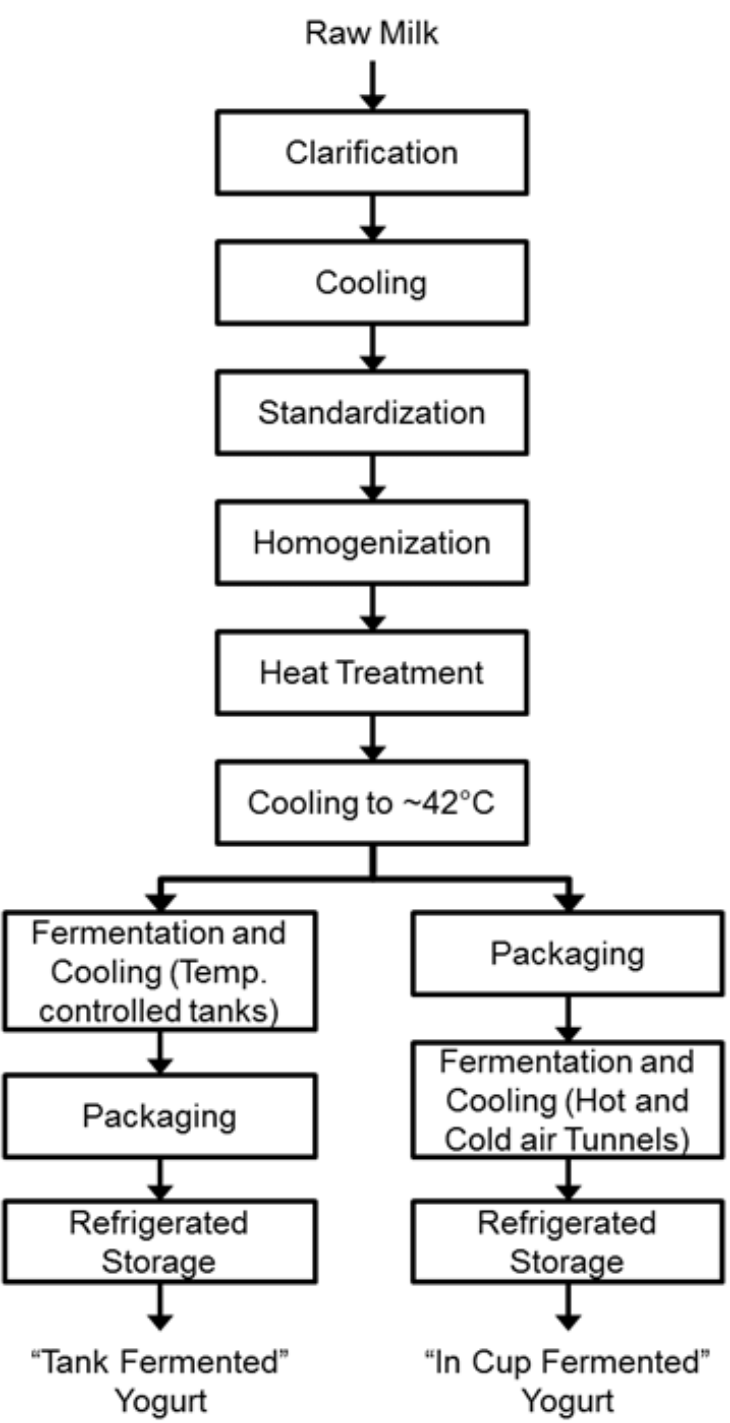
Dr: Ebrahim Elkhtab

- Lecturer of dairy science, Dairy science department, Faculty of Agriculture, Benha University

Manufacture of fermented milks

1- yoghurt:

- Yoghurt is considered one of the most important dairy products all over the world for its desirable properties and nutritive value.
- It may be made from milk of cows or buffalos.
- The following diagram shows the main steps of yoghurt production.



- Process diagram for yogurt production [1]

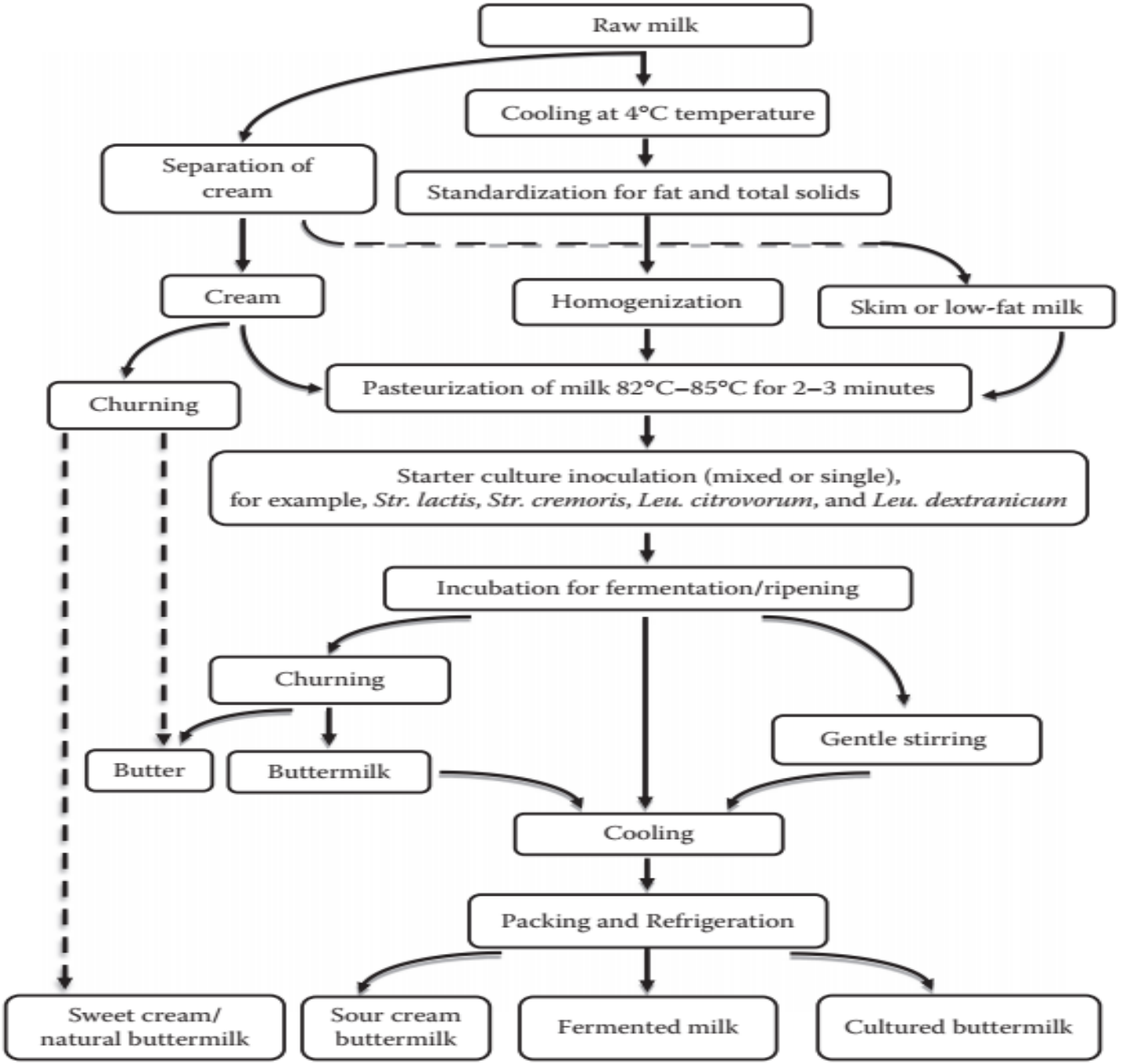
Table 4.6 Some common defects of yoghurt that might be noted by a taste panel, and an indication of some possible causes and remedies.

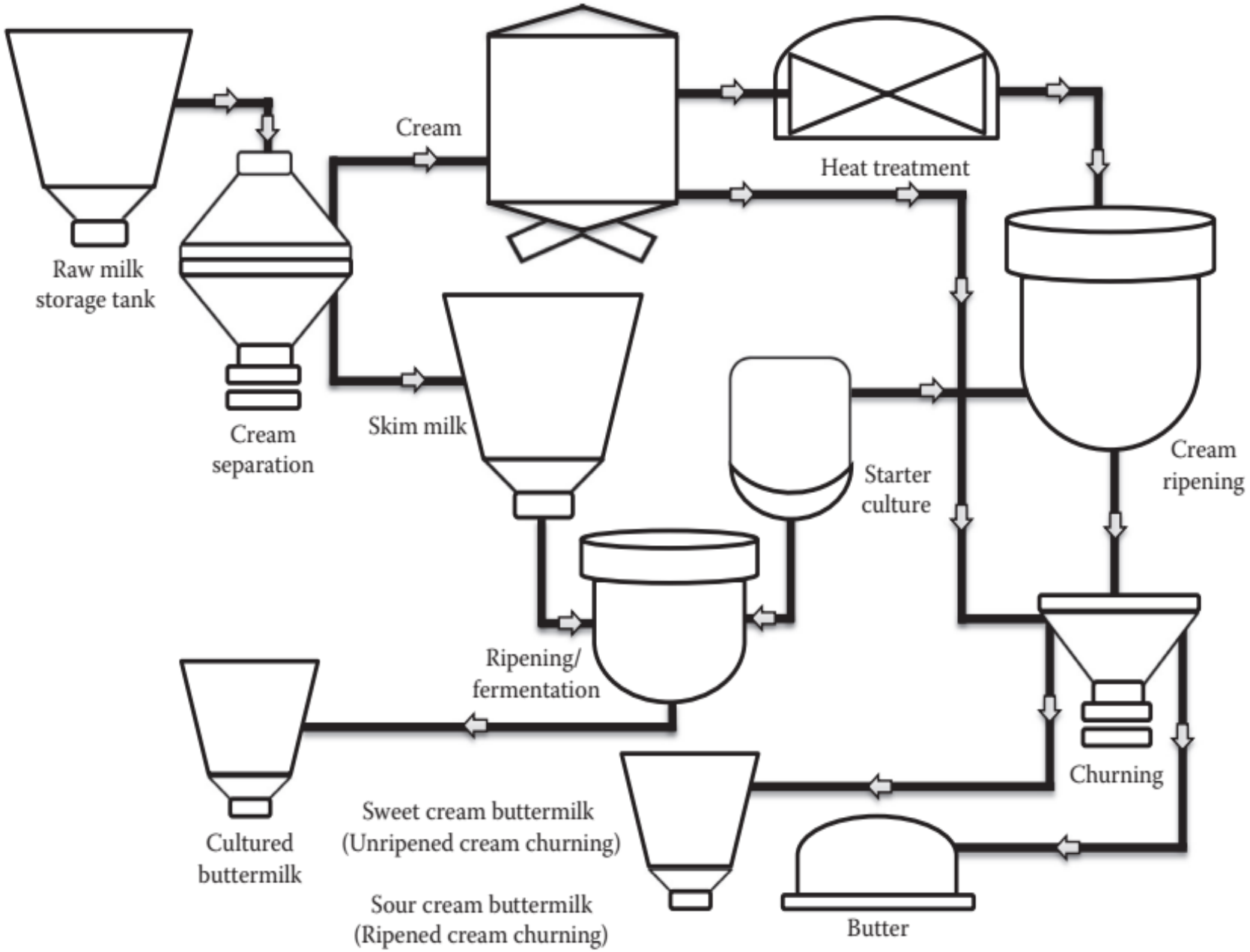
Defect	Possible causes	Possible remedies
Syneresis	Low SNF content	Adjust formulation
	High incubation temperature	Reduce temperature to 42°C
	Low acidity (stirred yoghurt)	Ensure pH < 4.4
	Curd shrinkage (set yoghurt)	Check storage temperature
	Poor mechanical handling of the gel	Check stirring/pumping/filling temperature
Low viscosity	Low SNF content	Adjust formulation
	Excessive agitation	Improve mechanical handling of the gel
		Add permitted stabiliser(s)
		Change culture to 'viscous' type
Gas bubbles	Excessive agitation	Improve mechanical handling of the gel
	Contamination with yeasts	Eliminate source of infection
	Coliforms present	Improve plant hygiene
Granulation	Undissolved milk powder	Adjust processing conditions
	Agitation prior to cooling	Improve cooling and/or install sieve in pipeline
	High incubation temperature	Reduce temperature to 42°C
	Seasonal variation in the milk	Change starter cultures
Poor flavour	Insipid	Change starter cultures
		Extend incubation time
	Unclean	Check for coliforms
	Bitter	Change starter cultures
	Sour	Lower the inoculation rate
		Check the storage temperature
	Malty/yeasty	Suspect contamination and investigate source

Adapted from Robinson *et al.* (2002) and Anon. (2002).

2- Cultured butter milk

- **This product has most of the fermented milk solids except fat which goes in butter , It also has mixed lactic acid bacteria, especially *Lactococci* and *Leuconstocs* , which gives it a typical diacetyl flavour.**
- **True buttermilk is the fluid remaining after cream is churned into butter.**
- **Cultured butter milk is prepared by souring true butter milk or more commonly, skim milk with a butter starter culture that produces a desirable flavor and aroma.**
- **The next two slides showing the manufacture steps of cultured butter milk** [2].

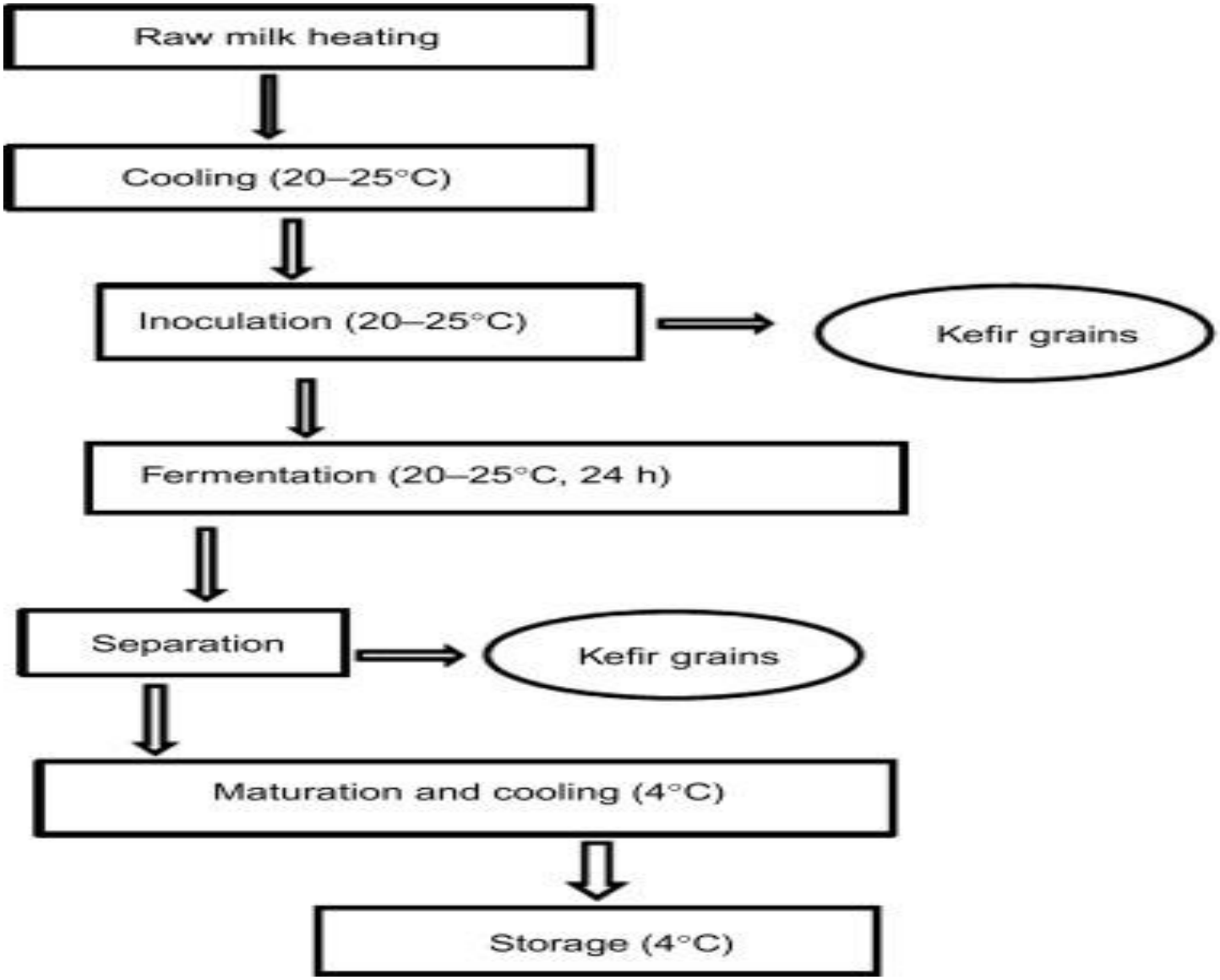

Raw milk
Cooling at 4°C temperature
Separation of cream
Standardization for fat and total solids
Cream
Homogenization
Skim or low-fat milk
Churning
Pasteurization of milk 82°C–85°C for 2–3 minutes
Starter culture inoculation (mixed or single), for example, Str. lactis, Str. cremoris, Leu. citrovorum, and Leu. dextranicum
Incubation for fermentation/ripening
Churning
Gentle stirring
Butter
Buttermilk
Cooling
Packing and Refrigeration
Sweet cream/ natural buttermilk
Sour cream buttermilk
Fermented milk
Cultured buttermilk


Raw milk
storage tank
Cream
separation
Cream
Skim milk
Heat treatment
Starter
culture
Cream
ripening
Ripening/
fermentation
Churning
Cultured
buttermilk
Sweet cream buttermilk
(Unripened cream churning)
Sour cream buttermilk
(Ripened cream churning)
Butter

3- Kefir production

- **it is a viscous, acidic, and mildly alcoholic milk beverage produced by fermentation of milk with a kefir grain as the starter culture .**
- **(FAO/WHO 2003), The Codex Alimentarius description of kefir state it as Starter culture prepared from kefir grains, *Lactobacillus kefir*, and species of the genera *Leuconostoc*, *Lactococcus* and *Acetobacter* growing in a strong specific relationship. Kefir grains constitute both lactose-fermenting yeasts (*Kluyveromyces marxianus*) and non-lactose-fermenting yeasts (*Saccharomyces unisporus*, *Saccharomyces cerevisiae* and *Saccharomyces exiguus*).**
- **The next slide shows the production steps of kefir** [3].

Manufacturing steps :



References

[1] Masanet, E., Brush, A. and Worrell, E., 2014. Energy efficiency opportunities in the US Dairy processing industry. *Energy Engineering*, *111*(5), pp.7-34.

[2] Kumar, R.A.V.I.N.D.E.R., Kaur, M.A.N.P.R.E.E.T., Garsa, A.K., Shrivastava, B.H.U.V.N.E.S.H., Reddy, V.P. and Tyagi, A., 2015. Natural and Cultured Buttermilk. *Fermented milk and dairy products*, pp.203-225.

[3] Altuntas, S. and Hapoglu, H., 2019. Kefir-Type Drinks From Whey. In *Non-Alcoholic Beverages* (pp. 185-226). Woodhead Publishing.

With my best wishes