

TECHNICAL NOTE

TITLE	TN
Effect of KLM-3 enzyme in Milk used for Fermentation	

Materials and Methods

Glycerophospholipid cholesterol acyltransferase KLM3 (K932): 100 LATU/g
 Standard pasteurized Whole Milk (3.5% fat) from ARLA in Denmark
 Skim Milk Powder ADMI grade, medium heat, from HUMANA in Germany
 YO-MIX™ 215 LYO (Streptococcus Thermophilus, Lactobacillus Delbrueckii subsp. Lactis,
 Lactobacillus Acidophilus, Bifidobacterium Lactis)
 YO-TEX™ 720 (Milk solids, Mono- Diglycerides of fatty acids, pectin)

Enzymated Milk was investigated in comparison to standard milk in terms of impact on fermentation time as well as organoleptic properties of the resulting fermented milk product, which in this trial was set yogurt. Composition of milk used for yogurt trial emulates a typical formulation for such product, as commonly used by Dairy Plants throughout the Middle East region.

EXPERIMENTAL**Recipe**

Ingredients in %		
Ingredient Name	1	2
Whole Milk	96,800	96,790
Skim Milk Powder	2,800	2,800
YO-MIX™ 215 (20 dcu/100 liter milk)	+	+
GRINDSTED YO-TEX 720 Emulsifier & Stabiliser system	0,400	0,400
KLM 3 (100 LATU/g)		0,010
Total %	100	100

Process**First Day:**

1. Add KLM3 (100 U/ml) to the cold milk at a dosage of 0.100 ml per litre milk
2. Agitate for two minutes
3. Place in cold store at 5°C for 16-24 hours.

Second Day:

- 1- Disperse skim milk powder and YO-TEX 720 in the milk and agitate well.
- 2- Hydrate powders for 30 minutes
- 3- Preheat mix to 65°C
- 4- Homogenise at 65 °C / 180 bar
- 5- Pasteurise 93°C for 6 minutes
- 6- Cool to 5°C and inoculate with YO-MIX™ 215
- 7- Fill inoculated yogurt milk into 100 ml glass beakers (and into one 250 cc sterile bottle for monitoring of fermentation on CINAC), place glass beakers and bottle in a water bath with cold

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water.

8- Store the inoculated milk overnight in water bath.

Third Day:

1- Increase temperature in water bath to 42°C and keep this temperature

2- When pH reaches 4.65 ± 0.05 , the glass beakers are transferred from water bath to the cold store and kept for 24 hours.

Evaluation of Yogurt samples:

Fermentation time:	321 minutes for non enzymated and 302 minutes for enzymated milk. (Later repeat of trial has shown similar tendency to reduced fermentation time when milk has been previously treated enzymatically with KLM3) <i>(CINAC fermentation curves available in hard copy in Brabrand, but can not be obtained directly for insertion in this word-file)</i>
Syneresis:	Syneresis from two samples were identical. (Method description see TM 2075 Determination of syneresis in set yogurt)
Gel strength:	Gel strength in the two samples, when measured on TBA texture analyser, showed slightly higher firmness for the yogurt prepared from enzymated milk when compared to non enzymated
Organoleptic:	Triangle tests made on the two samples, using a trained sensoric panel, did not show any significant difference between the two samples.
Texture:	When comparing the texture of the two samples it was clear that the yogurt prepared from enzymated milk has a shorter texture than the yogurt made from non enzymated milk.

Conclusion:

Enzymation of milk intended for use as raw material in the production of yogurt, or similar dairy products fermented with a thermophilic LAB culture, does not impair the quality of the final product, or render the milk unsuitable for use as media for fermentation.

There seems to be a potential positive effect on the time needed for normal thermophilic LAB cultures to convert lactose into lactic acid, in sufficient amount to reach a resulting pH in the product of 4.5-4.7, which functionality could be positive in that it could reduce processing time in the plant, consequently possibly facilitating a better plant utilisation or even an increased production capacity. This feature is at the moment being further substantiated with a number of different cultures.

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