



Euroopa Maaelu Arengu
Põllumajandusfond:
Euroopa investeeringud
maapiirkondadesse



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EPKK infopäev 02. detsembril Viinamärdi talus

The schedule / Topics

1. Different kind of starters and enzymes and their effects for milk and ripened cheeses

Erinevad juuretised ja ensüümid ja nende mõju piimale ning valminud juustudele.

2. Cheese fails and how we could prevent them?

Ebaõnnestumised juustu valmistamisel ja kuidas neid vältida.

3. Sensory evaluations of cheeses

Juustude sensoorne hindamine



Cheese fails and how we could prevent them?

Erinevad juuretised ja ensüümid ja nende mõju piimale ning valminud juustudele.

Fails in raw-milk:

- Measuring
- Sensory evaluation
- Acidity by pH-/SH- grade
- Somatic cell-level by base-test
- Microbiological-level by Reductase-/Fermenting- test
- Spore-level by Weinzrl-test
- Antibiotics by Delvotest
- Lipolytic- level measured via free fat acids
- Psychrotrophic- level (petri bowl)



Cheese fails and how we could prevent them – Continue

Preripening of raw milk on 10-13 C/15-20 h Cleaning of

cheese milk

-Sentrifugal methods

Heating of cheese milk

- Thermization/Pastorization



Cheese fails and how we could prevent them – Continue

Rennet – right active proteases for peptide-binds

-Temperature, pH, redox-potential, quality of milk

-How to use it

Starter(s) – right active combination for acidification of milk

-Amount of CFUs, bacteriophages, temperature, salt content, water content



Cheese fails and how we could prevent them – Continue

Cutting and pre stirring of the curd Washing the curd

Measuring the curd before moulding

-pH, DM

Pre-pressing and pressing the cheese

-Temperature, pH, turning



Cheese fails and how we could prevent them – Continue

Salting

- Different methods
- Quality of salt water

Ripening

- Different methods
- Time, temperature, RH-%



Different starters and enzymes for cheesemaking Erinevad juuretised ja ensüümid juustuvalmistamisel

Starters

- Mesofilic vs. thermofilic
- How they use sugars (homo- vs. heterofermentative)
- Single- vs. multistrain- cultures
- Functionality (protective-, probiotic cultures etc.)
- Direct- vs. bulk starter
- Frozen- vs. dried culture



Selection of mesophilic homofermentative

Valik mesofiilseid homofermentatiivseid juuretisi

- Mesophilic defined
 - Lyofast MWO 030 (1 – 2 – 3)
 - Lyofast MWO 040 (1 – 2)

APPLICATION

• SEMI HARD CHEESE

• SOUR CREAM

• MAASDAMER QUARK

• ACC



Selection of mesophilic homofermentative

Valik mesofiilseid homofermentatiivseid juuretisi

- Mesophilic undefined
 - Lyofast MWO 036 (9)
 - Lyofast MWO 046 (7)

APPLICATION

SEMI HARD
CHEESE

SOUR CREAM
MAASDAMER

QUARK



Selection of mesophilic homo + *Str. thermophilus*

Valik mesofiilised homofermetatiivseid + *Str. thermophilus*

- Defined blends

- Lyofast MOS 062 B
- Lyofast MOS 062 D
- Lyofast MOS 062 E
- Lyofast MOS 062 F

- Lyofast MOT 092 FE

APPLICATION

• SEMI HARD CHEESE

• SOUR CREAM QUARK

• ACC



Selection of mesophilic heterof. + Srt. Thermophilus

Valik mesofiilseid heterofermentatiiviseid + S. thermophilus

- Defined blends
 - Lyofast MS 062 CM (4 – 6)
 - Lyofast MS 064 CP (6)
 - Lyofast MS 059 DT
 - Lyofast MS 058 ET (9)

APPLICATION

SEMI HARD

CHEESE

SOUR

CREAM



Selection of mesophilic heterofermentative

Valik mesofiilised heterofermenttiivseid juuretisi

- Defined blends
 - Lyofast MW 030 N / R/ T
 - Lyofast MW 031 N / R/ T
 - Lyofast MW 032 N / R/ T
 - Lyofast MW 036 L / N
 - Lyofast MW 046 L / M / N

- Lyofast MW 036 K only
leuonostoc

APPLICATION

• SEMI HARD

CHEESE

• CREAM CHEESE

• SOUR CREAM

• TVOROG

• QUARK



Blends for stretched cheese

Segud pasta filata tüüpi juustudele

- Lyofast ST 051 / 3 / 5 / 7
- Lyofast ST 071 / 3 / 5 / 7
- Lyofast SH 092 / 6 F
- Lyofast LH 13

APPLICATION

• **MOZZARELLA**

• **PIZZA CHEESE**



Blends for soft cheese

Segud pehmetele iustudele

APPLICATION

- Lyofast ST 020 (2 – 6)
- Lyofast ST 031 / 3 / 5 / 7
- Lyofast ST 051 / 3 / 5 / 7

Soft cheese Hard

cheese



Blends for HARD cheese

Segud kõvadele juustudele

- Lyofast YH 092 E
- Lyofast YHL 092 F
- Lyofast LH 091
- Lyofast MT 092 FET/N
- Lyofast MT 086 EE
- Lyofast PB 1 (propionibacteria)

APPLICATION

Soft cheese Hard
cheese Big eyes
cheese



Blends for white brined cheese

Segud valgetele soolveejuustudele

- Lyofast MOS 062 E
- Lyofast MOS 062 B
- Lyofast MOS 062 D
- Lyofast MOS 058 D
- Lyofast MWO 030
- Lyofast MOT 082 DC
- Lyofast MOTC 082 DC
- Lyofast MOT 084 FK

APPLICATION

White brined
cheese

UF feta type Feta
type



PROTECTIVE culture

Nõ kaitsvad juuretised

- Lyofast LR B
- Lyofast LPR A
- Lyofast BG112

APPLICATION

FERMENTED MILK

PRODUCT

SOUR CREAM

BACKED MILK

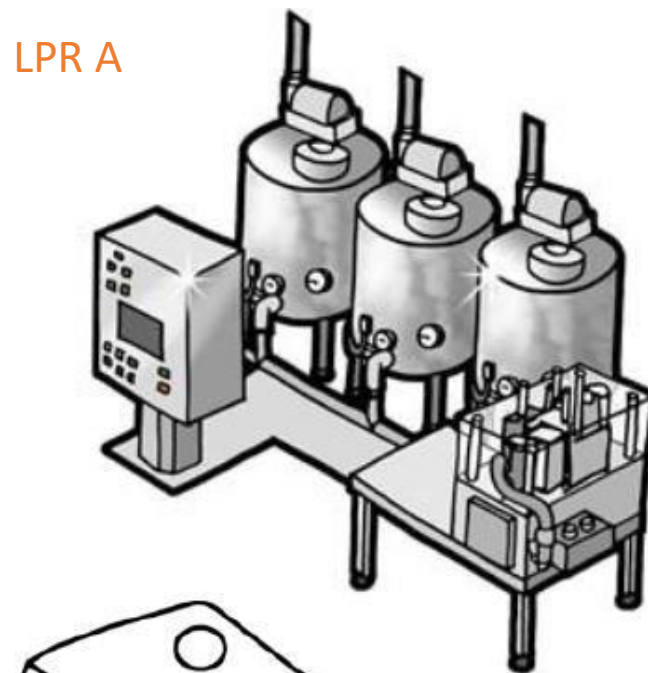
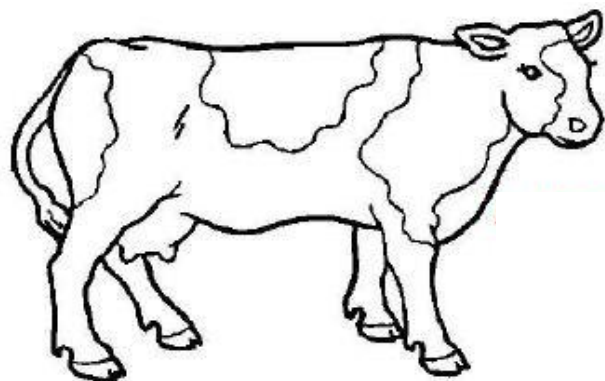
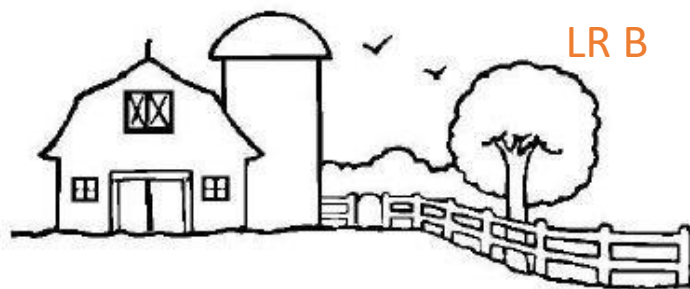
CHEESE IN

GENERAL



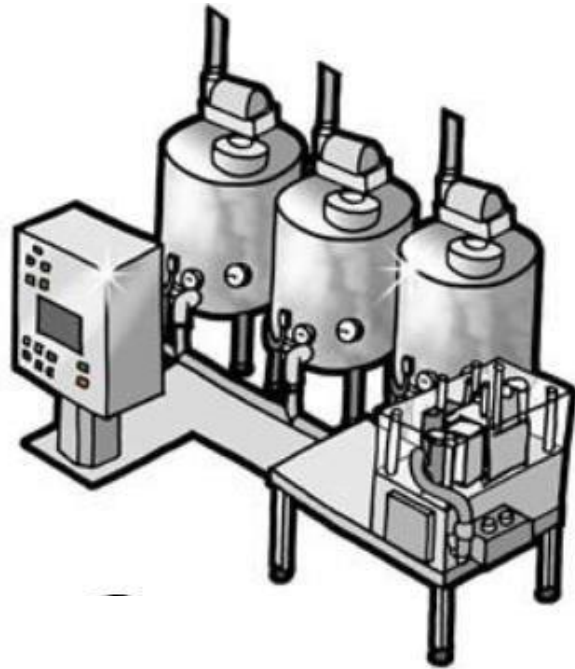
4 Protection LR B against psychrotrophic bacteria

Psühhotroofsete bakterite vastu



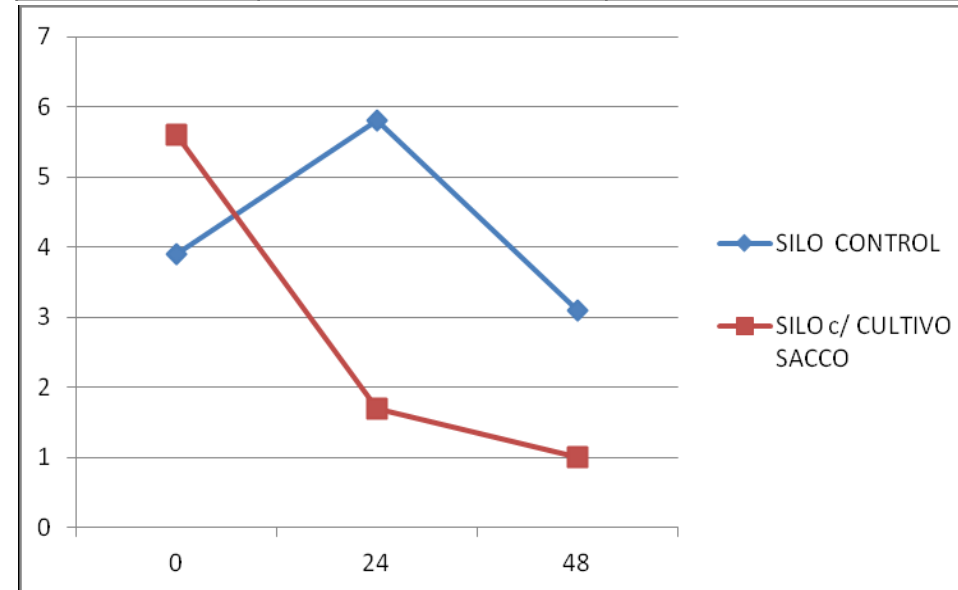
Raw milk «protection» ex 1.

4Protection LR B - 5×10^4 /ml



Time of action LR
B min 7-8 h

Time in hours	PSYCHROTROPHIC BACTERIA x 10 ⁶	
	SILO CONTROL	SILO / LRB
0	3,9	5,6
24	5,8	1,7
48	3,1	1



FARM: milk production

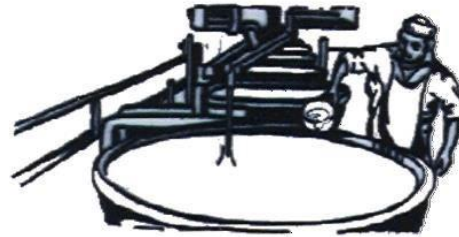


AGRIFERM:

- Biological preservatives
- Probiotic

- Labware
- Analysis equipment

CHEESE FACTORY: milk processing



- Rennet
- Lipases
- Clerizyma
- Other coagulants
- Food colours
- Liquid smoke

- Starters cultures
- Media
- Reagents
- Laboratory equipment and materials

RETAILER SHOP LARGE DISTRIBUTION



- Natamycin
- Cleriplast

- Labware
- Analysis equipment

Different starters and enzymes for cheesemaking Erinevad juuretised ja ensüümid juustuvalmistamisel

Enzymes – Coagulants

- Animal vs. microbiological vs. recombinant Chymosin
- Liquid vs. powder vs. paste



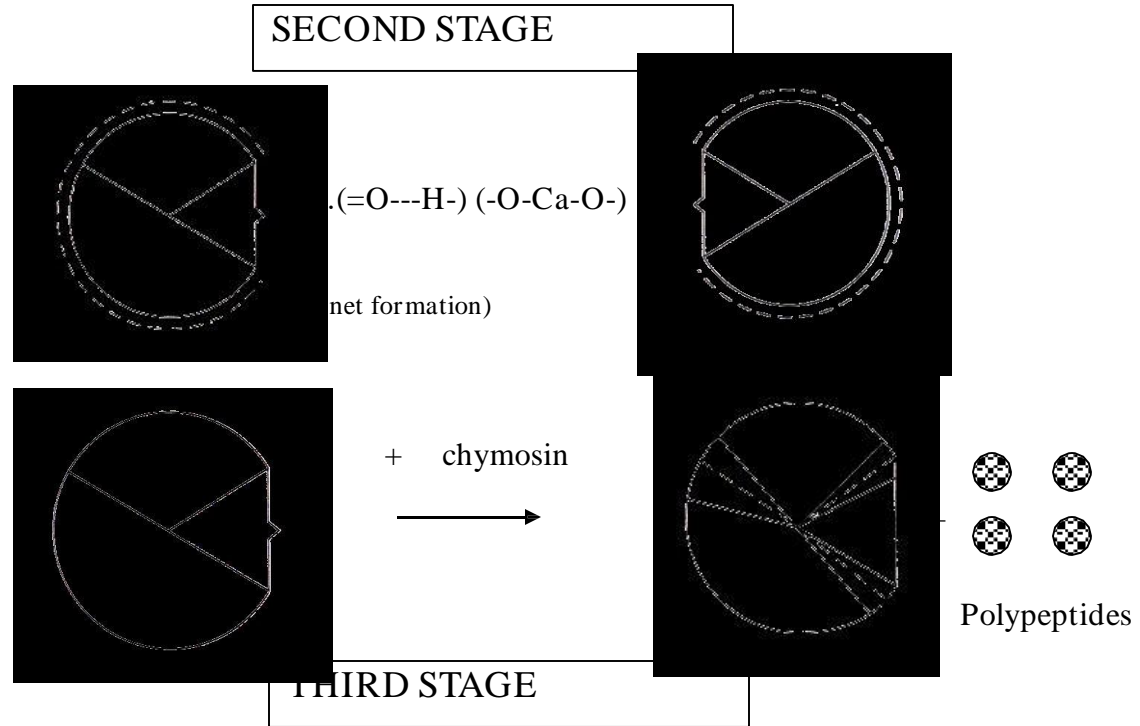
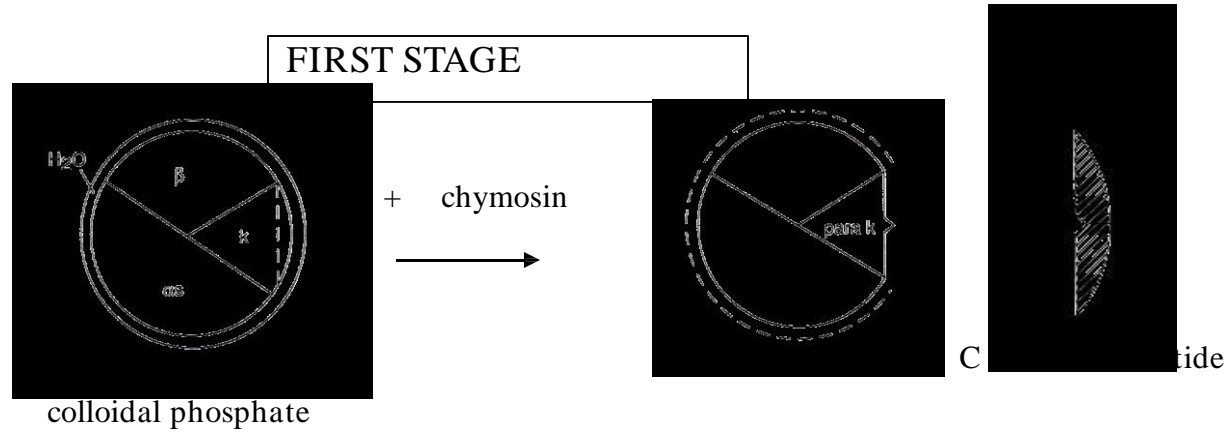
Liquid rennet	→	calf - bovine
Rennet powder	→	calf - bovine
Rennet paste	→	calf - lamb - kid

Microbial coagulants	↗	Rhizomucor miehei
	→	Rhizomucor pusillus
	↘	Endothia parasitica

Recombinant DNA chymosin	↗	Escherichia coli K 12-A
	→	Kluyveromices lactis-B
	↘	Aspergillus niger-B



Enzymatic milk clotting stages



THIRD STAGE

(random proteolysis)



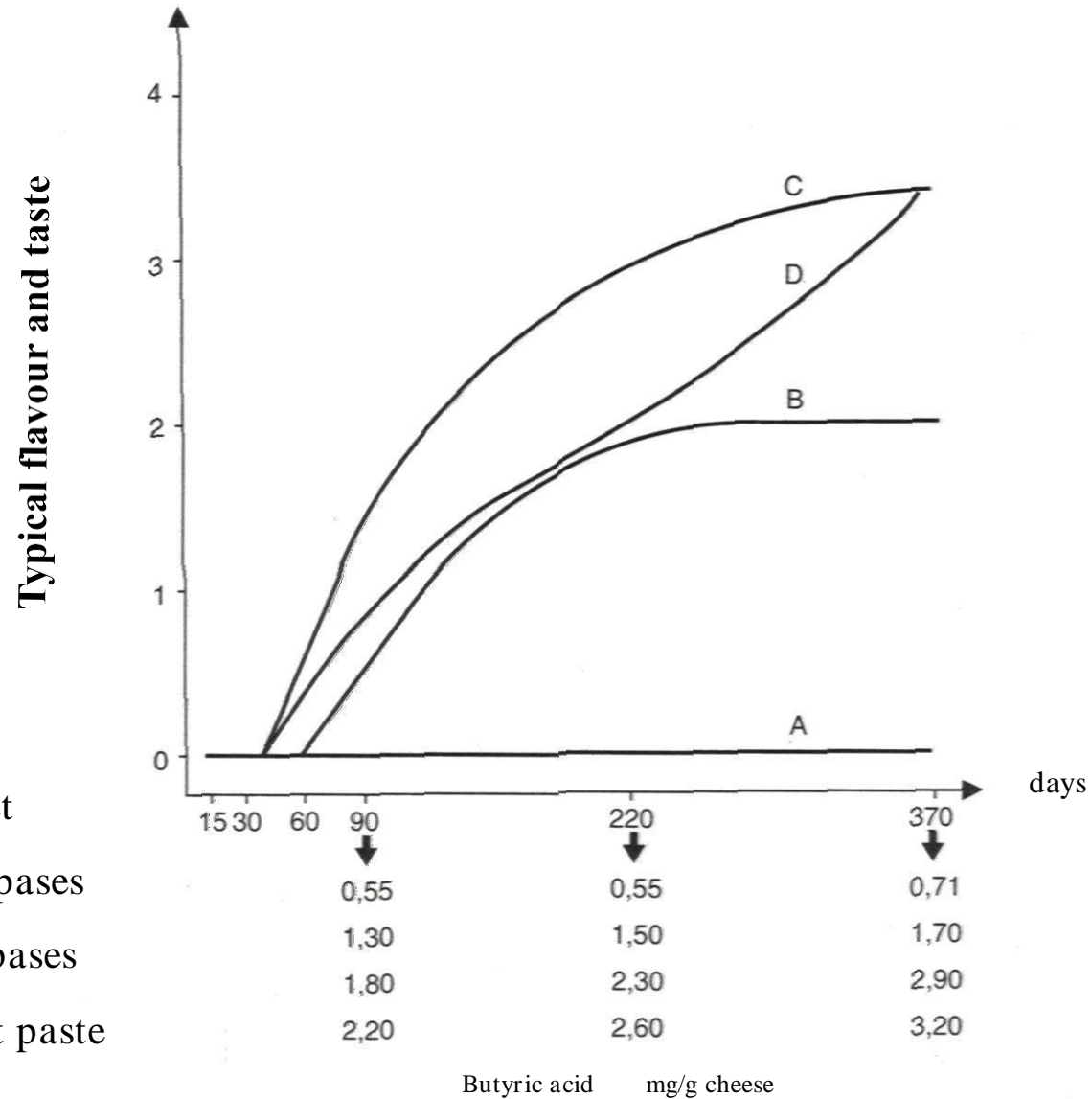
Different starters and enzymes for cheesemaking Erinevad juuretised ja ensüümid juustuvalmistamisel

Enzymes – Lipase

- Calf, Lamb and Kid goat



Development of the typical flavour and increase of butyric acid content in provolone cheese produced by different rennets and lipases



- A) Calf rennet
- B) ID+ calf lipases
- C) ID+ kid lipases
- D) Kid rennet paste

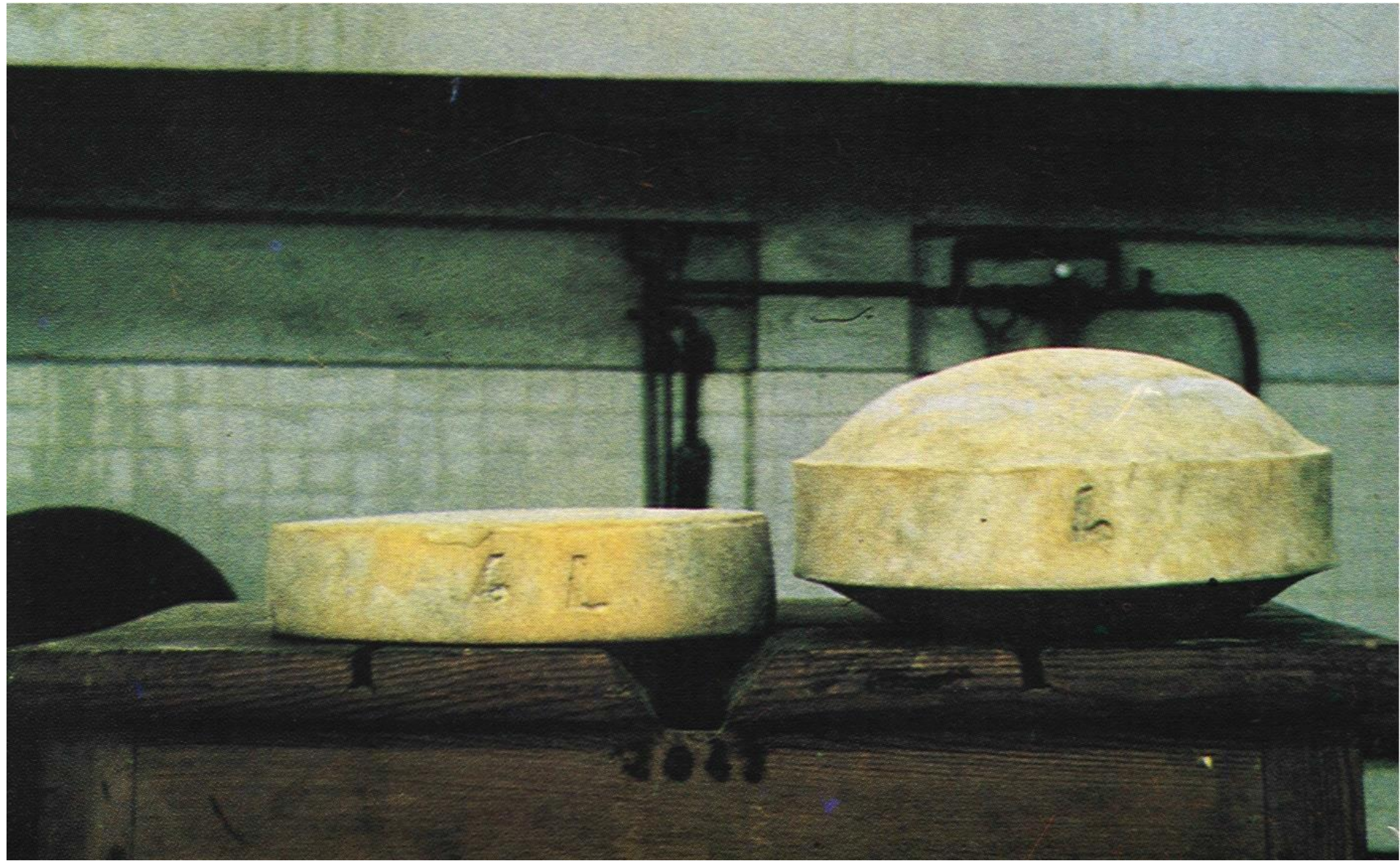


Different starters and enzymes for cheesemaking Erinevad juuretised ja ensüümid juustuvalmistamisel

Enzymes – Lysozyme

- Clerizyma against *Clostridium tyrobutyricum*





Christallization – What is all about? Kristallide moodustumine juustus

- Protein - peptides – Tyrosin
- Hard cheeses
- Sacco LH 92
- Push the ripening by higher temperature
- Avoid full fat cheese milk





Tänu!