Impact of Microfiltration on The Manufature of Goat's Milk Cheese - Microbiological Studies

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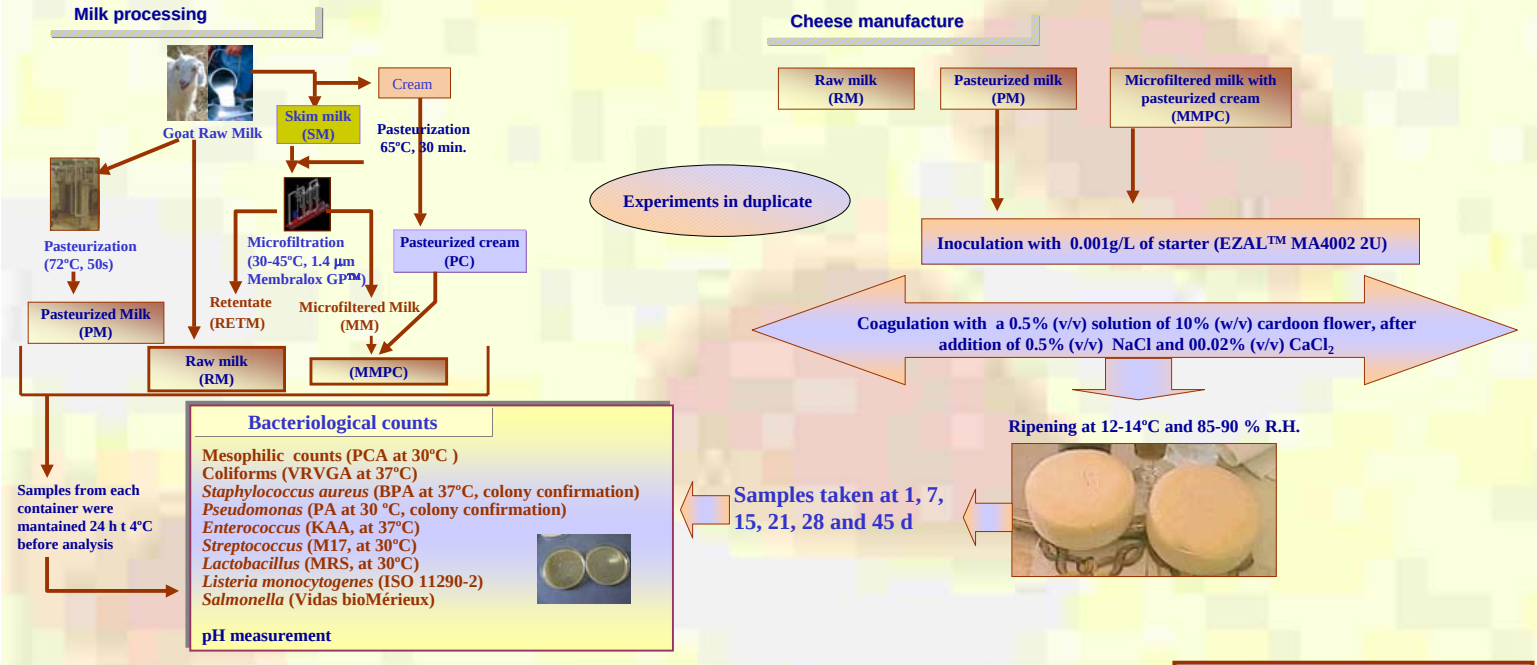
INTRODUCTION

Portugal, as well as other Mediterranean countries, still maintains a significant volume of manufacture of traditional, raw milk cheeses. However, awareness of food safety issues has urged the control of the microbial population in such raw cheese milk so that it may offer as high a quality as possible in attempts to guarantee the safety of the final product for the consumer. Heat treatment is generally used to perform such control; however, due to the alterations that it may promote in the milk components, microfiltration has alternatively been shown to be an alternative option for cheese manufacture. Cheese milk treatments performed to control detrimental microbial activities in cheese also have the potential to change milk properties which may be of value for the final product. It is well known that pasteurisation causes changes in cheese quality, mainly due to heat induced interactions of whey proteins with caseins (Lau *et al*., 1991). Microfiltration has proven to be a good option to cheese milk treatment when compared with pasteurisation showing similar reduction in microbial counts but improved quality of cheese (Beuvier, 1997). Our study was carried out so as to evaluate the effects of several pre-treatments of raw goat's milk on the microbiological properties of cheese manufactured therefrom.

MATERIALS AND METHODS



RESULTS AND DISCUSSION

No *Listeria* or *Salmonella* were detected in all samples assayed. *Pseudomonas and Staphylococcus aureus* were only observed in the retentate RETM (results not shown).

When compared with raw milk, samples of PM and MF milk (sampled from cheese vat and mantained at 4°C) showed an important decrease in total viable counts (ca. 2 log) and coliforms (ca. 2 log and ca. 3 cycles respectively) and (see Fig. 1). Pasteurized milk showed higher levels of lactic acid bacteria than MF, except for Enterococcus.

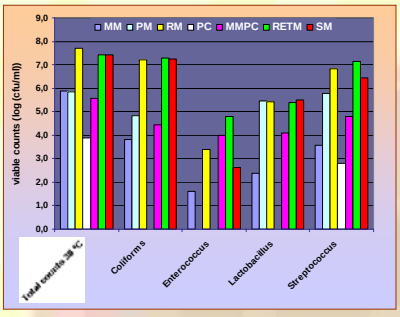
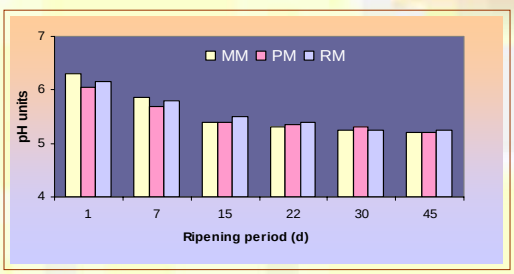


Figure 1. Mean values of viable counts of *different microbial groups in MM*, PM, RM, PC, MMPC, RETM and SM mantained 1 d at 4°C.

The retentate from microfiltration revealed the highest content for all groups (as expected), close to RM and Skimmed milk. Pasteurised cream showed the lowest viable counts not only because of by high lipids content, but also due to use of batch pasteurisation.



There was a gradual and similar decrease in pH in all types of cheese throughout ripening period (see Fig. 1), with a final pH ca. 5.2, with no apparent statistical difference in the spite of microbiological differences between them.

Figure 2. Mean values of pH throughout ripening storage.

The evolution of coliforms throughout ripening (see Fig. 3a) revealed that PM and MM cheeses possess lower counts (2-3 log cycles), manly during the first 3 weeks of ripening reducing the difference during the last stages of ripening, (due to de lower a_w). However, no statistical differences were observed between PM and MM.

The evolution of *Enterococcus* throughout the ripening-period (see Fig. 3b) showed lower counts in PM cheeses (< 104) until the end of ripening, while MF cheeses exhibited the highest counts until 3 wk of ripening-decreasing slightly during the last stages. Raw milk cheeses followed the same tendency, but higher numbers during the final period of ripening were reached; thus possesses lower counts (2-3 log cycles) mainly during the first 3 weeks of ripening

In terms of *Lactobacillus* (see Fig. 3c) in PM and MM (mainly from starter culture), the high initial numbers decrease slightly until the 3 wk, recovering by the end of ripening period. On the other hand, *Lactobacillus* present in RM cheese maintain higher levels in last stages. *Streptococcus* (see Fig. 3d), with high counts, followed an opposite tendency.

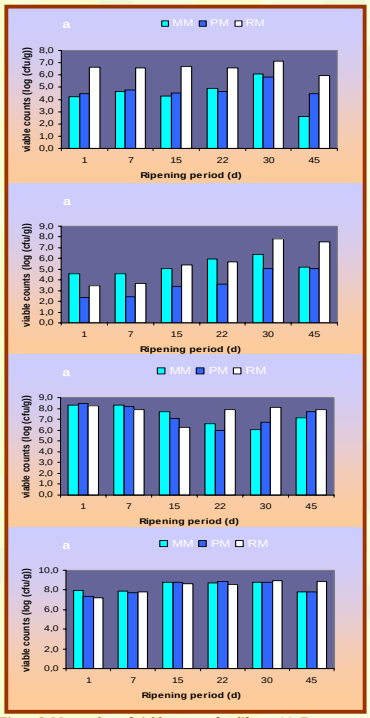


Figure 3. Mean values of viable counts of coliforms (a), *Enterococcus* (b), *Lactobacillus* (d) and *Streptococcus* (d) in MM, PM and RM cheeses throughout ripening.

Microfiltration has prove to be a good alternative to pasteurisation in order to improve final microbiological safety of raw goat milk cheeses. These results will be correlated with sensorial and biochemical properties under study.

REFERENCES

Beuvier, E., Bertahaud, K., Cegarra, S., Dasen, ª Pochet, S., Buchin, S., Duboz, G. 1997. *Int. Dairy. J*., 311-323. K.Y., Lau, K.Y., Barbano, D.M., Rasmussen, R.R. 1991. *J. Dairy Sci.* 74, 727-740.

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