

# EFFECT OF COLD STORAGE AND CALCIUM ADDITION ON MILK WITH DISTINCT COAGULATION ABILITIES

*G. M. Maciel, N. A. Poulsen, M. Hammershøj and L. B. Larsen*

Department of Food Science, Graduate School of Science and Technology, Aarhus University, 8830 Tjele, Denmark

guilherme.demouramaciel@agrsci.dk

Rennet-induced milk coagulation is markedly influenced by casein, calcium and phosphate content. Good coagulation ability is generally defined as milk capability of forming a strong gel, indicated by high values of  $G'_{max}$  and curd firming rate, and short rennet coagulation time. Jensen et al. 2012 identified that milk from Danish Holstein cows with non or poor rennet-coagulation abilities contained lower levels of total and micellar calcium and phosphorus as well as lower content of  $\kappa$ -casein (CN) relative to total CN. Furthermore, good coagulating milk presented higher proportions of  $\alpha_{s1}$ -8P CN rather than  $\alpha_{s1}$ -9P CN in percentage of total  $\alpha_{s1}$ -CN. We found significant correlations between relative  $\kappa$ -CN and total calcium content ( $r = 0.49$ ), and between  $\alpha_{s1}$ -8P CN/total  $\alpha_{s1}$ -CN and micellar phosphate or calcium, respectively ( $r = 0.37$  and  $r = 0.36$ ). This indicates that the higher levels of calcium and phosphorus in the micelles from good coagulating milks are related to the colloidal calcium phosphate instead of organic phosphate. Hallén et al., 2010 demonstrated that the addition of  $\text{CaCl}_2$  improves the coagulation ability of poor and non-coagulating milks. Furthermore, studies from our group (not published) showed that coagulation ability is significantly influenced by cold storage time. In near future, further experiments on  $\text{CaCl}_2$  addition and cold storage will be performed on milk from individual cows with different coagulation properties (ReoRox 4). The aim will be to examine the influence of these factors on the micelle size (ZetaSizer), the micellar and serum distribution of minerals (ICP-MS), and the casein profiles (LC-ESI/MS).

Jensen, et al. 2012. J. Dairy Sci. 96:2891-2903.

Hallén, et al. 2010. J. Dairy Res. 77:398-403.