

Coagulation ability of cheese milk determined by a ReoRox4 instrument

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ABSTRACT

Rheometry has been widely used to measure the coagulation properties of milk. The coagulation properties of cheese milk directly influence the cheese yield as non- or poorly-coagulating milk is unsuited for processing or results in a low cheese yield. The reports on non-coagulating milk from dairy cows of different breeds have increased, and the urge to investigate the underlying causes, as well as to establish the extent of this phenomenon is obvious.

By use of a free oscillation rheometry based technique (ReoRox4) we investigated the coagulation properties, i.e., rennet coagulation time, gel-strength by storage modulus G' and curd firming rate G'/min , of fresh skimmed milk obtained from three Danish dairy breeds ($n = 151$). Measurements of the storage modulus G' and the loss modulus G'' were performed continuously during renneting using a ReoRox4 instrument (Medirox AB, Nyköping, Sweden) with an oscillation frequency (f) of 10 Hz giving an angular frequency of $\omega = 63 \text{ s}^{-1}$ and strain 0.07. This screening of individual cows' milk established the provisory distribution of poorly coagulating milk in the selected herd. The results, which demonstrated wide differences in the measured coagulation parameters, were used for further selection of animals exhibiting the defined poor and good coagulation properties. The ReoRox4 instrument measures 4 samples

simultaneously and with 1 ml of sample sufficient for measurement. ReoRox4 thereby allows the higher throughput with less expenditure of raw material that is often required in screening trials. The data obtained were compared with classical rheometry data.