A comparative study on the viscoelastic behavior and cheese matrix melting temperature of some semi-hard and hard cheese varieties during heating

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Abstract: Raclette, Mozzarella, Comté and Emmental cheeses were heated from 20 to 80°C and the viscoelastic properties (G', G'', tan **δ** and η*), softening point, melting, flow temperatures were investigated. Principal component analysis (PCA) was applied to the rheological data set to receive a mapping of the melted cheese. ANOVA testing showed significant differences in the viscoelastic values of the investigated cheeses during heating. Also, there was a significant difference in cheese matrix melting temperature between Comté, Emmental and Raclette, Mozzarella cheeses. Mozzarella cheese presented the lowest cheese matrix melting and flow temperatures. The lowest softening and dropping points were found for Mozzarella and Raclette cheeses. Upon melting, both Raclette and Mozzarella cheeses were less elastic solid and more viscous liquid than the other cheese samples. PCA describe two phase of viscoelastic changes during heating, first phase from 20-40ºC and the second phase above 40ºC, according to by principal component 1 (PC_1). It was shown also that the PCA map defined by principal components 1 and 2 discriminated cheese samples as a function of temperature. These results demonstrate general viscoelastic behavior differences between Raclette, Mozzarella, Emmental and Comté cheeses upon heating.

Key Words: Dynamic viscoelastic properties, meltability, Mozzarella, Raclette, Comté, Emmental cheeses.