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Poster n° 189

Study of the Relationships between Homogenization of Standardized Milk and Milk Fat and Meltability and Stretchability of Emmental Cheese.

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Melting and stretching abilities of heese are of great significance since 75 % of French Emmental production are consumed in a cooked form. The fat content and fat globule membrane state are expected to play a key role in cooking properties of cheese (1). The aim of this work was to study the influence of milk fat homogenization on the melting and stretching of Emmental cheese.

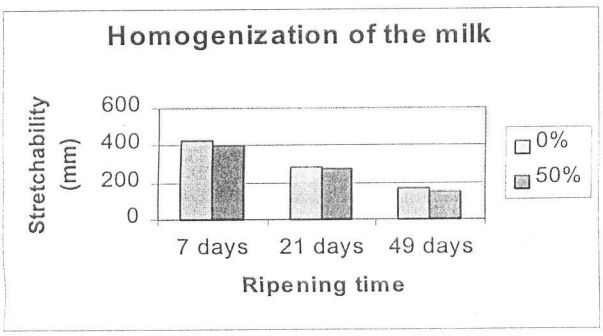
Material and methods

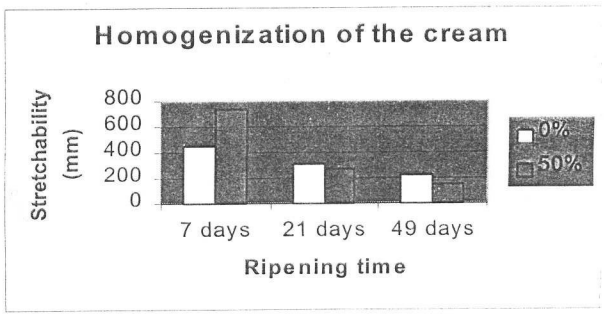
Small-scale Emmental cheese (800 g) were made following a standardized technology. Various amounts (0, 25, 50, 75, 100 %) of homogenized (6.0 Mpa, 50 °C), protein/fat standardized milk were added to the cheese milk. Alternatively, the fat of the cheese milk was adjusted with the same amounts (0, 25, 50, 75 or 100 % of fat recovered in cheese) of homogenized dairy cream. Melting, free-oil (Schreiber test) and stretching (original method, see Kerjean *et al.* this symposium) were measured after 7, 21 and 49 days ripening.

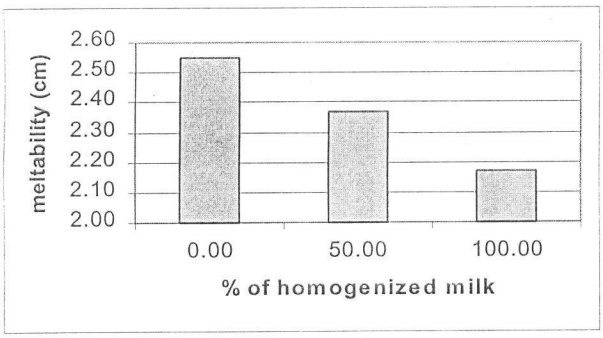
Results

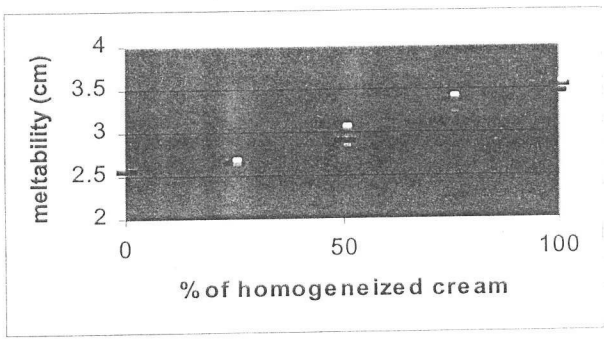
Homogenized cheese milk induced poor melting abilities and low free oil formation in cheese. Swiss-type cheese made with 100 % homogenized milk did not melt at all.

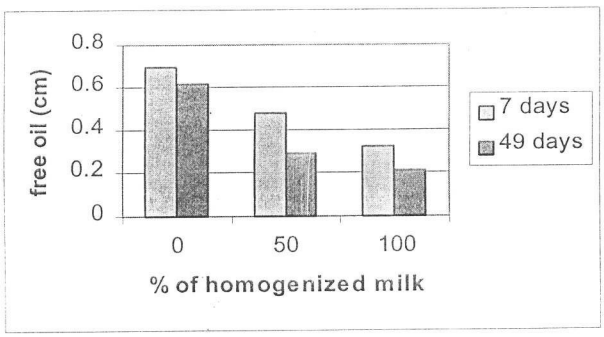
The homogenization of the dairy cream increased dramatically the melting abilities of cheese. A strong correlation (r=0.958) was found between the amount of homogenized cream and the average diameter of melted cheese.

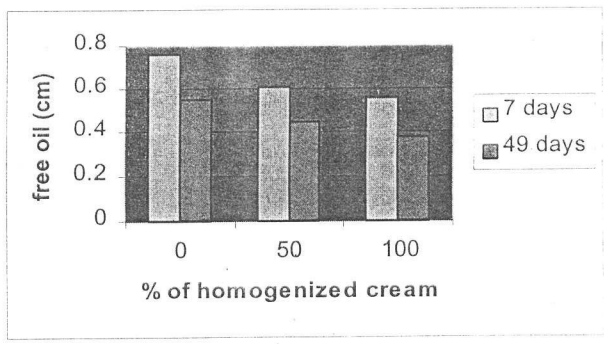












Despite strong technological corrections MNFS (moisture in non-fat substance) increased from 52.3 % in control cheeses to 55.2 % with 100 %-homogenized cream. However, MNFS did not differ statistically (54.8 %) in the range [50 %-100 %] homogenized cream but meltability increased from 2.93 cm to 3.53 cm. Introducing MNFS data did not improve the correlation with meltability. Also the sole humidity difference do not explain the increase of meltability.

Free-oil was significantly reduced by increasing homogenized cream addition. Stretching was improved for the early stage of ripening (day 7).

The cream fat content (30 or 42 %) did not have any effect on the melting of cheese.

Conclusion

This work confirms the importance of the size and the state of milk fat globule membrane on the melting abilities of cheese.

References

M.H. Tunick, E. Malin, P.W. Smith, J.J. Shieh, B.C. Sullivan, K.L. Mackey, V.H. Holsinger (1993). Proteolysis of rheology of low fat and full-fat mozzarella cheese prepared from homogenized milk, J. Dairy Sci., *76*, 3621-3628.