

# A Comparative Study of the Analysis of Free Fatty Acids in Cheeses (Cow's, Ewe's and Goat's) with Different Ripening Times using NIRS: Intact Samples and Fat Extracts

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**Abstract:** Lipolysis is of great importance in the development of the aroma and flavour of cheese and one of the usual ways of measuring it is to assess variations in fatty acids. The relative proportions of fatty acids in milk fat depend on the animal species, the stage of lactation and feed regime, the ripening time and the climatic conditions and microbiological quality of the milk. GC-MS is the reference method for the determination of fatty acids in cheeses, but the technique involves long analysis times.

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In the present work we set up and validated a method for the analysis of free fatty acids by means of NIRS technology in cheeses of different compositions (cow's, ewe's, and goat's) along the ripening period. A comparative study was made of the determination of free fatty acids by means of the two forms of sample recording: applying the fibre-optic probe directly onto the sample of cheese with neither previous treatment nor manipulation, and with a circular cell using cheese fat extracts.

The regression method employed was Modified Partial Least Squares (MPLS). The calibration results using the fibre-optic probe for 100 cheese samples were elaborated with well-known quantities and variables of cow's, ewe's and goat's milk that served as reference material, monitoring maturation later on along six months. The following free fatty acids were quantified: 10:0, 12:0, 14:1, 16:1, 17:1, 18:2, 18:0 when the measurements were made directly on the cheese, and when measurements were made on extracts a higher number of fatty acids were quantified, and those were 8:0,

10:0, 12:0, 14:1, 14:0, 15:0, 16:1, 16:0, 17:1, 18:2, 18:1, 18:0.

The prediction capacity of the models developed indicates that with NIRS technology it is possible to predict the fatty acids in unknown samples of cheeses of varying composition (cow's, ewe's and goat's) up to 6 months of ripening time, with results comparable to those obtained using the chemical method (which includes fat extractions, esterification and GC-MS detection).

## References

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