EAAP Annual Meeting, Nantes, France, August 26th - 29th 2013

Use of vis- and near-infrared spectroscopy to determine cheese properties

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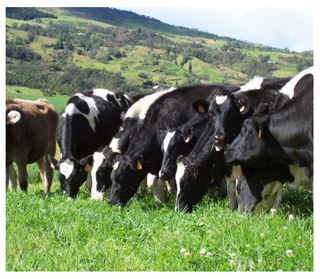
In the current context of milk price fluctuations resulting in several milk price crisis, the directly processing of milk at the farm is an additional way to diversify farm income. Cheese processing is one of the many possibilities of farm diversification. Characterization of milk and cheese using advanced techniques such as visible-, near- and mid- infrared spectroscopy allows the understanding of the changing characteristics over the production and maturation.

Aim

This study is dealing with the visible-near infrared (VIS-NIR) predictions to **define cheese characteristics** and to highlight effects associated with the **management of the herd**.



Conclusions

- ✓ The use of VIS-NIR spectra could be a very good tool to determine directly cheese characteristics and allow characterization of the evolution of the properties of the cheeses during ripening.
- ✓ The analysis of these spectra has showed herd management differences.
- ✓ These results need to be confirmed and validated with a larger number of samples.

Methodology

- ✓ Thirty milk samples were collected from individual cows. For each milk sample, 2 cheeses were produced.
- ✓ Cheese yield was determined, the pH, the texture and the color of the cheese were analyzed at 3 times (days 1, 28 and 42).
- ✓ VIS-NIR spectrum was determined for each cheese at the three times of ripening.
- ✓ Statistical and principal component analysis were applied.

Main results

- ✓ The cheese **firmness increased** throughout the ripening.
- ✓ There was no change in the color or very few between days 28 and 42.
- ✓ The principal component analysis of the VIS-NIR spectra allowed to **distinguish cheeses at day 1** compared to the same cheeses at other times (Figure 1).
- ✓ The distribution of **the spectra of day 1** of ripening **could discriminate** the different cheeses depending on the farm from which the animal comes (Figure 2).

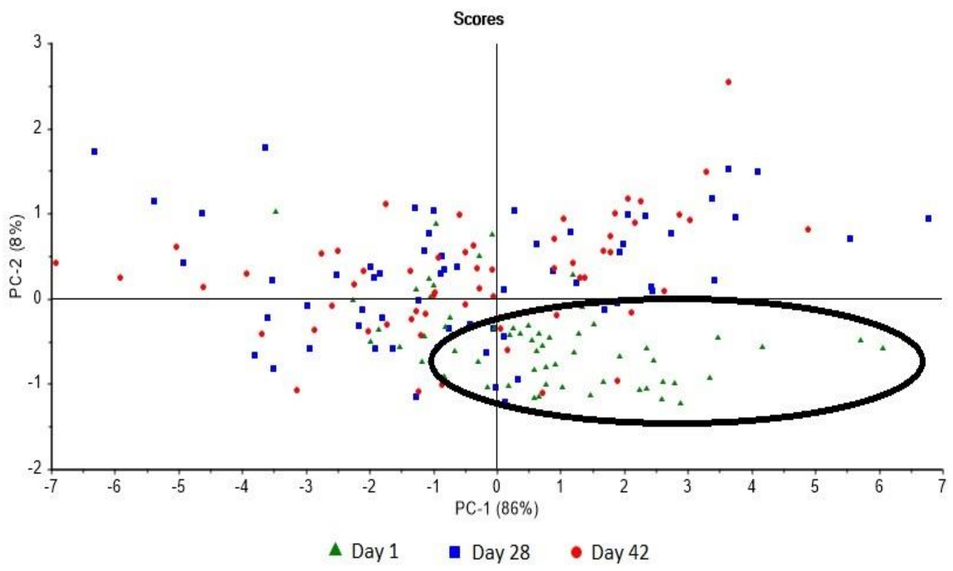


Figure 1: Distribution of the cheese samples according to axes 1 and 2 of the principal component analysis

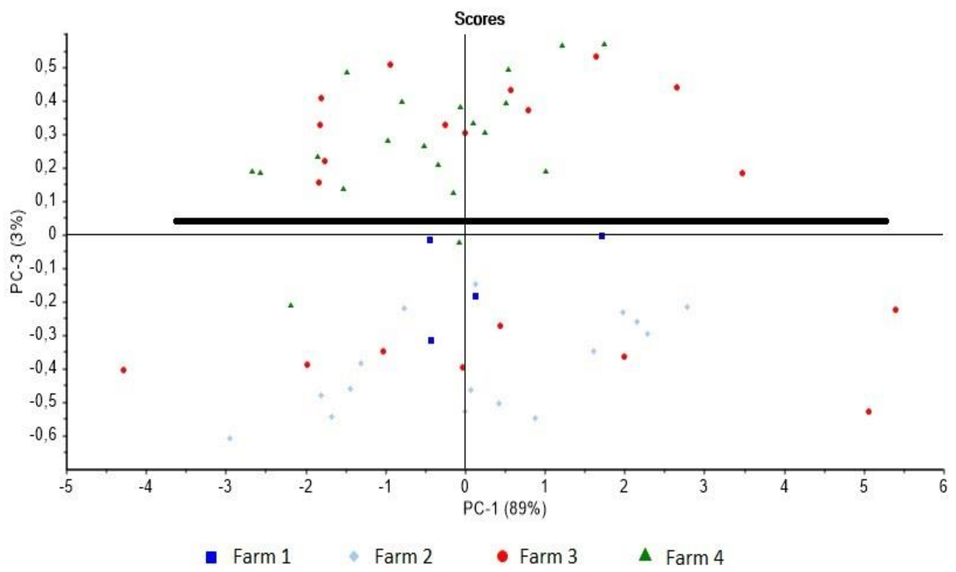


Figure 2: Distribution of the cheese samples at day 1 according to axes 1 and 3 of the principal component analysis

The authors gratefully acknowledge the financial support (projects D31/1255 and D31/1308) of Service Public de Wallonie – Direction Générale Opérationnelle de l'Agriculture, des Ressources Naturelles et de l'Environnement.

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