

Capacity of milk composition to identify the feeding system on dairy cows

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Short title: Milk composition discriminates among feeding system

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Summary

This Research Paper addressed the hypothesis that is possible to identify the type of feed used for dairy cows by means of the analysis of milk composition and the fatty acid profile of milk fat. Sixteen dairy farms were monitored during one year with a quarterly visit since summer 2014 till spring 2015. The rations varied throughout the year due to the annual dynamic change of forage production, the forage rotation, the variation of nutrient requirements according to the physiological state of the animal, etc. The ingredients of the rations were analyzed by cluster analysis identifying five feeding systems based on the main ingredient of the diet: Grazing; Maize silage; Grass silage; Dry forage; and Concentrate. The milk composition can explain up to 91.3% of the total variability among feeding systems, while the fatty acid profile could explain only up to 61.2% of total variability. However, when the sum of types of fatty acids and their ratios are taken, up to 93.5% of the total variability could be explained. The Maize silage system had the greatest milk yield, protein, solid non-fat and urea proportions, as well as the highest proportion of saturated fatty acid and lowest concentration of trans11 18:1, cis9 18:1 and 18:3 n3. The principal component analysis distinguishes the Maize silage system from other feeding systems, both from the milk composition and milk fatty acid profile. Concentrate system is partially overlapped with the Grazing, Grass silage and Dry forage systems. The latter systems had the highest concentrations of 18:0, cis9 18:1, trans11 18:1 and 18:3, but they could not distinguish between them in our conditions.