

5th IDF SYMPOSIUM ON CHEESE RIPENING

9–13 March 2008, Bern, Switzerland

FINAL PROGRAMME & BOOK OF ABSTRACTS



Schweizerische Eidgenossenschaft
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Federal Department
of Economic Affairs DEA
Agroscope Liebefeld-Posieux
Research Station ALP



organized under the auspices
of the International Dairy Federation

Volatile Terpene Analyses in Milk and Cheeses by Solid-Phase Microextraction Technique

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Terpenes are lipophilic aliphatic compounds involved, as secondary metabolites, in plant pollination, in plant resistance to predation and infection. These compounds abound in certain species, particularly dicotyledons and, if ingested by herbivores, could be subsequently found in associated milk, cheese and meat. Terpenes have then recently attracted interest both for their possible impact on cheese sensory properties and potential terroir-biomarkers in milk and cheese. Various techniques were used for their determination including dynamic headspace gas chromatography-mass spectrometry or purge-and-trap but also headspace solid-phase microextraction (HS-SPME) was suggested for its low costs and easy use.

The aim of this work was the development of a HS-SPME method with a three-phasic fiber to analyse these compounds in milk and cheese that could allow to detect a higher number of compounds with respect to the other fibers generally used in literature. The better extraction method defined, both from the qualitative as well as the quantitative point of view, included a treatment of sample (milk or cheese) with a NaH₂PO₄ solution and an absorption in the headspace for 1 h at 53 °C.

During a research supported by Pro-Alpe Project of Italy Government, this method was applied to analyse milks and cheeses produced by cows fed in diversified grassland. This method allowed to isolate and identify many monoterpenes, as limonene, β -pinene and *p*-cymene, and also sesquiterpenes as β -caryophyllene and *t,t*-farnesol. Therefore, the proposed method could satisfactorily perform qualitative and quantitative analyses of terpene compounds and be suitable to define terpene profile in dairy products and their link to grazing management.

Keywords: SPME, terpenes, milk, cheese

Persistency of Conjugated Linoleic Acid (CLA) in White Cheese from High CLA Milk

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The *cis*-9, *trans*-11 18:2 (CLA) presents several healthy properties demonstrated in experimental models. Being the cheese an important vehicle of this fatty acid for human being, this study was carried out to test the persistence of 9-*cis* 11-*trans* (CLA) on white cheese elaborated from high CLA raw milk. Milk containing 3.54 g CLA 100g⁻¹ FA was obtained from Holstein (Holando Argentina) cows grazing an oat pasture (11 kg pasture DM cow⁻¹) and receiving a supplement composed by corn grain, corn silage, sunflower oil, fish oil and sunflower meal. After a 10 days period, individual milk samples were collected, analysed and transformed into white spreadable cheese reproducing industrial technology.

Fatty acid composition was analyzed by gas chromatography and comparison between raw milk and cheese were evaluated using the T-test for paired observations.

Atherogenic Index (AI) value resulted in 2.32 in basal milk, while it lowered to 1.45 in high CLA milk. The vaccenic acid (VA = *trans*-11C_{18:1}, CLA precursor) and *cis*-9 *trans*-11-CLA values were 2.29 and 1.04 g 100g⁻¹ of FA in basal milk, respectively. The supplementation allowed to increase