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CHARACTERISATION OF FLAVOUR VOLATILE COMPOUNDS OF CASTELMAGNO POD DURING CHEESEMAKING AND RIPENING

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In Piedmont (North West Italy) the cheese-making sector is highly developed in its quantity and quality and cheese manufacturing has always been an important economic and cultural resource.

In fact of the 30 Italian cheeses with the Protected Denomination of Origin (POD) according to European Regulation 2081/92, ten are produced in Piedmont and seven of these are produced exclusively in Piedmont. Qualitatively the most important Piedmont POD is Castelmagno, a semi-fat, pressed, hard-paste cheese made of cow's milk and a small quantity of ewe's and/or goat's milk and ripened for 2-5 months. The particularity of this cheese is due to the immersion of curd in the soured whey obtained by previous cheesemaking for at least 48 hours and their following mince. The cheese obtained is very hard, granular and "chalky".

The aim of this work was to study for the first time the flavour volatile compounds of this cheese and their evolution during five cheese-makings by gas chromatography coupled with mass spectrometry. Samples of curd, mince and cheeses with 1 and 2 months of ripening obtained from five cheese-makings were analysed. The volatile compounds were extracted with a simultaneous distillation-extraction (SDE)[1] then analyzed by gas chromatography coupled with quadrupolar mass spectrometry. A semi-quantification in TIC was performed. Among the more than one hundred detected compounds, the most important are the fatty acids with both short and long chains produced from different biochemical pathways[2]. Their content increases during the cheese-making starting from the immersion in whey. After the first month of ripening the concentration returns stable. Other very important identified compounds of Castelmagno volatile fraction were the ketones generally with an odd number of carbon atoms. These compounds arise from fatty acids after the lypolisis and their concentration increases during the ripening similar to those of the fatty acids. The acetoin makes an exception. Its concentration is greatest to the end of the immersion in whey then decreases during the ripening for its conversion in 2-butanol. The concentration of alcohols such as the 3-methyl-butanol, the 2-heptanol and the 2-nonanol is also very high. These

compounds were obtained by the reduction of the corresponding ketones. Also present here the 2-phenylethanol, found in all the bluecheeses and its corresponding acetate.

The ethyl esters and the acetyl esters are abundant only in the more ripened products or after the immersion in whey for the presence of ethanol and fatty acids.

The aldehydes, from Streker degradation, are scarce. In the more ripened cheese the hydrocarbons with a long chain, by undecano to tetradecano, from oxidative breakdown of unsaturated fatty acids[3] were also present. In some samples also the terpenes originating from cows fed on herbs were identified. Other very important compounds identified were seven lactones, of which one of these with an unsaturated chain, likely produces a pleasant fruity odour. Quantitatively the most important identified lactones were the long-chain lactones such as the □-decalactone, the □-dodecalactone and the □-tetradecalactone. Generally their concentration increases after the immersion in whey.

The obtained results have underlined that, due to homemade production and its unusual cheese-making technique, the aroma of Castelmagno POD is very changeable. Thus its analysis is very difficult as well as the definition of its evolution. But this variability is also the most important and the most appreciated characteristic of this cheese which makes it one of the more important Piedmont POD cheeses.

Reference

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3. Grosh W., In *Food Flavours. Part A. Introduction.* Morton I.D., MacLeod A.J., Eds; Elsevier: Amsterdam, 1982.