

**P13****GC-MS DETERMINATION OF CYCLOPROPANE FATTY ACIDS: A NEW TOOL AGAINST PARMIGIANO REGGIANO COUNTERFEIT****Angela Marseglia<sup>1</sup>, Marco Nocetti<sup>2</sup>, Veronica Lolli<sup>3</sup>, Gerardo Palla<sup>4</sup>, Augusta Caligiani<sup>5\*</sup>**<sup>1,3,4,5</sup> Department of Food Science, University of Parma, Parma, Italy<sup>2</sup> Consorzio del Formaggio Parmigiano Reggiano, Reggio Emilia, Italy

\* Corresponding author – E-mail: angela.marseglia@unipr.it, Phone: +393495359480

Cyclopropane fatty acids (CPFA) as lactobacillic acid and dihydrosterculic acid are components of bacterial membranes discovered for the first time three years ago in milk and dairy products (concentration of 100-1000 ppm on milk fat). Data collected on more than 2000 dairy samples showed empirically that cyclopropane fatty acids (CPFA) were present only in dairy products from cows fed with silages (1,2), and their determination has been demonstrated to be a powerful tool for the authentication of PDO cheeses, as Parmigiano Reggiano, where the use of silages is forbidden. In this context, an application for an official standardization of the method has been proposed by our research group and by Consorzio del Formaggio Parmigiano Reggiano and is currently under validation study. The quantitative GC-MS method developed was applied to 304 samples of PDO cheeses of certified origin, comprising Parmigiano Reggiano (Italy), Grana Padano (Italy), Fontina (Italy), Comté (France), Gruyère (Switzerland). The cheese database we are constructing demonstrates that CPFA are always absent in all PDO cheeses for which the use of silages is forbidden and always present when silages in cow's feeding are admitted. In particular, all the authentic Parmigiano Reggiano samples showed values of CPFA lower than 0.006 mg/100 mg of cheese fat (LOD of the method), while cheese samples from milk of cows fed with silage always showed contents higher than 0.030 mg/100 mg cheese fat. The method is able to detect the counterfeiting of Parmigiano Reggiano with other cheeses until 10-20 %. These results comfort the hypothesis that CPFA can be used as a marker of silage feedings for cheese, and the present method, proposed for Parmigiano Reggiano cheese, can be easily extended to all Italian and European PDO cheeses that forbid the use of silage feeding in their Product Specification Rules.

[1] Marseglia A, Caligiani A, Comino L, Righi F, Quarantelli A, Palla G. (2013) Cyclopropyl and  $\omega$ -cyclohexyl fatty acids as quality markers of cow milk and cheese. *Food Chem*, 140, 711-716.

[2] Caligiani A, Marseglia A, Palla G. (2014) An Overview on the Presence of Cyclopropane Fatty Acids in Milk and Dairy Products. *J Agric Food Chem* 62, 7828–7832.

**Keywords:** authentication, animal feeding, milk and dairy products, cyclopropane fatty acids, Parmigiano Reggiano