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- 1 [84 - Phytochemical analysis and authenticity control of commercial essential oils and absolutes of Rosa damascena Mill. by GC-MS, GC-FID and GC/C-IRMS](#)

**Authors:** Federica Camin, Katryna A. van Leeuwen, Giulia Orlandini, Mauro Paolini, Davide Bertelli, Federica Pellati

**Division:** AGFD: Division of Agricultural and Food Chemistry

**Date/Time:** Tuesday, September 10, 2013 - 08:30 AM

**Session Info:** [Instrumental Methods for the Analysis of Bioactive Molecules \(08:30 AM - 11:50 AM\)](#)

**Location:** Indiana Convention Center

**Room:** 108

AGFD

Michael Qian

Tuesday, September 10, 2013

**84 - Phytochemical analysis and authenticity control of commercial essential oils and absolutes of Rosa damascena Mill. by GC-MS, GC-FID and GC/C-IRMS**

**Federica Camin**<sup>1</sup>, federica.camin@fmach.it, Katryna A. van Leeuwen<sup>1</sup>, Giulia Orlandini<sup>2</sup>, Mauro Paolini<sup>1</sup>, Davide Bertelli<sup>2</sup>, Federica Pellati<sup>2</sup>. (1) Department of Food Quality and Nutrition, Research and Innovation Centre, Fondazione Edmund Mach, San Michele all'Adige, Trento 38010, Italy, (2) Department of Pharmaceutical Sciences, University of Modena and Reggio Emilia, Modena, Italy

The essential oil of *Rosa damascena* Mill. is known for its fine perfumery application, use in cosmetic preparations and for several pharmacological activities. Due to its high value, it can be easily adulterated with flavors or cheaper oils. In this study we considered 24 commercial samples of *R. damascena* essential oil and absolute of different geographic origin. GC-MS and GC-FID techniques were applied for the phytochemical analysis of the samples. EA-IRMS (Elemental Analyser-Isotope Ratio Mass Spectrometry) and GC/C(Combustion)-IRMS were used to determine the  $\delta^{13}\text{C}$  composition of bulk samples and of some specific components. Citronellol (28.7-55.3%), geraniol (13.5-27.3%) and nonadecane (2.6-18.9%) were the main constituents of Bulgarian and Turkish essential oils. The samples from Iran were characterized by a high level of aliphatic hydrocarbons (nonadecane: 3.7-23.2%), while in the Turkish absolute rose and in the oils from Morocco and Ukraine phenylethyl alcohol was the main constituent (47.6-75.4%). The  $\delta^{13}\text{C}$  values of bulk samples were in the range between -29 and -26.9‰, typical for C3 plants. For most of the analyzed compounds in the essential oils and absolutes, the  $\delta^{13}\text{C}$  values were in the usual range for natural aromatic substances from C3 plants, except for geranyl acetate, which displayed higher values (up to -18‰). These unusual  $\delta^{13}\text{C}$  values could be justified by the addition of a natural cheaper oil from a C4 plant (*Cymbopogon martinii*, palmarosa). A synthetic origin was moreover postulated for geranyl acetate in the absolute from Ukraine. The results indicated that GC/C-IRMS, in combination with GC-MS and GC-FID, represents an effective and reliable tool for the authenticity control of *R. damascena* essential oil.

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