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BOOK of ABSTRACTS

draft

463 - GUM ARABIC CHARACTERISATION AND ITS DETECTION IN WINE USING HIGH RESOLUTION MASS SPECTROMETRY

Tiziana Nardin (1) - Giulia Ferrari (1) - Roberto Larcher (1)

Fondazione E. Mach, CTT, San Michele a/A (1)

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Introduction:
Gum Arabic is a dried exudate obtained from several Acaciaspecies from the sub-Saharan region ofAfrica [1]. It is a complex mixture of macromolecules, mainly carbohydrates and proteins, widely used asan edible ingredient in various types of food as well as for non-food applications [2]. For oenology, OIV approves the use of both A. senegal and A. seyal gums. Europe indicates a maximum of 200 mg/L as the recommended technological dosage [3].

Methods:
The study was performed using a Thermo Ultimate R3000 UHPLC equipped with a byphenyl column (3 x 150 mm, 2.7 µm). Separation was obtained at a flow rate of 0.3 mL/min with a ternary mobile phase with 2% formic acid, acetonitrile and water. Mass spectra were acquired through a full MS experiment at 70,000 FWHM resolution using a Q-ExactiveTM HRMS equipped with a heated electrospray ionization (HESI-II) interface working in both positive and negative ion modes.

Results:
The full scan MS profile, both in positive and negative ionization, of 45 gum Arabic samples was evaluated in order to check if specific ions could selectively characterise the botanical (A. seyal and A. senegal) and/or the geographic origins of gums (Kordofan, Hashab and Verek). The PLS-DA statistical approach indicated 18 masses as possible predictive origin markers, allowing the correct reclassification of 98% of the samples to the corresponding cases.Moreover, we analysed 40 micro-winery genuine wines (8 varieties) and then reanalysed the same ones after randomly adding 200 mg/L of gum Arabic of the 2 origins (seyal, n=10; senegal, 10). Comparing their ion profiles, 5 of the previous 18 masses, not detected in genuine wines, permitted the identification of the addition of gum Arabic. PCA based on the 5 masses allowed us to distinguish between wines added withA. senegal and A. seyal. Finally, each isotopic patterns and ion fragmentation allowed us to define their molecular formulas and structures.

Conclusions
The HRMS untargeted approach allowed us to identify, through PLS-DA analysis, 18 masses (m/z) that could be proposed as possible markers for the differentiation of the commercial gum Arabic samples, both with respect to the botanical (A. seyaland A. senegal) and geographic (Kordofan, Hashab and Verek) origin. 5 of these 18 masses (m/z 152.1067, 166.1225, 181.0459, 585.1428, 643.1403) were also effective in detecting the presence of 200 mg/L gum Arabic in wine.

Novel Aspect:
A new rapid untargeted high resolution MS approach allows us to predict gum Arabic origin and detect its presence in wine.

References
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