



“Gheorghe Asachi” Technical University of Iasi, Romania



STUDY OF VOLATILE COMPOUNDS OF ROMANIAN RED WINES AGED WITH OAK CHIPS

Georgiana-Diana Dumitriu Gabur¹, Carmen Teodosiu^{1*}, Valeriu V. Cotea²,
Rafael Andres Peinado³, Iulian Gabur⁴, Nieves Lopez de Lerma³

¹“Gheorghe Asachi” Technical University of Iasi, Romania, “Cristofor Simionescu” Faculty of Chemical Engineering and Environmental Protection, Department of Environmental Engineering and Management, 73 Prof. D. Mangeron Blvd., 700050 Iasi, Romania

²University of Agricultural Sciences and Veterinary Medicine “Ion Ionescu de la Brad” Iasi, Romania
Department of Viticulture and Oenology, 3 Mihail Sadoveanu Alley, 700490, Iasi, Romania

³University of Córdoba, Spain, Department of Agricultural Chemistry, Agrifood Campus of International Excellence ceiA3, Campus de Rabanales, Edificio Marie Curie, 14071, Córdoba, Spain

⁴University of Agricultural Sciences and Veterinary Medicine “Ion Ionescu de la Brad” Iasi, Romania
Department of Plant Sciences, 3 Mihail Sadoveanu Alley, 700490, Iasi, Romania

Abstract

Wine aroma plays an essential role and can be considered one of the most important attributes of the overall wine quality. Generally, aroma is a remarkable complex chemical matrix comprising compounds from various chemical classes (alcohols, esters, acids, aldehydes, lactones, phenols, terpenes, ketones, norisoprenoids, etc.). Although some studies tackle wine aroma in general, the chemical changes attributed to wine aroma during the ageing process are still poorly understood.

In this study, the profiles of minor volatile compounds of wine obtained from *Fetească neagră* grape variety, aged for 1.5 and 3 months by using stir bars sorptive extraction and gas chromatography coupled to mass spectrometry (SBSE-GS-MS) were investigated. Red wines were aged using medium toast oak wood chips with the following dimension 0.5 × 1.5 × 0.2 cm (width × length × thickness). The analysis identified 20 minor volatile compounds in samples. These compounds belong to four major chemical groups, namely esters, volatile phenols, carbonilics and oak compounds. Samples aged for 3 months registered an increase, when compared to 1.5 months samples, for all identified and quantified compounds. However, heptanal and octanal concentrations decreased. Principal components analysis of the minor volatile compounds differentiated wines according to their ageing time. The first principal components (PC1) explained 78.80% and PC2 14.03% of the total variance. Sensory profile of *Fetească neagră* aged with oak chips was characterized by high notes of woody, toasty, vanilla, smoky and cacao and an attenuation of ripe fruit and herbaceous attributes.

Key words: oak chips, red wines, SBSE-GC-MS analysis, volatile compounds

Received: January, 2019; *Revised final:* November, 2019; *Accepted:* November, 2019; *Published in final edited form:* February, 2020

* Author to whom all correspondence should be addressed: e-mail: cteo@tuiasi.ro