

HS-SPME-GC-MS determination of volatile components in toasted oak chips

Ivanova-Petropulos, V.¹, Necev, B.¹, Leitner, E.², Stafilov, T.³, Sigmund, B.²

¹Faculty of Agriculture, University "Goce Delčev", Štip, Krste Misirkov bb, 2000
Štip, Republic of Macedonia

²Institute of Chemistry, Faculty of Natural Sciences and Mathematics, Ss. "Cyril and Methodius" University,
Arhimedova 5, 1000 Skopje, Republic of Macedonia

³Institute of Analytical Chemistry and Food Chemistry, Graz University of Technology, NAWI Graz,
Stremayrgasse 9/II, A8010 Graz, Austria
e-mail: violeta.ivanova@ugd.edu.mk

Volatile compounds are present in a high content in oak and that have a great impact on wood-matured wine aroma. The main volatiles in oak are volatile phenols, such as guaiacol, eugenol and syringol, phenolic aldehydes such as vanillin and syringaldehyde, furanic aldehydes, such as furfural and oak lactones. In this study, volatile composition of untoasted and toasted oak chips samples produced from oak wood *Quercus* grown in Republic of Macedonia was studied for the first time. For that purpose, three sets of oak samples were prepared: (i) – open dried, (ii) light toasted (LT) 1 h at 120°C and (iii) medium toasted (MT) 2 h at 170°C. Analysis was performed with headspace solid phase microextraction (HS-SPME) with a PDMS/Carboxen/DVB fibre, coupled with gas chromatography–mass spectrometry (GC–MS). All oak chips samples presented a very complex aroma profile composed of acids, alcohols, aldehydes, esters, ketones, lactones, phenolic aldehydes, volatile phenols and other compounds. The results showed that heating temperature affect the volatile composition and content in the oak samples, leading to increased relative amounts of volatile compounds with increasing of the toasting temperature. Thus, samples toasted at 120°C presented highest amount of acids, alcohols, ketones and lactones, while aldehydes, esters, phenolic aldehydes and volatile phenols dominated in chips samples toasted at 170°C. Principal component analysis (PCA) was applied on the results for the volatile compounds in order to reveal any grouping of the oak chips samples dried at various ways as well as to identify the constituents that are the chemotypical factors, observing grouping of the oaks according to the heat treatment.

Keywords: volatile compounds, oak chips, toasting temperature, HS-SPME-GC-MS.

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