

Elemental composition of non-oak wood extracts commonly used in Balkan cooperage



Anita T. Smailagić¹, Sonja P. Veljović², Biljana P. Dojčinović³, Maja M. Natić⁴

¹ University of Belgrade, Innovation Center, Faculty of Chemistry Ltd, 11158 Belgrade, Serbia

² University of Belgrade, Institute of General and Physical Chemistry, 11158 Belgrade, Serbia

³ University of Belgrade, Institute of Chemistry, Technology and Metallurgy, 11000 Belgrade, Serbia

⁴ University of Belgrade, Faculty of Chemistry, P. O. Box 51, 11158 Belgrade, Serbia

Introduction

In the production of some alcoholic beverages one of the most important practices is the ageing process in a presence of wood. This process contributes to improved sensory characteristics such as aroma, color, taste and astringency. Although oak heartwood is the most used material in cooperage, other species such as chestnut, cherry, and mulberry can be also considered. Currently, limited published data are available on the mineral content of the wood extract from cooperage industry, although some research was done to investigate the content of heavy metals in alcoholic beverages (Bonić et al., 2013), especially in wine (Orescanin et al., 2003). Daily consumption of the wine and brandy with an elevated content of heavy metals might cause chronic poisoning. To avoid this issue, the maximum allowable concentration (MAC, mg L⁻¹) in fruit brandies were established for lead, zinc, arsenic, and copper (Bonić et al., 2013).

Materials and methods

- Elemental composition of ethanolic extracts, obtained from alternative wood species used in Balkan cooperage, such as mulberry (*Morus alba* L.), Myrobalan plum (*Prunus cerasifera* Ehrh.), black locust (*Robinia pseudoacacia* L.), and wild cherry (*Prunus avium* (L.) L.) was investigated.
- Elemental analysis was done using inductively coupled plasma-optical emission spectrometry (ICP-OES).

Results and discussion

- The contents of 21 elements were presented in Table 1.
- The most abundant element in wood extracts was potassium except in wild cherry, in which calcium was dominant.
- Elemental composition of wild cherry extract was much lower than in other non-oak wood extracts
- Chromium was present only in Myrobalan plum, while lithium was present only in mulberry
- All investigated wood extracts have lower content of trace elements than maximum allowable concentration in fruit brandies.

References

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Figure 1. Wood sawdust used in preparation of extracts. From left to the right: black locust (*Robinia pseudoacacia* L.), Myrobalan plum (*Prunus cerasifera* Ehrh.), wild cherry (*Prunus avium* (L.) L.), and mulberry (*Morus alba* L.).

Table 1. The mineral content of wood extracts from black locust (*Robinia pseudoacacia* L.), Myrobalan plum (*Prunus cerasifera* Ehrh.), wild cherry (*Prunus avium* (L.) L.), and mulberry (*Morus alba* L.).

content (µg/L)	Black Locust	Myrobalan plum	Wild Cherry	Mulberry
K	18400	32290	5057	51700
Ca	11480	7600	6072	8009
Mg	5671	3319	1448	3170
P	576.2	8809.0	322.3	726.8
S	2443.0	3177.0	739.6	2266.0
Na	959.0	1080.0	633.9	1282.0
Fe	122.60	45.49	31.40	153.10
Mn	31.31	30.90	6.24	30.89
Cu	268.00	306.50	52.48	134.40
Zn	125.40	93.02	31.78	189.70
Co	0.15	0.35	0.10	<0.1
Ni	7.68	23.85	3.32	21.64
Al	8.16	<1	<1	14.16
As	<0.1	<0.1	<0.1	<0.1
Ba	10.38	15.33	26.75	12.88
Cd	0.40	0.41	0.36	0.32
Cr	<0.1	0.64	<0.1	<0.1
Li	<0.1	<0.1	<0.1	0.26
Pb	5.29	3.44	3.07	8.40
Se	8.93	9.56	9.15	8.91
Sr	40.57	32.96	19.32	28.12