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ICP-AES ANALYSIS OF SOME OLIGOELEMENTS IN FRUIT WINES

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INTRODUCTION

Fruit wines in Serbia have a reputation as a source of good health, immunity and blood count. They are considered to contain hemoglobin precursors as well as oligoelements which are necessary for good health. Oligoelements are present in foodstuff in little quantities, but their significance is great. The biological value of foods can be increased by supplementation, or reduced because of poor quality raw materials.

Inductively coupled plasma-atomic emission spectrometry (ICP-AES) provides a rapid and precise means of monitoring elements simultaneously for minor- and trace-levels. The ICP-AES technique is widely regarded as the most versatile analytical technique in the chemistry laboratory.

ICP-AES CONDITIONS

The metals were analysed by Inductively Coupled Plasma - Atomic Emission Spectrometry (ICAP Series 600 Thermo Fisher scientific). The calibration curves were constructed using a series of dilutions containing different levels of metals (0,005 mg/L to 2 mg/L). The reading was made at the emission wavelenghts for zinc, manganese, iron, copper, chrome and cobalt of 202.548 nm, 257.610 nm, 238.204 nm, 324.754 nm, 267.716 nm and 238.616 nm respectively. The results were evaluate according to iTEVA iCAP Software ICP Spectrometer, and for the comparison of the metal values One-Sample t-test was used.

AIM

Our aim was to determine acontent of oligoelements: iron, zinc, copper, chrome manganese, in fruit wines, as well as in domestic wines, using ICP-AES spectrometry, with and without digestion, and to compare results obtained.

METHOD

We analyzed 4 types of fruit wines: cherry, raspberry, blackberry and blueberry, and domestic wines of various producers, a total of 30 samples. samples were prepared in two ways: by dilution with water to obtain 1% (v/v) ethanol, or microwave sample digestion: 5 g of the sample and 5 mL HNO3 65% added. A microwave furnace was used for the digestion of the experimental samples. In the method, the samples were dissolved at 180 °C and 400 psi pressure in apparatus. After further 20 min processing, the sample were put into 25 mL polyethylene flasks which were made up with deionised water.

RESULTS

CRM *	Mn mg/L	Fe mg/L	Cu mg/L	Cr mg/L	Co mg/L
Determined	26,8	27,9	25,1	23,7	30,3
Certified	25,4±2.54	29,6±4,76	27,6±2,84	24,4±2,13	27,9±2,56

*)Environment Canada TM-25.3 lot 0809

Content of selected elements in fruit wines and wines originating in Serbia

Wines	Zn mg/L	Mn mg/L	Fe mg/L	Cu mg/L	Cr mg/L	Co mg/L
Chardonne	1,371	0,928	1,430	0,804	0,104	0,007
	1,227	0,778	1,445	0,424	0,094	0,005
	1,321	0,754	1,767	0,742	0,094	<0,005
	1,043	0,986	1,307	0,876	0,099	<0,005
Traminac	1,623	0,875	3,157	0,350	0,106	0,009
	1,443	0,774	4,123	0,331	0,086	0,005
	1,534	0,821	3,572	0,399	0,076	<0,005
	0,935	1,069	2,180	0,214	0,121	0,007
	1,442	0,733	2,337	0,287	0,104	0,007
Vranac	0,963	1,140	2,926	0,201	0,096	0,006
	0,762	0,814	3,216	0,281	0,086	0,005
	0,933	0,910	2,426	0,193	0,077	0,006
Prokupac	1,528	1,438	2,364	0,698	0,068	0,006
	1,338	1,137	1,742	0,595	0,064	0,007
	1,223	0,938	2,554	0,447	0,083	0,008
	1,326	1,332	2,068	0,613	0,065	0,005
Fruit wines						
Cherry	0,575	3,152	6,065	0,358	0,187	0,011
	0,595	3,002	4,004	0,287	0,102	0,005
	0,483	2,782	4,534	0,266	0,147	0,006
	0,477	2,835	3,675	0,298	0,153	0,007
Rasbery	0,388	0,324	1,147	0,264	0,038	0,005
	0,344	0,302	1,237	0,327	0,068	<0,005
	0,372	0,287	1,402	0,269	0,059	<0,005
Blackberry	0,563	2,482	2,421	0,181	0,100	0,009
	0,611	2,683	2,712	0,176	0,091	0,007
	0,456	2,724	2,122	0,168	0,094	0,008
Blueberry	0,371	1,378	5,351	0,207	0,102	0,008

CONCLUSION

After samples preparation in two waves (by dilution and microwave digestion) and analyzing fruit wines and wines it was not determined statistically significant difference between these two methods of determination. Domestic fruit wines are a good source of oligoelements, as well as grape wines from the market. the advantage can be given fruit wines because of the lower ethanol content, making them suitable for the general population.