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and Summer School on Bioanalysis

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Foreword

It is our great pleasure to welcome you to the 14th International Symposium and Summer School on Bioanalysis (14th ISSSB) that will be mainly held at the SAS Congress Centre Smolenice between 28th of June and 6th of July 2014.

The event is organized in the frame of CEEPUS CIII-RO-0010-08-1314 network. The 14th ISSSB provides an overview of a broad range of interdisciplinary subjects in bioanalysis. Its main purpose is to offer an opportunity for young researchers to learn more about the current progress in the analytical techniques.

The symposium focuses on the application of bioanalytical methods in chemical and pharmaceutical research, and related topics. The scientific program will include oral lectures and poster presentations as well as practical courses on bioanalysis.

Bratislava, June 2014

Marián Masár
Symposium chair

LECTURES

L18

Influence of Vinification Practices on the Elements Concentration in Vranec wines studied by ICP-OES

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The presence of metals (i.e. Al, Zn, Cu, Fe, Pb) in wine is important for efficient alcoholic fermentation and for its sensorial characteristics (flavor, aroma, freshness). Certain metal ions, such as Fe, Cu and Mn participate in destabilization of wine and in their oxidative evolution, whereas Cu, Fe, Al, Zn and Ni contribute to haze formation and undesirable changes of aroma and taste. The element composition of the wines may be influenced by many factors such as elemental levels in the soil, fertilization practices, wine processing equipment and vinification [1,2].

In this study, Vranec wines produced with different maceration times (4, 7, 14 and 30 days) in presence of enzyme and oak chips during fermentation were studied in order to determine the influence of vinification conditions on the elements concentration. Analysis was performed with inductively coupled plasma – optical emission spectrometry (ICP-OES) for accurate determination of the concentration of 18 elements (Al, Ba, Bi, Ca, Cr, Cu, Fe, K, Li, Mg, Mn, Na, Ni, P, S, Sr, V, Zn). The results demonstrate that Mg and P increased during maceration, while the other elements content was not affected by the maceration time duration. Wines macerated for 7, 14 and 40 days, fermented in presence of oak chips showed highest content of Al, Ba, Fe, K, Mn, and P. The Student–Newman–Keuls test was applied to ascertain possible significant differences between the studied wines, and factor analysis was employed showing separation of the wines mainly according to the oak chips treatment.

References

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INFLUENCE OF VINIFICATION PRACTICES ON THE ELEMENTS CONCENTRATION IN VRANEC WINES STUDIED BY ICP-OES

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Aim of the work

1. **To analyse the elemental composition of Vranec wines**

2. **To study the influence of vinification conditions on the elements concentration**

- Applying ICP-OES for analyses

EXPERIMENTAL

Wine samples

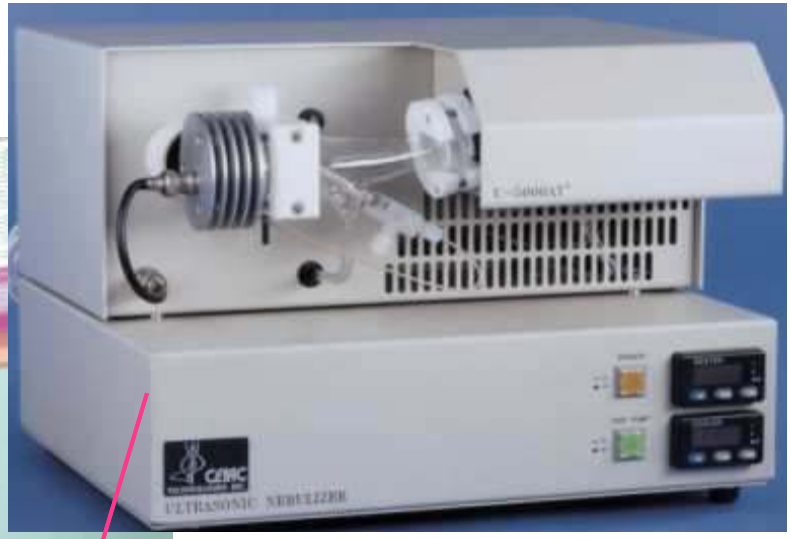
12 wine samples from Vranec variety

- **Different maceration time:**
  4, 7, 14 and 30 days

- **Application of:**
  - **Enzume**
  - **Oak chips**

ICP-OES analysis

Instrumental techniques for elements analysis



***CETAC* USNebulizer 5000+**

ICP-OES-Varian 715-ES

ICP-OES analysis

- wines were directly injected
- Varian 715-ES with *CETAC* USNebulizer 5000+

EXPERIMENTAL

Instrumentation and operating conditions for the ICP-OES (Varian, 715-ES) system

RF generator			
Operating frequency		**40.68 MHz free-running, air-cooled RF generator**	
Power output of RF generator		**700–1700 W in 50 W increments**	
Power output stability		**Better than 0.1 %**	
Introduction area			
Sample nebulizer		**V-groove**	
Spray chamber		**Double-pass cyclone**	
Peristaltic pump		**0–50 rpm**	
Plasma configuration		**Radially viewed**	
Spectrometer			
Optical arrangement		**Echelle optical design**	
Polychromator		**400 mm fo cal length**	
Echelle grating		**94.74 lines/mm**	
Polychromator purge		**0.5 l min^{-1}**	
Megapixel CCD detector		**1.12 million pixels**	
Wavelength coverage		**177 nm to 785 nm**	
Conditions for program			
RFG power	1.0 kW	Pump speed	**25 rpm**
Plasma Ar flow rate	15 l min^{-1}	Stabilization time	**30 s**
Auxiliary Ar flow rate	1.5 l min^{-1}	Rinse time	**30 s**
Nebulizer Ar flow rate	0.75 l min^{-1}	Sample delay	**30 s**
Background correction	**Fitted**	**Number of replicates**	**3**

RESULTS AND DISCUSSION

- 18 elements quantified in Vranec wines

Al, Ba, Bi, Ca, Cr, Cu, Fe, K, Li, Mg, Mn, Na, Ni, P, S, Sr, V and Zn

Elements	Al	As	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Li
LOD µg/L	0.25	10	0.5	1	0.5	0.1	1	1	0.25	0.12	100	1

Elements	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sr	Tl	V	Zn
LOD µg/L	0.5	0.03	4	50	5	10	10	50	0.5	10	1	0.06