DETERMINATION OF ORGANIC SELENIUM COMPOUNDS IN KRATOŠIJA WINE APPLYING HPLC-ESI-MS/MS

Violeta Ivanova-Petropulos[a]*, Elena Bogeva[a], Aleksandra Sentkowska[b]

[a]*Goce Delcev University, Faculty of Agriculture, 2000, Stip, Republic of N. Macedonia*, violeta.ivanova@ugd.edu.mk

[b]*Heavy Ion Laboratory, University of Warsaw, Pasteur Str. 5A, 02-093 Warsaw, Poland*

INTRODUCTION

Organic selenium compounds, specifically selenomethionine (SeMet) and Se-methylselenocysteine (MeSeCys) are the major selenium-containing amino acids in dietary sources. SeMet is a bioactive form of selenium with antioxidant properties, playing a significant role in cardiovascular health, autoimmune conditions, and the prevention of certain cancers, while Se-methylselenocysteine is a naturally occurring organoselenium compound found in certain plants and is known for its high peroral bioavailability in humans. Selenomethionine oxide (SeMetO) is the oxidized form of the amino acid selenomethionine and possesses a protective mechanism against oxidative stress.

In this study, for the first time, SeMet, SeMetO and MeSeCys were determined in Kratošija wines by applying a rapid and sensitive HPLC-ESI-MS/MS technique.

MATERIALS AND METHODS

Wine samples: **Kratošija** *Vitis vinifera* L.) grown in the Tikveš wine region, near town Kavadarci.

Winemaking: Wines were produced by inoculating two commercial *Saccharomyces cerevisiae* yeasts: 1 - Zymaflore™ Xpure (Laffort) and 2 - Lalvin ICV D80 (Lallemand) in order to study the effect of yeasts on the selenium compounds content in the final wines.

HPLC-ESI-MS/MS analysis:

Stationary phase: ZIC-HILIC column (100 x 2.1 mm, 3.5 µm)

Mobile phase: MeOH/water (85/15, v/v) in isocratic mode

Injection volume: 5µL

Limits of detection were established by succesive dilution of standard solution until no signal was observed.

RESULTS AND DISCUSSION

Table 1. Linear regression data

Selenium compounds	Linerity range (ppm)	LOD (ug/L)	LOQ (ug/L)	Slope	R^2
Se-methylselenocysteine (MeSeCys)	0.01- 25	0.100	0.200	444890	0.999
Selenomethionine (SeMet)	0.01- 25	0.100	0.300	903460	0.999
Selenomethionine oxide (SeMetO)	0.01- 25	0.100	0.200	853321	0.999

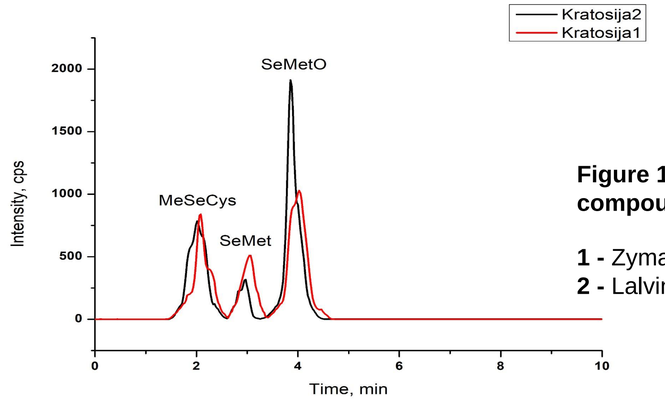

Figure 1. EIC of organic selenium compounds in Kratošija wines

1 - Zymaflore™ Xpure (Laffort)
2 - Lalvin ICV D80 (Lallemand)

Table 3. Content of organic selenium compounds in Kratošija wines

Selenium compounds	MeSeCys (ppm)	SeMet (ppm)	SeMetO (ppm)
Kratošija - 1	0.643 ± 0.0299	0.141± 0.003	2.79± 0.029
Kratošija - 2	0.729± 0.0343	0.242 ± 0.0189	1.72± 0.059

Results are average value of three repetitions ± SD

Kratošija

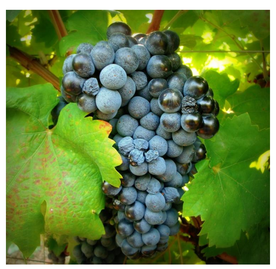

Table 2. MS/MS data

Selenium compounds	t_r(min)	MS (m/z) M^+	MS/MS (m/z) Fragment ion
MeSeCys	2.1	184	167.00; 94.95; 55.05
SeMet	3.4	198	181.00; 109.05; 56.00
SeMetO	4.2	212.90	148.95; 116.95; 85.05

CONCLUSION

- ✓ **Wine fermented with Lalvin ICV D80 contained higher amounts of SeMet and MeSeCys, probably due to a better ability of the yeast to transform the inorganic selenium into organic selenium compounds (especially selenomethionine).**
- ✓ **Both wines contained high levels of SeMetO, produced as a result of the oxidation of SeMet during wine fermentation and/or storage.**
- ✓ **The results obtained are preliminary and provide a basis for future studies using various varieties and vinification processes.**

ACKNOWLEDGEMNT - The work was supported by the CEEPUS HU-010 Network scholarship.