ОБРАЗЕЦ

До Универзитет „Гоце Делчев“ – Штип
Фонд за научно - истражувачка работа

Барање за финансирање на научно - истражувачки проект
Application form for financing of research projects

Дата на поднесување	
Проект Бр:	***(Се пополнува од Архивата на Универзитетот)***

Date of submission	
Project No:	***(Filled by the University authority)***

Наслов на проектот	**Хемиска карактеризација на вино, алкохолни пијалоци и храна со примена на инструментални техники**
Клучни зборови	**Хемиски состав, храна, вино, ракија, HPLC, ICP**
FRASCATI класификација	**1 Природно-математаички науки, 107 Хемија, 10702 Аналитичка хемија**

Proposal Title	**Chemical characterization of wine, alcoholic beverages and food by instrumental techniques**
Keywords	**Chemical composition, food, wine, spirit, HPLC, ICP**
FRASCATI classification	**1 Natural science and mathematics, 107 Chemistry, 10702 Analytical chemistry**

ПРВ ДЕЛ/PART 1:

Апстракт (максимум 250 зборови)

Хемиската карактеризација на храна и алкохолни пијалоци вклучува определување на својствата на храната и нејзиниот состав. Во последната декада се зголемуваат барањата на потрошувачите за консумација на безбедна храна. Производството на здрава и безбедна храна, вино и пијалоци, како и нивна контрола е една од целите на Р. Македонија и Европската унија. За исполнување на високите критериуми за квалитет на производите намети за извоз во ЕУ потребно е имплементација на современи методи за лабораториска контрола на различни контаминанти кои имаат негативно влијание врз човечкото здравје. Во овој предлог проект ќе бидат извршени анализи на различни примероци храна и алкохолни пијалоци, вклучувајќи ракија, вино, овошје и зеленчук. Ракиите ќе бидат произведени во домашни и индустриски услови, а вината ќе бидат произведени во винарска визба, но ќе бидат обезбедени од комерцијални вина. Хемиската карактеризација на примероците ќе вклучува определување на токсични метали, но и на биоактивни комоненти, како што се органски киселини, јаглехидрати, ароми и антиоксидантна активност. За таа цел ќе се применат неколку инстурментални техники: GFAAS, ICP-MS и HPLC-DAD-RID. Резултатите ќе бидат статистички обработени, вклучувајќи пресметување на средни вредности, стандардни девијации, Анализа на варијација (ANOVA), Студентов Newman-Keuls тест, Факторна анализа (FA) и Клатер анализа (CA) со цел да се утврдат можни разлики меѓу анализираните примероци.

Abstract (max 250 words)

Chemical characterization of food and beverages include analysis of the properties of foods and their constituents. In the last decated, the consumer demands for safety food, wine and alcoholic beverages are increased. Production of safety food, wine and spirits, as well as their control during the production is one of the policies of R. Macedonia and European Union. The high quality criteria for export on the EU markets results with need for implementation of up to date methods for laboratory control of various contaminants which have negative impact on the human health. In this project proposal, various food and alcoholic samples will be analyzed, including "rakija", wine, fruits and vegetables. Brandies will be produced in home and industrial conditions, while wines will be produced in a winery, but also commercial samples will be provided. Chemical characterization of the samples will include determination of toxic metal and bioactive compounds, such as organic acids, carbohydrates, aroma compounds and antioxidant activity. For that purpose, few instrumental techniques will be applied: GFAAS, ICP-MS and HPLC-DAD-RID. Results will be statistically processed, caluclating mean and standard deviation, and applying Analysis of variance (ANOVA), student's Newman-Keuls test, Factor analysis (FA) and Claster analysis (CA) in order to determine possible differences between the analyzed samples.

Details of the proposal:

Introduction

Chemical characterization of food and beverages include analysis of the properties of foods and their constituents. In the last decated, the consumer demands for safety food, wine and alcoholic beverages are increased. Production of safety food, wine and spirits, as well as their control during the production is one of the policies of R. Macedonia and European Union. The high quality criteria for export on the EU markets results with need for implementation of up to date methods for laboratory control of various contaminants which have negative impact on the human health.

Trace elements are considered as contaminants and information about the content of metals in brandies, wine and various foods (fruits, vegetables, processed food) is of great importance for producers and consumers for their health protection against toxic elements, as well as for the government authorities in order to guarantee the quality of the own traditional product. Trace elements concentration in distillates, wine and food produced around the world is a significant parameter with a positive or negative effect on the quality of the final product (Ivanova-Petropulos et al. 2013). From nutritional and toxicological points of view, elements are classified into essential and non-essential. Elements such as Ca, Cr, Co, K, Mg, Mn, Na Se and Zn are considered as essential elements for the human organism, while As, Cd and Pb are harmful elements because they are not chemically or biologically degradable (Ivanova-Petropulos et al. 2013).

Moreover, determination of a potentially bioactive compounds which posses antioxidant, antimicrobial and antibacterial properties is very important chemical characterization. Grapes are one of the world's largest and economically important fruit crops. Other fruits, such as apples, plums and berries play an important role in many worldwide cultures with its nutritional values as a fruit. Grapes, apples, berries and wine are rich sources of different compounds: bioactive polyphenols, organic acids, carbohydrates, aroma compounds, proteins etc. These compounds contribute to the physical characteristics of the fruit such as the color, the flavor and astringency of and therefore to the differences between different varieties of fruits. Moreover, organic acids are responsible for the chemical and microbial stability of the samples.

The traditional macedonina grape brandy "rakija" has never been analyzed in terms of heavy metals and aroma compounds. Moreover, there are no officially published data for the chemical characterization of various fruits and beverages. Therefore, the aim of this project proposal is two fold: (1) to determine the toxic chemical consitituents in various food samples (rakija, wine, fruits and vegetables) and (2) to determine the positive characteristics of the samples, such as antioxidant acitivity, phenolic profile, aroma composition, organic acids and carbohudrates profile.

Research Project

a) Aims

Considering the negative effects of toxic metals and compounds on the human health and on the food and beverages quality, as well as the positive effects of various bioactive compounds, the project objectives will be focused on a study of brandy samples, wines, fruits and vegetables produced in experimental conditions and bought from a market. Therefore, we propose the following systematic research tasks that will allow successful completion of the project:

1. **"Rakija" samples:** collecting "rakija" samples from private producers (home-made "rakija") and production of "rakija" in industrial conditions
2. **Wine samples:** including production of red and wihite wines from different varieties as well as commercial wine samples
3. **Collecting food samples** (fruits, vegetables).
4. **Determination of toxic elements in the samples** applying GFAAS and ICP-MS techiques.
5. **Determination of organic acids and carbohydrates** with HPLC-DAD-RID technique.
6. **Aroma characterization** by gas chromatography coupled with mass spectrometer (**GC-MS)**
7. **Determination of antioxidant activity**
8. **Dissemination** of the results

b) Methodology and research activities

"Rakija" samples: Three kinds of brandies (eight samples in total) will be produced with different technologies and will be subjected to analysis, as follows: three brandies home-made and stored in stainless steel tanks, five brandies produced by industrial distillation of which two aged in French oak barrels and three aged with different oak chips. In fact, aging of "rakija" in oak wood barrels or in the presence of oak chips in the tanks is traditionally used in Macedonia before the consumption in order to improve the intensity and complexity of the flavor and aroma of the brandy. Therefore, we decided to compare the elements content of brandy samples aged with and without oak. All brandies will be produced from wines of Vranec variety, except one brandy which will be produced from Muscat grapes (Muscat Temjanika and Muscat Ottonel). The industrial distillation will occurre in Elenov winery, Demir Kapija, Macedonia, using stainless steel and copper unit (1000 L capacity).

Wine samples: (1) Commercial wines: few white (Riesling, Chardonnay, Temjanika, Smederevka and Traminec) and red (Vranec, Merlot and Cabernet Sauvignon) wines from different *Vitis vinifera* L. grape varieties will be collected directly from the commercial wineries located in different wine regions in Macedonia. **(2) Experimental wines produced in winery**: Traditioanal way of wine production will be applied on grapes from various red and white varieties (Vranec, Cabernet Sauvignon, Merlot, Smederevka, Chardonnay, Temjanika). All grapes will be harvested at optimal maturity and transported to the winery. Then, grapes will be crushed, followed with addition of SO_2 and inoculation of yeast for fermentation. For red wine production, maceration time of 7-10 days will be applied, while for white wines, only 6-10 hours of maceration. During the fermentation, red wines will be "pumped over" two-three times a day. After the mechanical pressing, obtained wines will be transferred to tanks from stabilization and aging.

Food samples: Various food samples, including fruit and vegetable samples will be provided from the local producers and from a market place.

Determination of toxic elements in the samples with application of GFAAS and ICP-MS techniques: **(1) GFAAS method for trace elements in brandies -** a graphite furnace atomic absorption spectrometer will be used for determination of Cd, Pb, Cr and Ni in brandy samples without dilution, while Cu, Fe, Mn and Zn will be quantified after

appropriate dilution. Sample aliquots of 20 μL will be directly injected into the graphite tube and then a volume of 5 μL of chemical modifier will be added. Matrix modifiers will be used according to the recommendation of the instrument manufacturer (Ivanova-Petropulos et al., 2015a). **(2) ICP-MS method for trace elements in wine, fruits and vegetables** - for measurements of the elements contents in various samples, a microwave digestion will be applied for total digestion of the samples, followed by inductively coupled plasma with mass spectrometry analysis (Balabanova et al., 2015). Total digestion of the samples will involve digestion with mixture of HNO_3 and H_2O_2 in the microwave digestion system with controlled temperature and pressure conditions. A standard ICP-MS system with quadropol as mass analizator will be used for determination of total elements content. All elements will be measured under identical optimal condition for the given technique.

Determination of organic acids and carbohydrates: Organic acids in wine and fruit extracts will be determined at two ways in order to compared them, direct injection of the wine into the HPLC system and injection of the sample after performed solid-phase extraction (SPE). For SPE analysis, samples will be filtered and then subjected to solid-phase extraction cartage. The cartridges will be conditioned with methanol and water, followed by loading of the wine/fruit extract sample. Elution will be performed with buffered water. A volume of 10 μL of the eluate will be injected into the HPLC system for analysis of organic acids. A High Performance Liquid Chromatography (HPLC) system will be used for identification and quantification of organic acids in the samples. Separation of the analytes will be performed with isocratic elution on a C18 column, using a mobile phase of aqueous solution of H_3PO_4.

Aroma characterization: An automated headspace solid-phase microextraction (HS-SPME) combined with gas chromatography-mass spectrometry (GC-MS) will be used for extraction and enrichment of the volatile compounds from the investigated samples, followed by GC-MS analysis of the aroma compounds (Ivanova Petroplos et al., 2014). The following SPME fiber will be used: DVB/Carboxen/PDMS 50/30, 2 cm stable flex. Prior to the volatiles extraction, the samples will be equilibrated in the oven of the autosampler at 40°C for 5 minutes. The SPME fiber will be exposed into the headspace of the sample for 20 minutes at 40°C. Immediately after the exposure, the fiber will be transferred to the GC-injector. GC-MS analysis will be performed on an analytical column of medium polarity (HP5MS, 30m*0,25mm*1μm). The mass selective detection will be performed in the scan mode.

Antioxidant activity: Antioxidant activity of wines and fruit samples will be determined as a radical scavenging ability following the procedure described by Brand-Williams et al. (1995) Results will be expressed as mg Trolox equivalent/L (TE/L) (Ivanova-Petropulos et al., 2015b).

Statistical analysis: All analyses will be performed in triplicates. Different statistical treatments, including means, standard deviations, one-way ANOVA, Student–Newman Keuls test, Factor Analysis and Cluster Analysis will be applied STATISTICA 6.0 (StatSoft Inc., USA) software package. Significant difference will be considered statistically at the level of $p < 0.05$.

Dissemination: Dissemination of the results will include:

(a) Involvement of young researchers, who will be trained to use the instrumentation, to analyze various food samples and discuss the results. That will provide extending of their knowledge and experience, ability to plan and advice on future scientific activities.

(b) Writing and publishing scientific papers in international journals with impact factor and presenting results on international conferences.

(c) Collaboration with wineries, private produces and practical application of the results of the project.

c) Research work plan

Research and project activities are divided into the following thirds of the year:

Third 1, 2017: (1) Initial activities, meeting with the project participants and organizing the further activities; (2) collecting rakija, wine, fruits and vegerables.

Third 2, 2017: Chemical analyses of the samples, including: (1) GFAAS analysis of brandies; (2) GC-MS analysis of various food samples; (3) HPLC analysis of organic acids in wine

Third 3, 2017: (1) Wine-making; (b) meeting with project participants, discussion for the obtained results and make arrangements for further activities.

Third 1 amd 2, 2018: (1) GC-MS analysis of wine; (2) ICP-MS analysis of various samples

Third 3, 2018: (1) Discussion for the obtained results, preparation of scientific papers for presentation at scientific conferences; (2) Writing and submitting papers for publication in scientific international journals with impact factor; (3) Writing the Final Report of the project.

References:

Balabanova B., Boev B., Mitrev S., Ivanova-Petropulos V. (2015). Method for determination of 35 elements content in various samples with application of microwave digestion and inductively coupled plasma with mass spectrometry (ICP-MS). Yearbook of Faculty of Agriculture, 13, 99-112.

Ivanova-Petropulos V., Wiltsche H., Stafilov T., Stefova M., Motter H., Lankmayr E. (2013). Multi-element analysis of Macedonian wines by inductively coupled plasma–mass spectrometry (ICP–MS) and inductively coupled plasma–optical emission spectrometry (ICP–OES) for their classification. *Macedonian Journal of Chemistry and Chemical Engineering,* 32(2) 265-281.

Ivanova Petropulos V., Bogeva E., Stafilov T., Stefova M., Siegmund B., Pabi N., Lankmayr E. (2014). Study of the influence of maceration time and oenological practices on the aroma profile of Vranec wines. *Food Chemistry*, 165, 506-514.

Ivanova-Petropulos V., Jakabová S., Nedelkovski D., Pavlík V., Balážová Ž., Hegedűs O. (2015a). Determination of Pb and Cd in Macedonian wines by electrothermal atomic absorption spectrometry (ETAAS). *Food Analytical Methods*, 8, 1947-1952.

Ivanova-Petropulos V., Ricci A., Nedelkovski D., Dimovska V., Parpinnelo G.P., Versari A. (2015b). Targeted analysis of bioactive phenolic compounds and antioxidant activity of Macedonian red wines. *Food Chemistry*, 171, 414-420.

ВТОР ДЕЛ/PART 2:
Истражувачки тим:

Главен истражувач:

Име и презиме	**Виолета Иванова-Петропулос**
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Кратка биографија:
Родена на 22.08.1978 во Скопје, Р. Македонија
Образование:
2006-2009: Доктор на хемиски науки (област енохемија и енологија), Природно-математички факултет, Универзитет "Св. Кирил и Методиј", Скопје
Наслов на докторска дисертација: *"Разработка на методи за идентификација и квантификација на фенолни супстанци во вино и грозје со примена на спектрофотометрија, течна хроматографија и масена спектрометрија"*
2002-2006: Магистер на хемиски науки, Природно-математички факултет, Универзитет "Св. Кирил и Методиј", Скопје
1997-2002: Дипломиран професор по хемија, Природно-математички факултет, Универзитет "Св. Кирил и Методиј", Скопје.

Работно искуство:
2015 - тековно: Вонреден професор на Универзитет "Гоце Делчев", Земјоделски факултет – Штип, по предметите: Сензорна и аналитичка евалуација на вино, Енологија, Хемија, Аналитичка хемија и Биохемија.
2010 - 2015: Доцент на Универзитет "Гоце Делчев", Земјоделски факултет – Штип, по предметите: Сензорна и аналитичка евалуација на вино, Енологија, Хемија, Аналитичка хемија и Биохемија.
2005-2010: Асистент на Земјоделски институт – Скопје, Одделение за винарство, одговорна за аналитичка евалуација на вина со примена на инструментални методи (течна и гасна хроматографија, спектрофотометрија), како и анализа за вина за контрола на квалитет според стандардни OIV методи.

Други активности:
2008-2011: учесник во проект - FP7 проект CHROMLAB-ANTIOXIDANT Засилување на истражувачкиот капацитет на земјите од западен балкан за карактеризација на квалитет на храна" под раководство на проф. д-р Марина Стефова, Природно-математички факултет-Скопје.

Студиски престои во странство:

1.	16.06.2016-16.07.2016	Институт за Аналитичка хемија и хемија на храна, Технолошки Универзитет на Грац, Грац, **Австрија** Institute for Analytical Chemistry and Food Chemistry, Graz University of Technology, Graz, **Austria**
2.	19.10.2016-25.10.2016	Природно-математички факултет, Универзитет во Ниш, Ниш, Србија Faculty of Natural Sciences and Mathematics, University of Nis, Nis, **Serbia**
3.	06.09.2015-13.09.2015	Оддел за хемија, Факултет за хемија и неорганска хемија,

		Универзитет Бабеш-Бојаи, Клуж Напока, Романија Faculty of Chemistry and Chemical Engineering, Babes-Bolyai University, Cluj-Napoca, **Romania**	
4.	20.06.2015-18.07.2015	Институт за Биоанализа, Факултет за Медицина, Универзитет во Печ,Печ, Унгарија Institute of Bioanalysis, Medical School, University of Pecs, Pecs, **Hungary**	
5.	27.10.2014-07.11.2014	Природно-математички факултет, Универзитет на Приштина, **Косово** Faculty of Mathematics and Natural Sciences, University of Prishtina **Kosovo**	
6.	01.06.2014-01.07.2014	Институт за Аналитичка хемија и хемија на храна, Технолошки Универзитет на Грац, Грац, **Австрија** Institute for Analytical Chemistry and Food Chemistry, Graz University of Technology, Graz, **Austria**	
7.	20.01.2014-21.02.2014	Универзитет во Болоња, Оддел за Земјоделски науки и науки на храна, Чезена, **Италија** University of Bologna, Department of Agricultural and Food Sciences (DISTAL), Cesena, **Italy**	
8.	10.08.2013-17.08.2013	Institute of Analytical Chemistry, Faculty of Chemistry and Mineralogy, University of Leipzig, **Germany** Институт за Аналитичка хемија, Факултет за хемија и минерологија, Универзитет во Лајпциг, **Германија**	
9.	01.06.2013–05.07.2013	Faculty of Natural Sciences, Constantine the Philosopher University in Nitra, **Slovakia** Факултет за природни науки, Универзитет Константин Филозофот, Нитра, **Словачка**	
10.	02.12.2012 – 14.12.2012	Институт за Аналитичка хемија, Факултет за хемија и минерологија, Универзитет во Лајпциг, **Германија** Institute of Analytical Chemistry, Faculty of Chemistry and Mineralogy, University of Leipzig, **Germany**	
11.	08.06.2012 – 08.07.2012	Институт за Аналитичка хемија и хемија на храна, Технолошки Универзитет на Грац, Грац, **Австрија** Institute for Analytical Chemistry and Food Chemistry, Graz University of Technology, Graz, **Austria**	
12.	02.01.2012 –19.02.2012	Оддел за Аналитичка хемија, Природно-математички факултет, Универзитет во Печ, Печ, **Унгарија**	
13.	10.05.2009 – 30.7.2009	Оддел за Аналитичка хемија, Природно-математички факултет, Универзитет во Печ, Печ, **Унгарија**	
14.	20.09.2008 – 16.12.2008	Оддел за Енологија, ИНРА-Француски Национален Институт за истражувања од област на агрономија, Монпеље, **Франција**	
15.	01.02.2008 – 01.04.2008	Оддел за Аналитичка хемија, Природно-математички факултет, Универзитет во Печ, Печ, **Унгарија**	
16.	08.05.2006 – 02.06.2006	Институт за Енологија во Асти, и Конзорциум за Енологија, Асти, **Италија**	

Виолета Иванова Петропулос е рецензент на 100-тина трудови поднесени за публикување во следниве SCI интернационални списанија: Food Chemistry, Food Research International, Food Analytical Methods, Food and Bioprocess Technology, Food Control, Journal of Agricultural and Food Chemistry, Journal of Food Science, Journal of Food Quality, Journal of Herbs Spices & Medicinal Plants, Journal of the Serbian Chemical Society, European Food Research and Technology, Environmental engineering and management journal, Agriculturae Conspectus Scientificus, Macedonian Journal of Chemistry and Chemical Engineering, Italian Journal of Food Science.

Виолета Иванова Петропулос е член на уредувачкиот научен одбор на меѓународните списанија *Food Research International* (**IF=3.15**) и *Journal of Food Research (Canadian Center of Science and Education).*

Трудови објавени во последните 5 години во стручни списанија кои се наоѓаат на меѓународно признатата листа СЦИ (SCI - Science citation index), со назначен импакт фактор за секој труд:

1. Tašev K., Stefova M., **Ivanova-Petropulos V.** (2016). HPLC method validation and application for organic acids analysis in wine after solid-phase extraction**.** *Macedonian Journal of Chemistry and Chemical Engineering*, **accepted for publication** (**Impact factor = 0.44**).
2. **Ivanova-Petropulos V.**, Balabanova B., Bogeva E., Frentiu T., Ponta M., Senila M., Gulaboski R., Dan Irimie F. (2016). Rapid determination of trace elements in Macedonian grape brandies for their characterization and safety evaluation. *Food Analytical Methods*, **in press (Impact factor = 2.167)**.
3. Tašev K., **Ivanova-Petropulos V.**, Stefova M. (2016). Optimization and validation of a derivatization method for analysis of biogenic amines in wines using RP-HPLC-DAD. *Macedonian Journal of Chemistry and Chemical Engineering*, 35(1), 19-28 (**Impact factor = 0.44**).
4. **Ivanova-Petropulos V**., Durakova S., Ricci A., Parpinnelo G.P., Versari A. (2016). Extraction of natural occurring bioactive compounds and change in antioxidant capacity of Macedonian red wines during vinification. *Journal of Food Science and Technology*, 53(6) 2634-2643 (**Impact factor = 2.20**).
5. **Ivanova-Petropulos V**., Balabanova B., Mitrev S., Nedelkovski D., Dimovska V., Gulaboski R. (2016). Optimization and validation of a microwave digestion method for multi-element analysis of Vranec wines. *Food Analytical Methods*, 9, 48-60 **(Impact factor = 1.956)**.
6. **Ivanova-Petropulos V**., Mitrev S, Stafilov T., Markova N., Leither E., Lankmayr E., Siegmund B. (2015). Characterization of traditional Macedonian edible oils by their fatty acid composition and their volatile compounds. *Food Research International*, 77, 506-514 **(Impact factor = 2.818)**.
7. **Ivanova-Petropulos V**., Jakabová S., Nedelkovski D., Pavlík V., Balážová Ž., Hegedűs O. (2015). Determination of Pb and Cd in Macedonian wines by electrothermal atomic absorption spectrometry (ETAAS). *Food Analytical Methods*, 8, 1947-1952 **(Impact factor = 1.802)**.
8. **Ivanova-Petropulos V**., Ricci A., Nedelkovski D., Dimovska V., Parpinnelo G.P., Versari A. (2015). Targeted analysis of bioactive phenolic compounds and antioxidant activity of Macedonian red wines. *Food Chemistry*, 171, 414-420 (**Impact factor = 3.259**).
9. **Ivanova-Petropulos V**., Hermosín-Gutiérrez I., Boros B., Stefova M., Stafilov T., Vojnoski B., Dörnyei Á., Kilár F. (2015). Phenolic compounds and antioxidant activity of Macedonian red wines. *Journal of Food Composition and Analysis*, 41, 1-41 (**Impact factor = 2.259**).
10. **Ivanova Petropulos V.,** Bogeva E., Stafilov T., Stefova M., Siegmund B., Pabi N., Lankmayr E. (2014). Study of the influence of maceration time and oenological practices on the aroma profile of Vranec wines. *Food Chemistry*, 165, 506-514 (**Impact factor = 3.33)**.
11. **Ivanova Petropulos V.,** Dörnyei Á, Stefova M., Stafilov T., Vojnoski B., Márk L., Hermosín-Gutiérrez I., Kilár F. (2014). **Application of a Novel Small-Scale Sample Cleanup Procedure Prior to MALDI-TOF-MS for Rapid Pigment Fingerprinting of Red Wines**. *Food Analytical Methods*, 7(4) 820-827 (**Impact factor = 1.802)**.
12. **Ivanova-Petropulos V.**, Wiltsche H., Stafilov T., Stefova M., Motter H., Lankmayr E. (2013). Multi-element analysis of Macedonian wines by inductively coupled

plasma–mass spectrometry (ICP–MS) and inductively coupled plasma–optical emission spectrometry (ICP–OES) for their classification. *Macedonian Journal of Chemistry and Chemical Engineering,* 32(2) 265-281 (**Impact factor = 0.821)**.

13. **Ivanova V**., Stefova M., Vojnoski B., Stafilov T., Bíró I., Bufa A., Felinger A., Kilár F. (2013). Volatile composition of Macedonian and Hungarian wines assessed by GC-MS. *Food and Bioprocess Technology,* DOI: 10.1007/s11947-011-0760-y, 6(6) 1609-1617 (**Impact factor =3.703**).
14. Dimovska V., Beleski K., Boskov K., **Ivanova V.**, Ilieva F. (2013). Comparison of three Chardonnay clones (*Vitis vinifera* L.) growing in Skopje' vineyard region, R. Macedonia. *International Journal of Agronomy and Plant Production*, 4(6), 1143-1147 **(IF- GIF = 0.467)**.
15. Kostadinović S., Wilkens A., Stefova M., **Ivanova V**., Vojnoski B., Mirhosseini H., Winterhalter P. (2012). Stilbene levels and antioxidant activity of Vranec and Merlot wines from Macedonia: effect of variety and enological practices. *Food Chemistry*, 135, 3003-3009, http://dx.doi.org/10.1016/j.foodchem.2012.06.118 (**Impact factor = 3.655)**.
16. **Ivanova V**., Stefova M., Stafilov T., Vojnoski B., Bíró I., Bufa A., Kilár F. (2012). Validation of a method for analysis of aroma compounds in red wine using liquid-liquid extraction and GC-MS. *Food Analytical Methods*, 5, 1427-1434, DOI: 10.1007/s12161-012-9401-y (**Impact factor =1.943**).
17. **Ivanova V**., Vojnoski B., Stefova M. (2012). Effect of winemaking treatment and wine aging on phenolic content in Vranec wines. DOI: 10.1007/s13197-011-0279-2, *Journal of Food Science and Technology*, 49(2) 161-172 (**Impact factor =1.123**).

Учество во научноистражувачки проекти:

Наслов на проектот	**Период**	**Финансиран од:**	**Улога во проектот (главен истражувач или учесник**
CEEPUS (Central European Exchange Program for University Studies-Централна европска орограма за размена за универзитетски студии) CII-HU-0010-01-0607	**2006-тековно**	**Европска Унија**	***Соработник истражувач***
„Класификација на вина преку определување на биоактивни фенолни соединенија со примена на масена спектрометрија со висока резолуција“	**2016-2018**	**Министерство за образование и наука, Р. Македонија, билатерален проект со Австрија**	***Главен истражувач, носител на проект***
„Биогени амини и ароми во вина Вранец од Македонија и Црна Гора и влијание на јаболково-млечната ферментација на нивното формирање“	**2016-2018**	**Министерство за образование и наука, Р. Македонија, билатерален проект со Црна Гора**	***Главен истражувач, носител на проект***
„Сензорски мрежи за надгледување и контрола на производство на вино“	**2014-2016**	**Фонд за научно-истражувачка работа на УГД**	***Учесник - истражувач***
„Полифенолен и ароматичен профил на вина од сортата Вранец ферментирани со изолирани квасци од Тиквешкото виногорје“	**2013-2015**	**Фонд за научно-истражувачка работа на УГД**	***Главен истражувач, носител на проект***

„Металокомплексирачки и антиоксидативни особини на нови деривати на Coenzyme Q-10“	**2013-2015**	**Фонд за научно-истражувачка работа на УГД**	***Учесник - истражувач***	
“Карактеризација и определување на географското потекло на македонските вина со примена на хемиски методи и метода на стабилни изотопи”	**од 01.10.2010 до 30.09.2012**	**Министерство за образование и наука, Р. Македонија**	***Учесник - истражувач***	
FP7 Project CHROMLAB-ANTIOXIDANT: Reinforcement of the WBC research capacities for food quality characterization (FP7), (Засилување на истражувачките капацитети на земјите од Западен Балкан за карактеризација на квалитет на храна)	**од 01.09.2008 до 27.12.2010**	**Европска Унија**	***Учесник - соработник истражувач***	
Quality and Regulatory Infrastructure Development for Food Safety & Quality in Macedonia – Квалитет и развој на регулаторната инфраструктура за безбедност на храна и квалитет во Македонија	**2009-2011**	**Шведска амбасада - Скопје**	***Учесник - соработник***	

Задолженија во предлог-проектот со временска рамка:

Во текот на двете години:

1. Да ги координира и организира активностите во рамките на проектот (*за време на целиот период на траење на проектот*),
2. Да ги следи и контролира анализите на вино, алкохолни пијалоци, овошје и зеленчук со примена на инструментални техники (*за време на целиот период на траење на проектот*),
3. Да ги обучува и следи младите истражувачи во текот на активностите на проектот, применувајќи ги најсовремените техники за анализа (*за време на целиот период на траење на проектот*),
4. Да учествува во пишување на научни трудови и нивно објавување во научни списанија и учество на научни конференции (*Третина 3, 2017 и Третина 3, 2018 год*),
5. Да подготвува извештаи од проектот (*на крајот од првата и втората година*).

Истражувач:

Име и презиме	**Биљана Балабанова**
Титула	**Доктор на хемиски науки**
Позиција	**Доцент, Универзитет "Гоце Делчев"-Штип, Земјоделски факултет**
Адреса	**ул. Крсте Мисирков бб. 2000 Штип, Р. Македонија**
Тел / Факс:	**++389 32 550 612**
e-mail	**biljana.balabanova@ugd.edu.mk**

Кратка биографија:
Родена на 08.11.12 г. во Штип, Р.Македонија;
Образование и обуки:
2001-2006- Прв циклус на студии-Институт за Биологија;
2008-2010 - Втор циклус на студии-Институт за Хемија (Оддел за физичка хемија-атомска спектрометрија);
2011-2014 – Трет циклус на студии- Институт за Хемија (Оддел за физичка хемија-атомска спектрометрија)

Обуки и работно искуство:
2009 Инсталација и обука за работа на ICP-MS, модел 7500- Agilent, Фармахем, Скопје, Р.Македонија;
2007-2012- Помлад асистент во областа хемија на земјиште Универзитет „Гоце Делчев", Земјоделски факултет
2012-Асистент во областа хемија на земјиште, Универзитет „Гоце Делчев", Земјоделски факултет
2015- Доцент во областа хемија на земјиште, Универзитет „Гоце Делчев", Земјоделски факултет
2007- Хемиски аналитичар при Лабораторијата за заштита на растенијата и животната средина-Оддел за истражување на животната средина.
Познавање на странски јазик: Англиски – разбирање (C2), Говор (C2), Пишување (C2) (самопроцена); Организациски способности: Висока организациска способност, способност за тимска работа, способност за извршување на повеќе задачи паралелно; Технички особености: Одличен оратор, со извонредни презентерски способности; Одлично познавање и користење на: Windows XP/2007, MS Office (Excel, Word, Power Point), Adobe Photoshop, Corel Draw, Statistics software-Statistica 8.0.

Трудови објавени во последните 5 години, со назначен импакт фактор за секој труд според JSR датабазата на Thomson Routers (доколку трудот е објавен во списание со импакт фактор)

1. **B. Balabanova,** T. Stafilov**,** R. Šajn**,** C. Tănăselia (2016). Multivariate extraction of dominant geochemical markers for 69 elements deposition in Bregalnica river basin, Republic of Macedonia (moss biomonitoring). *Environmental Science and Pollution Research*, 23:22852–22870. **IF-2.76.**
2. **B. Balabanova**, T. Stafilov, R. Šajn, C. Tănăselia (2016). Long-term geochemical evolution of lithogenic vs. Anthropogenic distribution of macro and trace elements in household attic dust. *Archives of Environmental Contamination and Toxicology,* (doi:10.1007/s00244-016-0336-y) **IF-2.039.**
3. **B. Balabanova**, T. Stafilov, R. Šajn, K. Bačeva Andonovska (2016). Quantitative assessment of metal elements using moss species as biomonitors in downwind area of lead-zinc mine. *Journal of Environmental Science and Health Part A* (in press)

IF-1.01.

4. B. Balabanova, T.Stafilov, R. Šajn, C. Tănăselia (2016). Geochemical hunting of lithogenic and anthropogenic impacts on polymetallic distribution (Bregalnica river basin, Republic of Macedonia). *Journal of Environmental Science and Health Part A,* 15(13) 1180-1194, **IF-1.01.**
5. V. Ivanova-Petropulos, **B. Balabanova,** S. Mitrev, D. Nedelkovski, V. Dimovska, R. Gulaboski (2016) Optimization and Validation of a Microwave Digestion Method for Multi-element Characterization of Vranec Wines. Food Analytical Methods, 9: 48. **IF-2.167**
6. **B. Balabanova,** T. Stafilov**,** R. Šajn**,** C. Tănăselia (2016). Multivariate factor assessment for lithogenic and anthropogenic distribution of trace and macro elements in river water from Bregalnica river basin, R. Macedonia. Macedonian Journal of Chemistry and Chemical Engineering, 35 (2) 1-16. **IF-0.4**
7. S. Angelovska, T. Stafilov, R. Šajn, **B. Balabanova** (2016). Geogenic and anthropogenic moss responsiveness on lithological elements distribution around Pb-Zn ore deposit. *Archives of Environmental Contamination and Toxicology,* 70: 487. **IF-2.039**
8. **Balabanova, B.,** Stafilov, T., Baceva, K. (2015) Bioavailability and bioaccumulation characterization of essential and heavy metals contents in *R. acetosa, S. oleracea and U. dioica* from copper polluted and referent areas. *Journal of Environmental Health Science & Engineering*, 13 (2) 1-13 **IF-0.129.**
9. **Balabanova, B.,** Stafilov, T., Sajn, R. (2015). Lithological distribution of rare earth elements in automorphic and alluvial soils in the Bregalnica river basin. *Macedonian Journal of Chemistry and Chemical Engineering*, 34(1). **IF-0.4.**
10. **Balabanova, B.,** Stafilov, T., Sajn, R., Baceva, K. (2014) Comparison of response of moss, lichens and attic dust to geology and atmospheric pollution from copper mine. *International Journal of Environmental Science and Technology*, 11 (2). pp. 517-528. **IF-2.344.**
11. **Balabanova, B**., Stafilov, T., Šajn, R., Bačeva, K. 2012: Characterisation of Heavy Metals in Lichen Species *Hypogymnia physodes* and *Evernia prunastri* due to Biomonitoring of Air Pollution in the Vicinity of Copper Mine, *International Journal of Environmental Research*, 6(3). **IF-0.992.**

Учество во научноистражувачки проекти:

Наслов на проектот	**Период**	**Финансиран од:**	**Улога во проектот (главен истражувач или учесник**
Characterization of heavy metals contents in different plant foods from polluted sites and their impact in food chain.	**2016-2017**	**МОН**	**Раководител**
Biogenic aminies and aroma in Vranec wines from Macedonia and Montenegro and effect of malolactic fermentation on their formation.	**2016-2017**	**МОН**	**Истражувач**
Developing OER and Blended Modules for Agriculture and Rural Development,	**2015-2017**	**Erasmus+ KA202 Project.**	**Истражувач**

Задолженија во предлог-проектот со временска рамка:

Прва година:

1. Да учествува во изведување на спектрометриската анализа за определување на содржината на хемиски елементи во различни примероци.

Втора година:

1. Да учествува во изведување на спектрометриската анализа за определување на содржината на хемиски елементи во различни примероци.
2. Статистичка обработка на податоците, вклучувајќи Факторна анализа, ANOVA, Кластер анализа
3. Да учествува во пишување на научни трудови и нивно објавување во научни списанија и научни манифестации.

Истражувач:

Име и презиме	**Саша Митрев**
Титула	**Доктор на земјоделскинауки**
Позиција	**Редовен професор**
Адреса	**Крсте Мисирков 10-А Штип**
Тел / Факс:	**032 550 610**
e-mail	**sasa.mitrev@ugd.edu.mk**

Кратка биографија:
Роден на 29.05.1965 во Штип.

- Магистрирал во 1993 година на Земјоделскиот факултет на Универзитетот во Нови Сад по што се запишал на докторски студии на Земјоделскиот факултет во Скопје каде што успешно ја одбранил докторската дисертација во 1998 година. Основна научна област му е фитопатологија, бактериологија и вирологија. Во својата работна кариера бил државен секретар во МЗШВ, Професор по фитопатологија на Факултетот за Земјоделски науки и храна при Универзитетот Св. Кирил и Методиј во Скопје, Директор на Институтот за Јужни земјоделски култури во Струмица, а од 2007 година работи и твори како Ректор на Универзитетот „Гоце Делчев“ во Штип.
- Во својата повеќегодишна научна кариера имал повеќе научни престои во странство и учествувал на голем број конгреси и советувања во земјава и во странство: 13-15 November 2005 EESNET - Association for Seed and Planting Material - Sofia, Bulgaria The 5th Annual Eastern Europe Seed Network; 06 - 11 Maj 2004, ISTA - Нови Сад, Србија и Црна Гора, Контрола на здравствената состојба на семенскиот материјал; 07 - 21 Октомври 2003, Egyiptian International Center for Agriculture - Dokki, Giza – Egypt, Работилница Современо земјоделско производство; Повеќе години бил член на различни комисии од областа на земјоделието: 2002 – 2005, ЈНУ Институт за земјоделие, Скопје, надворешен член (учество во проекти, научни истражувања); 1995-2006 Министерство за земјоделие, шумарство и водостопанство, Скопје, Член на комисијата за заштита на растенијата, Утврдување на болести во разни локалитети во Македонија; Препораки за нивно спречување и сузбивање; 2001 – 2006 (неколку мандата) Министерство за земјоделство, шумарство и водостопанство, Скопје, Член на комисија за одобрување на сорти од поледелски и градинарски растенија.

Трудови објавени во последните 5 години, со назначен импакт фактор за секој труд според JSR датабазата на Thomson Routers (доколку трудот е објавен во списание со импакт фактор)

1. Boev I., Šorša, A., Kovacevik, B., **Mitrev S.,** Boev B. (2016) The use of factor analysis to distinguish the influence of parent material, mining and agriculture on groundwater composition in the Strumica valley, Macedonia. *Geologica Croatica*, 69 (2). pp. 245-253. ISSN 1333-4875 **(Impact factor = 0.625)**.
2. Balabanova B., Karov I., **Mitrev S.** (2016) *Comparative analysis for macro and trace elements content in goji berries between varieties from China and R. Macedonia.* Agricultural Science and Technology, 8 (1). pp. 79-84. ISSN 1313-8820
3. Ivanova-Petropulos V., Balabanova B., **Mitrev S.**, Nedelkovski D., Dimovska V., Gulaboski R. (2016). Optimization and validation of a microwave digestion method for multi-element analysis of Vranec wines. *Food Analytical Methods*, 9, 48-60 **(Impact factor = 1.956)**.
4. Ivanova-Petropulos V., **Mitrev S**., Stafilov, T., Markova N., Leitner E., Lankmayr E., Siegmund B. (2015) Characterisation of traditional Macedonian edible oils by their

fatty acid composition and their volatile compounds. *Food Research International*, 77, 506-514. **(Impact Factor = 2.82)**.

5. Markova Ruzdik N.,Valcheva D., Mihajlov Lj., **Mitrev S.,** Karov I., Ilieva V. (2015). The influence of environment on yield and yield components in two row winter barley varieties. *Bulgarian Journal of Agricultural Science*, 21(4), 863-871. ISSN 1310-0351 **(Impact Factor = 0.136).**
6. Kostadinovska E., Quaglino F., **Mitrev S.,** Casati P., Bulgari D., Bianco P. A. (2014). Multiple gene analyses identified distinct 'bois noir' phytoplasma genotypes in the Republic of Macedonia. *Phytopathologia Mediterranea*, 53(3), 491-501. **(Impact factor = 1.293)**.
7. Kostadinovska E., **Mitrev S.,** Casati P., Bulgari D., Atilio Bianco P. (2014). First Report of Grapevine virus A (GVA) and Grapevine fleck virus (GFkV) in the Former Yugoslav Republic of Macedonia. *Plant Disease*. 98, 1747 ISSN 0191-2917 **(Impact factor = 3.02)**.
8. Gulaboski R., Bogeski I., Mirčeski V., Saul S., Pasieka B., Haeri H.H., Stefova M., Petreska Stanoeva J., **Mitrev S.**, Hoth M., Kappl R. (2013). Hydroxylated derivatives of dimethoxy-1,4-benzoquinone as redox switchable earth-alkaline metal ligands and radical scavengers. *Nature Scientific Reports*, 3 1-8 (**Impact Factor = 5.578**).
9. Gulaboski R., Mirceski V., **Mitrev S.** (2013). Development of a rapid and simple voltammetric method to determine the total antioxidative capacity of edible oils. *Food Chemistry* 138, 116-121. (**Impact Factor = 3.391**).
10. **Mitrev S.,** Kostadinovska E. (2013). Wild pear - *Pyrus pyraster* as a new host of *Erwinia amylovora* in Macedonia. *Journal of Plant Pathology*. 95, 167-170. **(Impact Factor: 0.91)**.
11. Gulaboski R., Kokoskarova P., **Mitrev S.** (2012). Theoretical aspects of several successive two-step redox mechanisms in protein-film cyclic staircase voltammetry. *Electrochimica Acta*, 69, 86-96. (**Impact Factor = 4.504**).
12. Gjorgieva D., Kadifkova-Panovska T., **Mitrev S.**, Kovacevik B., Kostadinovska E., Bačeva K. Stafilov T. (2012): Assessment of the genotoxicity of heavy metals in Phaseolus vulgaris L. as a model plant system by Random Amplified Polymorphic DNA (RAPD) analysis. *Journal of Environmental Science and Health, Part A* (2012) 47, 366-373. **(Impact Factor: 1.164).**

Учество во научноистражувачки проекти:

Наслов на проектот	**Период**	**Финансиран од:**	**Улога во проектот (главен истражувач или учесник**
„Класификација на вина преку определување на биоактивни фенолни соединенија со примена на масена спектрометрија со висока резолуција"	2016-2018	МОН, билатерален проект со Австрија	*Учесник*
„Полифенолен и ароматичен профил на вина од сортата Вранец ферментирани со изолирани квасци од Тиквешкото виногорје"	2013-2015	Фонд за научно-истражувачка работа на УГД	*Учесник*
Integrated selection, protection and promotion of Balkan forest genetic resources with aesthetic values - ISPROP FORGEN.	2013-2015		*Главен истражувач*
Selection, protection and promotion of Balkan food forest species – FOOD FOREST PARKS	2013-2014		*Главен истражувач*
COST Action FAO807 Integrated	2009-		*Учесник*

Management of Phytoplasma Epidemics in Different Crop System	2013		
SM-511355-2010 IPA 2009 Higher Education and Society Building Capacity for Structural Reform in Higher Education of Western Balkan Countries	2010 – 2013	Tempus	*Учесник*
Using local resources for micro-regional development – sustainable agribusiness and tourism in the southern Balkan	2010-2013		*Учесник*
Western Balkan Rural Extension Network through Curriculum Reform	2009 - 2012	Tempus	*Учесник*
Survey of biodiversity and regional distribution of parasitic oronachaceae on the Balkans	2009 - 2012		*Учесник*
Integrated Selection, Protection and Promotion of Balkan Forest Genetic Resources with Aesthetic Values, Cross border Coperation program with Greece.	2011 - 2013		*Главен истражувач*
Bridging Universities and Business for Enhancing Employability Skills for Students	2011 – 2012		*Главен истражувач*
Partnership Agreement with the Bulgaria – Republic of Macedonia IPA Cross-border Programme	2011 - 2012		*Главен истражувач*
Diagnostic, control and protection of grapevines and spontaneos plants from phytoplasmas	2010 - 2012		*Главен истражувач*
Organic agriculture – an opportunity for Republic of Macedonia's East Planing Region	2010-2012		*Главен истражувач*
Providing optimal conditions in vegetable production by use of renewable resources of energy	2008 - 2009		*Главен истражувач*
Establishment of Research and Information Centre in Agriculture at the Goce Delcev University	2008 - 2009		*Главен истражувач*
Providing optimal conditions in vegetable production by use of renewable resources of energy	2008 - 2009		*Главен истражувач*
Establishment of Research and Information Centre in Agriculture at the Goce Delcev University	2008 - 2009		*Главен истражувач*
Implementation of Novel Biotechnological Methods Towards Food Security	2006-2009	NATO	*Супервизија на NATO грант*

Задолженија во предлог-проектот со временска рамка:

Прва и втора година:

1. Да ги следи младите истражувачи во текот на активностите на проектот.
2. Да ја следи анализата на тешки метали во овошје и зеленчук со примена на ICP-MS.
3. Да учествува во пишување на научни трудови и нивно објавување во научни списанија и да учествува на научни конференции.

Млад истражувач:

Име и презиме	**Жанета Нечева**
Титула	**Дипломиран инженер агроном**
Позиција	**Студент на втор циклус на студии**
Адреса	**Земјоделски факултет, Универзитет „Гоце Делчев“ - Штип**
Тел / Факс:	**071- 250 -235**
e-mail	**zaneta.neceva@gmail.com**

Кратка биографија:

Родена на 05.10.1989 во Демир Капија, Р. Македонија

Образование:

2012 –тековно: Студент на втор циклус на студии, насока Енологија, Земјоделски факултет, Универзитет “Гоце Делчев” – Штип

2008-2012: Дипломиран инжинер агроном, Факултетот за земјоделски науки и храна, Универзитет „Св. Кирил и Методиј“, Скопје

Работно искуство:

2012 - тековно: Енолог во винарска визба „Бовин“, Неготино, Р. Македонија.

Изработка на магистерски/докторски труд – наслов:

“Проучување на составот на органски киселини во вино од сортата Вранец со примена на капиларна електрофореза поврзана со масен детектор“

Задолженија во предлог-проектот со временска рамка:

Прва година:

4. Да учествува во производство на вино, бело и црвено, и во собирање на примероци вина произведени во Македонија.
5. Да учествува во собирање на примероци овошје и зеленчук од приватни производители и маркет.
6. Да учествува во ICP-MS анализи на вино, алкхолни пијалоци, овошје и зеленчук

Втора година:

1. Да учествува во ICP-MS анализи на вино, алкхолни пијалоци, овошје и зеленчук
2. Да учествува во пишување на научни трудови и нивно објавување во научни списанија и да учествува на научни конференции.

Млад истражувач:

Име и презиме	**Јорданка Јосифова**
Титула	**Дипломиран земјоделски инженер агроном - енолог**
Позиција	**Студент на втор циклус студии по енологија**
Адреса	**Никола Карев 15, Кавадарци**
Тел / Факс:	**+389 72 218 253**
e-mail	**jordanka.209103@student.ugd.edu.mk**

Кратка биографија:
Родена на 02.01.1990 во Кавадарци, Р. Македонија
Образование:
2015 –тековно: Студент на втор циклус на студии, насока Енологија, Земјоделски факултет, Универзитет "Гоце Делчев" – Штип
2008-2012: Диплмоиран земјоделски инженер агроном-енолог, Земјоделски факултет, Универзитет "Гоце Делчев" – Штип
2004-2008: Економски техничар, гимназија „Добри Даскалов", Кавадарци

Работно искуство:
2012 - тековно: Енолог – лаборант во винарска визба „Повардарие", Неготино, Р. Македонија.

Изработка на магистерски/докторски труд – наслов:
/

Задолженија во предлог-проектот со временска рамка:

Прва година:

1. Да учествува во производство на вино, бело и црвено, и во собирање на примероци вина произведени во Македонија.
2. Да учествува во собирање на примероци овошје и зеленчук од приватни производители и маркет.
3. Да учествува во HPLC анализи на вино, овошје и зеленчук.

Втора година:

1. Да учествува во HPLC анализи на вино, овошје и зеленчук.
2. Да учествува во пишување на научни трудови и нивно објавување во научни списанија и да учествува на научни конференции.

Researchers:

Principal researcher

Name Surname	**Violeta Ivanova-Petropulos**
Title	**PhD in Chemical Sciences**
Position	**Associate Professor**
Address	**University "Goce Delcev", Faculty of Agriculture, Stip, Str. Krste Misirkov bb, 2000 Stip**
Tel./Fax.	**+ 389 32 550 639 / + 389 32 550 001**
e-mail	**violeta.ivanova@ugd.edu.mk**

Short CV:

Born on 22.08.1978 in Skopje, R. Macedonia

Education:

2006-2009: PhD in Chemistry, (enochemistry and enology field), Faculty of Natural Sciences and Mathematics (FNSM), "Ss Cyril and Methodius University", Skopje

PhD Thesis: "Development of methods for identification and quantification of phenolic compounds in wine and grape applying spectrophotometry, liquid chromatography and mass spectrometry"

2002-2006: Master of Chemical Science, Faculty of Natural Sciences and Mathematics (FNSM), "Ss Cyril and Methodius University", Skopje

1997-2002: Graduated Professor of Chemistry, Faculty of Natural Sciences and Mathematics (FNSM), "Ss Cyril and Methodius" University, Skopje

Working experience:

2015-current: Associate Professor at University "Goce Delčev", Faculty of Agriculture – Štip, teaching Sensorial and analytical evaluation of wine, Enology, Chemistry, Analytical Chemistry and Biochemistry.

2010-2015: Assistant Professor at University "Goce Delčev", Faculty of Agriculture – Štip, teaching Sensorial and analytical evaluation of wine, Enology, Chemistry, Analytical Chemistry and Biochemistry.

2005-2010: Assistant at the Institute of Agriculture-Skopje, Department for Enology, responsible for analytical evaluation of wine applying instrumental methods (liquid and gas chromatography, spectrophotometry), as well as wine analysis for quality control with standard OIV methods.

Other activities:

2008-2011: participant - FP7 project CHROMLAB-ANTIOXIDANT Reinforcement of the WBC Research Capacities for Food Quality Characterization, coordinated by Prof. Marina Stefova, Faculty of Natural Sciencies and Mathematics

Study stays abroad:

17.	16.06.2016-16.07.2016	Institute for Analytical Chemistry and Food Chemistry, Graz University of Technology, Graz, **Austria**
18.	19.10.2016-25.10.2016	Faculty of Natural Sciences and Mathematics, University of Nis, Nis, **Serbia**
19.	06.09.2015-13.09.2015	Faculty of Chemistry and Chemical Engineering, Babes-Bolyai University, Cluj-Napoca, **Romania**
20.	20.06.2015-18.07.2015	Institute of Bioanalysis, Medical School, University of Pecs, Pecs, **Hungary**

21.	27.10.2014-07.11.2014	Faculty of Mathematics and Natural Sciences, University of Prishtina, **Kosovo**	
22.	01.06.2014-01.07.2014	Institute for Analytical Chemistry and Food Chemistry, Graz University of Technology, Graz, **Austria**	
23.	20.01.2014-21.02.2014	University of Bologna, Department of Agricultural and Food Sciences (DISTAL), Cesena, **Italy**	
24.	10.08.2013-17.08.2013	Институт за Аналитичка хемија, Факултет за хемија и минерологија, Универзитет во Лајпциг, **Германија**	
25.	01.06.2013–05.07.2013	Факултет за природни науки, Универзитет Константин Филозофот, Нитра, **Словачка**	
26.	02.12.2012 – 14.12.2012	Institute of Analytical Chemistry, Faculty of Chemistry and Mineralogy, University of Leipzig, **Germany**	
27.	08.06.2012 – 08.07.2012	Institute for Analytical Chemistry and Food Chemistry, Graz University of Technology, Graz, **Austria**	
28.	02.01.2012 –19.02.2012	Faculty of Sciences, University of Pecs, Pecs, **Hungary**	
29.	10.05.2009 – 30.7.2009	Faculty of Sciences, University of Pecs, Pecs, **Hungary**	
30.	20.09.2008 – 16.12.2008	Оддел за Енологија, ИНРА-Француски Национален Институт за истражувања од област на агрономија, Монпеље, **Франција**	
31.	01.02.2008 – 01.04.2008	Оддел за Аналитичка хемија, Природно-математички факултет, Универзитет во Печ, Печ, **Унгарија**	
32.	08.05.2006 – 02.06.2006	Институт за Енологија во Асти, и Конзорциум за Енологија, Асти, **Италија**	

Violeta Ivanova-Petropulos is a referee at about 100 papers submitted for publication in the following SCI international journals: Food Chemistry, Food Research International, Food Analytical Methods, Food and Bioprocess Technology, Food Control, Journal of Agricultural and Food Chemistry, Journal of Food Science, Journal of Food Quality, Journal of Herbs Spices & Medicinal Plants, Journal of the Serbian Chemical Society, European Food Research and Technology, Environmental engineering and management journal, Agriculturae Conspectus Scientificus, Macedonian Journal of Chemistry and Chemical Engineering, Italian Journal of Food Science.

Violeta Ivanova-Petropulos is member of the Editorial Boards of *Food Research International* (**IF=3.15**) and *Journal of Food Research (Canadian Center of Science and Education).*

Scientific papers published in the last 5 years in SCI - Science citation index, indicating the impact factor

1. Tašev K., Stefova M., **Ivanova-Petropulos V.** (2016). HPLC method validation and application for organic acids analysis in wine after solid-phase extraction**.** *Macedonian Journal of Chemistry and Chemical Engineering*, **accepted for publication** (**Impact factor = 0.44**).
2. **Ivanova-Petropulos V.**, Balabanova B., Bogeva E., Frentiu T., Ponta M., Senila M., Gulaboski R., Dan Irimie F. (2016). Rapid determination of trace elements in Macedonian grape brandies for their characterization and safety evaluation. *Food Analytical Methods*, **in press (Impact factor = 2.167)**.
3. Tašev K., **Ivanova-Petropulos V.**, Stefova M. (2016). Optimization and validation of a derivatization method for analysis of biogenic amines in wines using RP-HPLC-DAD. *Macedonian Journal of Chemistry and Chemical Engineering*, 35(1), 19-28 (**Impact factor = 0.44**).
4. **Ivanova-Petropulos V**., Durakova S., Ricci A., Parpinnelo G.P., Versari A. (2016). Extraction of natural occurring bioactive compounds and change in antioxidant capacity of Macedonian red wines during vinification. *Journal of Food Science and Technology*, 53(6) 2634-2643 (**Impact factor = 2.20**).
5. **Ivanova-Petropulos V**., Balabanova B., Mitrev S., Nedelkovski D., Dimovska V.,

Gulaboski R. (2016). Optimization and validation of a microwave digestion method for multi-element analysis of Vranec wines. *Food Analytical Methods*, 9, 48-60 **(Impact factor = 1.956)**.

6. **Ivanova-Petropulos V**., Mitrev S, Stafilov T., Markova N., Leither E., Lankmayr E., Siegmund B. (2015). Characterization of traditional Macedonian edible oils by their fatty acid composition and their volatile compounds. *Food Research International*, 77, 506-514 **(Impact factor = 2.818)**.
7. **Ivanova-Petropulos V**., Jakabová S., Nedelkovski D., Pavlík V., Balážová Ž., Hegedűs O. (2015). Determination of Pb and Cd in Macedonian wines by electrothermal atomic absorption spectrometry (ETAAS). *Food Analytical Methods*, 8, 1947-1952 **(Impact factor = 1.802)**.
8. **Ivanova-Petropulos V**., Ricci A., Nedelkovski D., Dimovska V., Parpinnelo G.P., Versari A. (2015). Targeted analysis of bioactive phenolic compounds and antioxidant activity of Macedonian red wines. *Food Chemistry*, 171, 414-420 (**Impact factor = 3.259**).
9. **Ivanova-Petropulos V**., Hermosín-Gutiérrez I., Boros B., Stefova M., Stafilov T., Vojnoski B., Dörnyei Á., Kilár F. (2015). Phenolic compounds and antioxidant activity of Macedonian red wines. *Journal of Food Composition and Analysis*, 41, 1-41 (**Impact factor = 2.259**).
10. **Ivanova Petropulos V.,** Bogeva E., Stafilov T., Stefova M., Siegmund B., Pabi N., Lankmayr E. (2014). Study of the influence of maceration time and oenological practices on the aroma profile of Vranec wines. *Food Chemistry*, 165, 506-514 (**Impact factor = 3.33)**.
11. **Ivanova Petropulos V.,** Dörnyei Á, Stefova M., Stafilov T., Vojnoski B., Márk L., Hermosín-Gutiérrez I., Kilár F. (2014). **Application of a Novel Small-Scale Sample Cleanup Procedure Prior to MALDI-TOF-MS for Rapid Pigment Fingerprinting of Red Wines**. *Food Analytical Methods*, 7(4) 820-827 (**Impact factor = 1.802)**.
12. **Ivanova-Petropulos V.**, Wiltsche H., Stafilov T., Stefova M., Motter H., Lankmayr E. (2013). Multi-element analysis of Macedonian wines by inductively coupled plasma–mass spectrometry (ICP–MS) and inductively coupled plasma–optical emission spectrometry (ICP–OES) for their classification. *Macedonian Journal of Chemistry and Chemical Engineering,* 32(2) 265-281 (**Impact factor = 0.821)**.
13. **Ivanova V**., Stefova M., Vojnoski B., Stafilov T., Bíró I., Bufa A., Felinger A., Kilár F. (2013). Volatile composition of Macedonian and Hungarian wines assessed by GC-MS. *Food and Bioprocess Technology,* DOI: 10.1007/s11947-011-0760-y, 6(6) 1609-1617 (**Impact factor =3.703**).
14. Dimovska V., Beleski K., Boskov K., **Ivanova V.**, Ilieva F. (2013). Comparison of three Chardonnay clones (*Vitis vinifera* L.) growing in Skopje' vineyard region, R. Macedonia. *International Journal of Agronomy and Plant Production*, 4(6), 1143-1147 **(IF- GIF = 0.467)**.
15. Kostadinović S., Wilkens A., Stefova M., **Ivanova V**., Vojnoski B., Mirhosseini H., Winterhalter P. (2012). Stilbene levels and antioxidant activity of Vranec and Merlot wines from Macedonia: effect of variety and enological practices. *Food Chemistry*, 135, 3003-3009, http://dx.doi.org/10.1016/j.foodchem.2012.06.118 (**Impact factor = 3.655)**.
16. **Ivanova V**., Stefova M., Stafilov T., Vojnoski B., Bíró I., Bufa A., Kilár F. (2012). Validation of a method for analysis of aroma compounds in red wine using liquid-liquid extraction and GC-MS. *Food Analytical Methods*, 5, 1427-1434, DOI: 10.1007/s12161-012-9401-y (**Impact factor =1.943**).
17. **Ivanova V**., Vojnoski B., Stefova M. (2012). Effect of winemaking treatment and wine aging on phenolic content in Vranec wines. DOI: 10.1007/s13197-011-0279-2, *Journal of Food Science and Technology*, 49(2) 161-172 (**Impact factor =1.123**).

Participation in research projects

Project title	Period	Financed by	Role in the project (PI or participant)
CEEPUS (Central European Exchange Program for University Studies - CII-HU-0010-01-0607	**2006-current**	**European Union**	***Participant***
"Classification of wine by determination of bioactive phenolic compounds using high resolution mass spectrometry"	**2016-2018**	**Ministry of Education and Science of the Republic of Macedonia, bilateral project with Austria**	***Principal researcher***
"Biogenic aminies and aroma in Vranec wines from Macedonia and Montenegro and effect of malolactic fermentation on their formation"	**2016-2018**	**Ministry of Education and Science of the Republic of Macedonia, bilateral project with Austria**	***Principal researcher***
"Sensor networks for monitoring and controlling wine production"	**2014-2016**	**Resurch Fund of UGD**	***Participant***
"Polyphenolic and aroma profile of Vranec wines fermented with isolated yeasts from Tikveš wine area"	**2013-2015**	**Resurch Fund of UGD**	***Principal researcher***
"Metal binding and antioxidative properties of novel Coenzyme Q-10 derivatives"	**2013-2015**	**Resurch Fund of UGD**	***Participant***
"Characterization and determination of the geographical origin of macedonian wine using chemical and stable isotope methods"	**from 01.10.2010 to 30.09.2012**	**Ministry of Education and Science, R. Macednia**	***Participant***
FP7 Project "Reinforcement of the WBC research capacities for food quality characterization"	**from 01.09.2008 to 27.12.2010**	**European Union**	***Participant***
Quality and Regulatory Infrastructure Development for Food Safety & Quality in Macedonia –	**2009-2011**	**Swedic ambasy – Skopje**	***Participant***

Tasks to be conducted in the frame of the project proposal (timetable)

During the two years:

1. To coordinate and organize the project activities (*during the whole period of the project duration*)
2. To follow and control the analysis of wine, alcoholic beverages, fruits and vegetables applying instrumental techiques
3. To train junior researchers during the project activities, applying the most sophisticated techniques for wine analysis (*during the whole period of the project duration*)
4. To participate in writing of scientific papers and publishing of papers in scientific journals with impact factor, as well as, in debates with the wineries (*Third 3, 2017 and Third 3, 2018*)
5. To prepare Repor (*at the end of the first and second project year).*

Senior Scientist/Researcher

Name Surname	**Biljana Balabanova**
Title	**PhD**
Position	**Assistant Professor, University "Goce Delčev" – Štip, Faculty of Agruculture**
Address	**Krste Misirkov bb, 2000 Stip, Republic of Macedonia**
Tel./Fax.	**++389 32 550 612**
e-mail	**biljana.balabanova@ugd.edu.mk**

Short CV:

Born 8/11/12 Stip, Macedonia

Education and Training:

2001-2006: First cycle studies-Institute of Biology, Faculty of Science, Sts. Cyril and Methodius University, Skopje, R. Macedonia;

2008-2010; Second cycle studies-Institute for Chemistry Faculty of Science, Sts. Cyril and Methodius University, Skopje, R. Macedonia (Department of Physical Chemistry-atomic spectrometry);

2011-2014; Third cycle studies-Institute for Chemistry Faculty of Science, Sts. Cyril and Methodius University, Skopje, R. Macedonia (Department of Physical Chemistry-atomic spectrometry);

Employment and working experience:

2007-2012- Junior assistant, University "Goce Delčev" - Štip, Faculty of Agriculture

2012-2015 current – Assistant, University "Goce Delčev", Štip, Faculty of Agriculture

2015 current – Assistant proffesor, University "Goce Delčev", Štip, Faculty of Agriculture

2007- Chemical analyst at the Laboratory of plant protection and environmental, Department research environment;

Foreign languages: English - Understanding (C2) Speech (C2), Writing (C2) (selve judgment): Organizational skills: High organizational skills, ability for teamwork, ability to perform multiple tasks simultaneously; Technical characteristics: Excellent speaker with, high presentation skills, excellent knowledge and use on: Windows XP/2007, MS Office (Excel, Word, Power Point), Adobe Photoshop, Corel Draw, Statistics software-Statistica 8.0.

(2009) Installation and training in the ICP-MS, model 7500 - Agilent, Pharmachem, Skopje, Macedonia; (2011 - ongoing) Third cycle studies-Institute for chemistry (Department of Physical chemistry-atomic spectrometry)

Scientific papers published in the last 5 years, indicating the impact factor according to JSR database of Thomson Routers (if any) of the journals in which each paper was published

1. **B. Balabanova,** T. Stafilov**,** R. Šajn**,** C. Tănăselia (2016). Multivariate extraction of dominant geochemical markers for 69 elements deposition in Bregalnica river basin, Republic of Macedonia (moss biomonitoring). *Environmental Science and Pollution Research*, 23:22852–22870. **IF-2.76.**
2. **B. Balabanova**, T. Stafilov, R. Šajn, C. Tănăselia (2016). Long-term geochemical evolution of lithogenic vs. Anthropogenic distribution of macro and trace elements in household attic dust. *Archives of Environmental Contamination and Toxicology,* (doi:10.1007/s00244-016-0336-y) **IF-2.039.**
3. **B. Balabanova**, T. Stafilov, R. Šajn, K. Bačeva Andonovska (2016). Quantitative assessment of metal elements using moss species as biomonitors in downwind area of lead-zinc mine. *Journal of Environmental Science and Health Part A* (in press)

IF-1.01.

4. B. Balabanova, T.Stafilov, R. Šajn, C. Tănăselia (2016). Geochemical hunting of lithogenic and anthropogenic impacts on polymetallic distribution (Bregalnica river basin, Republic of Macedonia). *Journal of Environmental Science and Health Part A,* 15(13) 1180-1194, **IF-1.01.**
5. V. Ivanova-Petropulos, **B. Balabanova,** S. Mitrev, D. Nedelkovski, V. Dimovska, R. Gulaboski (2016) Optimization and Validation of a Microwave Digestion Method for Multi-element Characterization of Vranec Wines. Food Analytical Methods, 9: 48. **IF-2.167**
6. **B. Balabanova,** T. Stafilov**,** R. Šajn**,** C. Tănăselia (2016). Multivariate factor assessment for lithogenic and anthropogenic distribution of trace and macro elements in river water from Bregalnica river basin, R. Macedonia. Macedonian Journal of Chemistry and Chemical Engineering, 35 (2) 1-16. **IF-0.4**
7. S. Angelovska, T. Stafilov, R. Šajn, **B. Balabanova** (2016). Geogenic and anthropogenic moss responsiveness on lithological elements distribution around Pb-Zn ore deposit. *Archives of Environmental Contamination and Toxicology,* 70: 487. **IF-2.039**
8. **Balabanova, B.,** Stafilov, T., Baceva, K. (2015) Bioavailability and bioaccumulation characterization of essential and heavy metals contents in *R. acetosa, S. oleracea and U. dioica* from copper polluted and referent areas. *Journal of Environmental Health Science & Engineering*, 13 (2) 1-13 **IF-0.129.**
9. **Balabanova, B.,** Stafilov, T., Sajn, R. (2015). Lithological distribution of rare earth elements in automorphic and alluvial soils in the Bregalnica river basin. *Macedonian Journal of Chemistry and Chemical Engineering*, 34(1). **IF-0.4.**
10. **Balabanova, B.,** Stafilov, T., Sajn, R., Baceva, K. (2014) Comparison of response of moss, lichens and attic dust to geology and atmospheric pollution from copper mine. *International Journal of Environmental Science and Technology*, 11 (2). pp. 517-528. **IF-2.344.**
11. **Balabanova, B**., Stafilov, T., Šajn, R., Bačeva, K. 2012: Characterisation of Heavy Metals in Lichen Species *Hypogymnia physodes* and *Evernia prunastri* due to Biomonitoring of Air Pollution in the Vicinity of Copper Mine, *International Journal of Environmental Research*, 6(3). **IF-0.992.**

Participation in research projects

Project title	Period	Financed by	Role in the project (PI or participant)
Characterization of heavy metals contents in different plant foods from polluted sites and their impact in food chain	**2016-2017**	**Ministry of Education and Science, R. Macednia**	**PI**
Biogenic aminies and aroma in Vranec wines from Macedonia and Montenegro and effect of malolactic fermentation on their formation	**2016-2017**	**Ministry of Education and Science, R. Macednia**	**participant**
Developing OER and	**2015-2017**	**Erasmus+**	**participant**

Tasks to be conducted in the frame of the project proposal (timetable)

First year:

1. To participate in performing of spectrometric analysis for multi-element complosition of samples

Second year:

1. To performe spectrometric analysis for multi-element complosition of samples
2. Statictical treatment of data, including Factor Analysis, Cluster Analysis, ANOVA
3. To participate in writing of scientific papers and publishing of papers in scientific journals with impact factor, and participate at scientific conferences.

Senior Scientist/ Researcher

Name Surname	**Sasa Mitrev**
Title	**PhD in Agriculture Sciences**
Position	**Full professor at the Faculty of Agriculture**
Address	**Krste Misirkov 10-A Stip, Macedonia**
Tel./Fax.	**++38932 550 610**
e-mail	**sasa.mitrev@ugd.edu.mk**

Short CV:

Born on 29.05.1965, Štip, R. Macedonia

- Prof. d-r. Sasha Mitrev finished his master studies in 1993 year at the Faculty of Agriculture, University of Novi Sad. In 1998 year, he finished his doctoral study on the Faculty of Agriculture and Food Science, UKM - Skopje. His professional occupation is phytopathology, bacteriology and virology.
- In his career he has been state secretary at the Ministry of Agriculture, forestry and water resources, Preffessor of phytopathology at the Faculty of Agriculture and Food Science at the UKM-Skopje, Manager of the Institute of Southern Crops in Strumica. Since 2007 till 2015, worked as a Rector of the University of Goce Delcev – Shtip.
- In his scientific career he has many scientific stays abroad and has took a part in many scientific congreeses and workshops from the field of agriculture: 13-15 November 2005 SEE.NET - Association for Seed and Planting Material - Sofia, Bulgaria The 5th Annual Eastern Europe Seed Network; 06 - 11 Maj 2004, ISTA – Novi sad, Serbia and Monte Negro, Seed healt control; 07 – 21 Octomber 2003, Egyiptian International Center for Agriculture - Dokki, Giza – Egypt, Workshop for Sustainable agriculture production. Almost a decade he has been participant in many agriculture commissions: 2001- 2005, PSO Agriculture institute, Skopje; 1995 – 2006 Ministry of Agriculture, forest and water resources, Skopje, Participant in the commission for plant protection, Signalization of plant diseases in different regions in Macedonia, recommendations for their suppression. 2001 – 2006 Ministry of Agriculture, forest and water resources, Skopje, Participant in the commission for variety approvenes of different vegerable and industrial crops.

Scientific papers published in the last 5 years, indicating the impact factor according to JSR database of Thomson Routers (if any) of the journals in which each paper was published

1. Boev I., Šorša, A., Kovacevik, B., **Mitrev S.,** Boev B. (2016) The use of factor analysis to distinguish the influence of parent material, mining and agriculture on groundwater composition in the Strumica valley, Macedonia. *Geologica Croatica*, 69 (2). pp. 245-253. ISSN 1333-4875 **(Impact factor = 0.625)**.
2. Balabanova B., Karov I., **Mitrev S.** (2016) *Comparative analysis for macro and trace elements content in goji berries between varieties from China and R. Macedonia.* Agricultural Science and Technology, 8 (1). pp. 79-84. ISSN 1313-8820
3. Ivanova-Petropulos V., Balabanova B., **Mitrev S.**, Nedelkovski D., Dimovska V., Gulaboski R. (2016). Optimization and validation of a microwave digestion method for multi-element analysis of Vranec wines. *Food Analytical Methods*, 9, 48-60 **(Impact factor = 1.956)**.
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12. Gjorgieva D., Kadifkova-Panovska T., **Mitrev S.**, Kovacevik B., Kostadinovska E., Bačeva K. Stafilov T. (2012): Assessment of the genotoxicity of heavy metals in Phaseolus vulgaris L. as a model plant system by Random Amplified Polymorphic DNA (RAPD) analysis. *Journal of Environmental Science and Health, Part A* (2012) 47, 366-373. **(Impact Factor: 1.164).**

Participation in research projects

Project title	Period	Financed by	Role in the project (PI or participant)
Classification of wine by determination of bioactive phenolic compounds using high resolution mass spectrometry	2016-2018	MON bilateral project with Austria	*Participant*
Characterization of heavy metals contents in different plant foods from polluted sites and their impact in food chain.	2016-2018	MON bilateral project with China	*Participant*
Developing OER and Blended Modules for Agriculture and Rural Development, Erasmus+ KA202 Project.	2015-2017	Erasmus+ KA202 Project.	*Participant*
Polyphenolic and aroma profile of Vranec wines fermented with isolated yeasts from Tikveš wine area	2013-2015	Resurch Fund of UGD	*Participant*
Integrated selection, protection and promotion of Balkan forest genetic resources with aesthetic values - ISPROP FORGEN.	2013-2015		*PI*
Selection, protection and promotion of Balkan food forest species – FOOD FOREST PARKS	2013-2014		*PI*
COST Action FAO807 Integrated Management of Phytoplasma Epidemics in Different Crop System	2009-2013		*Participant*

SM-511355-2010 IPA 2009 Higher Education and Society Building Capacity for Structural Reform in Higher Education of Western Balkan Countries	2010 – 2013	Tempus project	*Participant*
Using local resources for micro-regional development – sustainable agribusiness and tourism in the southern Balkan	2010-2013		*Participant*
Western Balkan Rural Extension Network through Curriculum Reform	2009 - 2012	Tempus project	*Participant*
Survey of biodiversity and regional distribution of parasitic oronachaceae on the Balkans	2009 - 2012		*Participant*
Integrated Selection, Protection and Promotion of Balkan Forest Genetic Resources with Aesthetic Values, Cross border Coperation program with Greece.	2011 - 2013		*PI*
Bridging Universities and Business for Enhancing Employability Skills for Students	2011 – 2012		*PI*
Partnership Agreement with the Bulgaria – Republic of Macedonia IPA Cross-border Programme	2011 - 2012		*PI*
Diagnostic, control and protection of grapevines and spontaneos plants from phytoplasmas	2010 - 2012		*PI*
Organic agriculture – an opportunity for Republic of Macedonia's East Planing Region	2010-2012		*PI*
Providing optimal conditions in vegetable production by use of renewable resources of energy	2008 - 2009		*PI*
Establishment of Research and Information Centre in Agriculture at the Goce Delcev University	2008 - 2009		*PI*
Providing optimal conditions in vegetable production by use of renewable resources of energy	2008 - 2009		*PI*
Establishment of Research and Information Centre in Agriculture at the Goce Delcev University	2008 - 2009		*PI*
Implementation of Novel Biotechnological Methods Towards Food Security	2006-2009	NATO grant	Supervision of NATO grant

Tasks to be conducted in the frame of the project proposal (timetable)

First and second year:

1. To follow and control the yourn researgers during the project activities
2. To control the analysis of heavy metals in fruits and vegetables with ISP-MS
3. To participate in writing of scientific papers and publishing of papers in scientific journals with impact factor, and participate at scientific conferences.

Junior researcher

Name Surname	**Zaneta Neceva**
Title	**Graduate engineer agronomist**
Position	**Student at second cycle of studies of oenology**
Address	**Tikveska 15 Demir Kapija**
Tel./Fax.	**071-250-235**
e-mail	**zaneta.neceva@gmail.com**

Short CV:
Born on 05.10.1989 in Demir Kapija, R. Macedonia

Education:
2012-current: Student at second sycle of studies, study programme-Oenology, Faculty of Agriculture, Universit "Goce Delčev" - Štip
2008-2012: Graduated engineer agronomist – Faculty of Agricultural Sciences and Food, University "Ss Cyril and Methodius" - Skopje

Working experience:

2012-current: Oenologist in „Bovin" winery, Negotino, R. Macedonia.

Title of the MSci or PhD theses

"Studying the composition of organic acids in Vranec wines using capillary electrophoresis connected to mass detector"

Tasks to be conducted in the frame of the project proposal (timetable)

First year:
1. To participate in winemaking (white and red wine) and to collect wine samples from the Macedonian wineries.
2. To collect fruit and vegetable samples from private producers and market.
3. To participate in performing ICP-MS analysis of wine, alcoholic beverages, fruits and vegetables

Second year:
1. To participate in performing ICP-MS analysis of wine, alcoholic beverages, fruits and vegetables
2. To participate in writing of scientific papers and publishing of papers in scientific journals with impact factor, and participate at scientific conferences.

Junior researcher

Name Surname	**Jordanka Josifova**
Title	**Graduated agricultural engineer agronomist - oenologist**
Position	**Student at second cycle of studies of oenology**
Address	**Nikola Karev 15, Kavadarci**
Tel./Fax.	**+389 72 218 253**
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Short CV:

Born on 02.01.1990 in Kavadarci, R. Macedonia

Education:

2015-current: Student at second sycle of studies, study programme-Oenology, Faculty of Agriculture, University "Goce Delčev" - Štip

2008-2012: Graduated agricultural engineer agronomist – oenologist, Faculty of Agriculture, University "Goce Delčev" - Štip

2004-2008: Economical techicien, Gimnasium "Gorgi Daskalvo", Kavadarci

Working experience:

2012-current: Oenologist – laboratory techicien, in „Povardarie" winery, Negotino, R. Macedonia.

Title of the MSci or PhD theses

Tasks to be conducted in the frame of the project proposal (timetable)

First year:

4. To participate in winemaking (white and red wine) and to collect wine samples from the Macedonian wineries.
5. To collect fruit and vegetable samples from private producers and market.
6. To participate in performing HPLC analysis of wine, fruits and vegetables

Second year:

1. To participate in writing of scientific papers and publishing of papers in scientific journals with impact factor, and participate at scientific conferences.

Истражувачка инфраструктура

Истражувачки капацитети/опрема

За извршување на задачите од проектот, ќе биде формиран искусен тим од областа на хемија и аналитички техники за анализа на вино и храна:

1. Универзитет "Гоце Делчев" – Штип, (***http://www.ugd.edu.mk)*** (УГД) со учество на **Земјоделски факултет**

- Лабораторијата на Земјоделскиот факултет во Штип има искусен кадар кој е добро обучен и подготвен за анализа на вино со примена на најсовремена и најнова опрема со која располага:

а) **Гасен хроматограф поврзан со трипл-квадропол масен спектрометар (GC-QQQ MS)**, за анализа на ароми и други испарливи компоненти во вино, овошје, зеленчук и други примероци. Инструментот се карактеризира со многу висока точност, прецизност и осетливост на компоненти присутни во траги.
- Овој инструмент ќе биде користен за анализа на ароматичните компоненти во примероците.

б) **Спектрофотометар,** за анализа на биоактивни компоненти и антиоксидантна активност.

в) **ICP-MS** – Овој инструмент ќе се користи за анализа на тешки метали во вино и примероци храна

Research infrastructure

Facilities available in the Researchers Team's laboratory (if applicable)

To perform the project tasks and activities, an experienced team will be formed, with experience in chemistry and analytical techniques for wine and food analysis:

1. University "Goce Delcev" – Stip, (***http://www.ugd.edu.mk)*** (UGD) with participation of the **Faculty of Agriculture**, and

- The Laboratory at the Faculty of Agriculture - Štip is well equipped and trained for using the most sophisticated and modern equipment for analysis of wine, as:

a) **Gas chromatograph tripl-quadrupole mass spectrometer (GC-QQQ MS)**, for analysis of aroma and other volatile compounds in wine, fruit, vegetable and other samples. The instrument is characterized with high accuracy, precision and sensitivity for components in low limits.
   - This instrument will be used for aroma analysis of the samples.

b) **Spectrophotometar**, for analysis of bioactive compounds and antioxidant activity.

c) **ICP-MS** – This instrument will be used for analysis of heavy metals in wine and food samples.