

## Образец ОБ-3

Министерство за Образование и Наука на Република Македонија  
*Ministry of Education and Science of the Republic of Macedonia*

Пријава за финансирање на билатерални проекти  
*Application form for financing of bilateral projects*

Дата на поднесување	
Проект Бр:	<i>(Се пополнува од Министерството за образование и наука)</i>
Траење на проектот од – до	01.01.2013 год. до 31.12. 2014 год.
Држава партнер	<i>Црна Гора</i>

Date of submission	
Project No:	<i>(Filled by the Ministry authority)</i>
Project duration	01.01.2013 to 31.12. 2014
Partner country	

Наслов на проектот	Биогени амини и ароми во вина Вранец од Македонија и Црна Гора и влијание на јаголково-млечната ферментација на нивното формирање
Клучни зборови	Вино, биогени амини, ароми, Вранец, HPLC, GC, екстракција, дериватизација
FRASCATI класификација	Био-технички науки

Носител на проектот во Македонија	Виолета Иванова-Петропулос
Институција	Универзитет “Гоце Делчев” – Штип, Земјоделски факултет

Носител на проектот во Црна Гора	Даниела Раичевиќ
Институција	Биотехнички факултет, Подгорица, Универзитет на Црна Гора

Proposal Title	Biogenic amines and aroma in Vranec wines from Macedonia and Montenegro and effect of malolactic fermentation on their formation
Keywords	Wine, biogenic amines, aroma, Vranec, HPLC, GC, extraction, derivatization
FRASCATI classification	Bio-technical sciences

Principal Investigator in Macedonia	Violeta Ivanova-Petropulos
Institution	University “Goce Delčev” – Štip, Faculty of Agriculture

Principal Investigator in Montenegro	Danijela Raičević
Institution	Biotechnical Faculty, Podgorica, University of Montenegro

# ПРВ ДЕЛ/PART 1:

## Апстракт (максимум 250 зборови)

Контролата на биогените амини во виното станува сè позначајна од аспект на потрошувачите, но и на производителите на вино поради потенцијалниот ризик од токсичност врз луѓето како и негативното влијание од нивното присуство на продажбата, трговијата и извозот на вино. Биогените амини се органски азотни соединенија со мала молекулска маса кои во виното имаат различно потекло. Тие се присутни во ширата, се формираат од квасецот во текот на алкохолната ферментација, во текот на јаболово-млечната ферментација, како и при зреењето на виното. Во овој проект ќе се анализираат биогени амини и ароми во вина од сортата Вранец произведени во присуство на јаболово-млечна бактерија додадена во различни фази од винификацијата. Анализата на биогените амини ќе се изврши со течна хроматографија поврзана со DAD и MS детектори и со гасна хроматографија поврзана со детектор со јонска замка и QQQ MS детектор. Со цел да се утврди влијанието на јаболово-млечната ферментација врз содржината на биогените амини, како и врз содржината на ароматичните соединенија, јаболово-млечната бактерија ќе се додаде пред ферментација и по завршување на алкохолната ферментација. Се очекува да биде определена содржината на следните биогени амини: триптамин, путрескин, хистамин, фенилиетиламин, тирамин, кадаверин, спермин и спермидин. 1,7 диаминохептан ќе се користи како внатрешен стандард. Добиените резултати ќе бидат статистички обработени со различни тестови, вклучувајќи анализа на варијација, карактеристична векторска анализа, кластер анализа и линеарна дискриминантна анализа со цел да се утврдат можни разлики меѓу анализираните вина. Спроведувањето на контролирана јаболово-млечна ферментација се очекува да доведе до подобрување на ароматските карактеристики на виното, и воопшто на неговиот квалитет.

## Abstract (max 250 words)

The control of biogenic amines is becoming increasingly important to the consumers and also to wine producers because of the potential risk of toxicity and the negative impact on sales, trade and export of wine. Biogenic amines are organic nitrogen compounds with low molecular weight which have different origin in the wine. They can be found in the must, can be formed by the yeast during the alcoholic and malolactic fermentation and during wine aging. In this project the content of the biogenic amines and aroma profile of the wine from Vranec variety will be analyzed, produced by addition of malolactic bacteria during different stages of vinification. The analysis of biogenic amines will be performed with liquid chromatography coupled with DAD and MS detector and gas chromatography coupled with ion trap MS and QQQ MS detector. In order to determine the effect of malolactic fermentation on the content of biogenic amines, as well as, on the aroma compounds in wines, malolactic bacteria will be applied before fermentation and after the alcoholic fermentation. The following biogenic amines will be analyzed: tryptamine, putrescine, histamine, phenylethyl amine, tyramine, cadaverine, spermine and spermedine. 1,7 diaminoheptane will be used as an internal standard. The obtained results will be statistically processed, applying Analysis of Variance (ANOVA), Principle Component Analysis (PCA), Cluster Analysis (CA) and Linear Discriminant Analysis (LDA) in order to determine possible differences between the analyzed wines. Implementation of controlled malolactic fermentation is expected to improve aromatic profile of the wine and the overall control of the wine as well.

## Details of the proposal:

### Introduction

Consumer demands for safety food, including safety wine too, are increased in the last decades. One of the goals of the developed countries is to have a high level protection of different food contaminants, which could be produced by microbiological activities during food processing, but contaminants could be also a result of the low level hygiene production conditions. Production of safety wine and control of the wine safety during the production, as well as, the markets control, is one of the policies of R. Macedonia, R. Montenegro and European Union. The high quality criteria for wine exports 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.

The application of natural preservatives is a trend nowadays which is usually used during the production process of fermented food and beverages in order to improve the hygiene production conditions and nutritive value and flavors of the fermented foods, including the wine too. But, as a result of the microorganism's activity undesirable compounds such as **biogenic amines (BA)** are formed. These compounds are related with the fermentation and spoilage processes and could be found in fermented products like cheese, sausage, meat, fish products, alcoholic beverages and wine. Higher ingestion of this compounds lead to several disorders: headache, hyper and hypotension, intoxication of kidney, heart palpitation, dangerous cases of intracerebral bleeding and even a death (Smit et al. 2008). Therefore, the control of BA is necessary. Depending on the wine quality, the total concentration of biogenic amines ranges from few milligrams per liter to 50 mg/l. Legal frame of the maximum content of BA in wine is preparing in the European Union, and also, national legislation of maximum concentration of histamine in wine has been already prepared by some countries. Thus, the allowed content of histamine in some countries is following: 2 mg/L in Germany, 3 mg/l in Netherlands, 5 mg/l in Finland, 5 to 6 mg/L in Belgium, 8 mg/L in France, 10 mg/L in Switzerland and 10 mg/l in Austria.

The main BAs found in wine are histamine, tyramine, putrescine, cadavarin and phenylethylamine (Beneduce et al. 2010). Their presence in the wine adversely affects its quality. These toxic compounds are formed as a result of the presence of free amino acids, decarboxylic microorganisms activity and environmental condition which lead to microbiological development and decarboxylic activity. Fermentation of wine is a complex process that takes place in the presence of yeast and malolactic bacteria. Malolactic fermentation, which occurs after alcoholic fermentation, takes place in the presence of bacteria of the genus *Oenococcus oeni*. The presence of *Lactobacillus*, *Leuconostoc* and *Pediococcus* can cause negative effects on wine. The presence of the malolactic bacteria which could originate from the grapevine, grape skins or equipment in the winery, lead to unpredictable, uncontrolled and spontaneous malolactic fermentation. This kind of malolactic fermentation results with formation of a higher content of volatile acids, microbiological problems and formation of undesirable metabolites such as biogenic amines. To prevent these negative effects inoculation with starter cultures is desirable, that reduce the risk of wine spoiling, enabling rapid development of malolactic fermentation and preventing the development of biogenic amines.

The amount of biogenic amines depends on the grape variety, soil type and composition, fertilization, plant protection products (pesticides) and climatic conditions during grape ripening. Conditions during fermentation, such as temperature, pH, presence of oxygen or content of sodium chloride, also influence the concentration of biogenic amines in the final product. Other factors that influence the formation of biogenic amines in wine are: composition and treatment of the must, length of fermentation in the presence of skins and seeds of grapes, content of alcohol, concentration of sulfur dioxide, added nutrients, pH, temperature and amount and type of reagents for clarification and stabilization of the wine. One part of biogenic amines are formed during the maceration, depending on the applied technology for the production of wine, yeast for fermentation, degree of the yeast autolysis, type of the malolactic bacteria, remain population of the microorganisms, as well as, on the processes of purification and enological treatments of the wine.

Since biogenic amines are small organic molecules that are commonly analyzed with high performance liquid chromatography after pre- or post-column derivatization. Dansyl chloride (Dugo et al, 2006) is usually used as a derivatization reagent. Other separation techniques such as gas chromatography, thin layer chromatography or capillary electrophoresis could be also applied for separation and analysis of BA. The detectors commonly used for biogenic amines are UV-Vis, fluorescence or mass spectrometer detector.

**Vranec** is a dominant grape variety grown in Macedonia and Montenegro, which is one of the most spread varieties grown in both countries. This is autochthonous Montenegrin variety, which is also widely grown in Macedonia, used for production of high quality wines. Vranec wines are characterized by intense dark ruby red color and complex structure. The quality of Vranec grapes and wines in terms of polyphenolic composition is already examined in previous studies (Ivanova et al. In 2012, Ivanova et al. 2011a, Ivanova et al. 2011b). Concerning biogenic amines content, there are no data for their composition and content in Vranec wines, neither in other wines from Macedonia and Montenegro. Therefore, the main goals of this project would be: (1) Development and validation of a method for determination of biogenic amines in wines from Vranec variety applying HPLC-UV/Vis technique with pre-column derivatization and SPE extraction and (2) Application of the method for analysis of wines produced with malolactic bacteria added at different stages of vinification in order to determinate its influence on the formation of biogenic amines. Moreover, analysis of the aromatic profile of wines will be performed in order to determinate the influence of malolactic fermentation on the content of flavors.

# ВТОР ДЕЛ/PART 2:

Researchers:

## Principal researcher

Name Surname	Violeta Ivanova-Petropulos
Title	PhD in Chemical Sciences
Position	Assistant 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	<a href="mailto:violeta.ivanova@ugd.edu.mk">violeta.ivanova@ugd.edu.mk</a>

## 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:

2010-current: 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 Sciences and Mathematics

## Study stays abroad:

02.01.2012– 19.02.2012	Department for Analytical Chemistry, Faculty of Sciences, University of Pecs, Pecs, <b>Hungary</b>
10.05.2009 – 30.7.2009	Department for Analytical Chemistry, Faculty of Sciences, University of Pecs, Pecs, <b>Hungary</b>
20.09.2008 – 16.12.2008	JRU Science for Enology, INRA Montpellier, <b>France</b>
01.02.2008 – 01.04.2008	Department for Analytical Chemistry, Faculty of Sciences, University of Pecs, Pecs, <b>Hungary</b>
08.05.2006 – 02.06.2006	Instituto Sperimentale per l'Enologia di Asti and Consorzio per la Tutela dell' Asti, <b>Italy</b>

She is author of 16 scientific papers, including 10 papers with impact factor in the last 5 years; author/co-author of 26 presentations at scientific conferences, whereas 17 presentation in the last 5 years, including 3 oral presentations at the International CEEPUS symposiums in Nitra, Slovakia (2008), Blagoevgrad, Bulgaria (2009) and Zagreb, Croatia (2010).

Violeta Ivanova is a referee at about 50 papers submitted for publication in the following SCI international journals: *European Food Research and Technology*, *Food and Bioprocess Technology*, *Food Research International*, *Food Chemistry*, *Food Analytical Methods*, *Journal of Food Quality*, *Journal of Medicinal Plants Research*, *Journal of the Serbian Chemical Society* and *Macedonian Journal of Chemistry and Chemical Engineering*.

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

1. **Ivanova V.**, Stefova M., Stafilov T., Vojnoski B., Bíró I., Bufa A., KilárF., Validation of a method for analysis of aroma compounds in red wine using liquid-liquid extraction and GC-MS, *Food Analytical Methods*, 2012, DOI: 10.1007/s12161-012-9401-y, во печат, (IF=1.932).
2. **Ivanova V.**, Stefova M., Vojnoski B., Stafilov T., Bíró I., Bufa A., Felinger A., KilárF., Volatile composition of

Macedonian and Hungarian wines assessed by GC-MS *Food and Bioprocess Technology*, DOI: 10.1007/s11947-011-0760-y, во печат, 2012, (IF=3.576).

3. **Ivanova V.**, Vojnoski B., Stefova M., 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, 2012 (IF=0.477).
4. Dimovska V., **Ivanova V.**, Ilieva F., Sofijanov E., Influence of Bioregulator Gibberellic Acid on Some Technological Characteristics of the Cluster and Berry from Some Seedless Grape Varieties, *Journal of Agricultural Science and Technology B*, 1, 1054-1058, 2011.
5. **Ivanova V.**, Stefova M., Vojnoski B., Dörnyei Á., Márk L., Dimovska V., Stafilov T., Kilár F., Identification of polyphenolic compounds in red and white grape varieties grown in R. Macedonia and changes of their content during ripening, *Food Research International*, DOI:10.1016/J.FOODRES.2011.06.046, 44, 2851-2869, 2011, (IF=2.416).
6. **Ivanova V.**, Vojnoski B., Stefova M., Effect of the winemaking practices and aging on phenolic content of Smederevka and Chardonnay wines, DOI: 10.1007/s11947-011-0566-y, *Food and Bioprocess Technology*, 4(8) 1512-1518, 2011, (IF=3.576).
7. **Ivanova V.**, Dörnyei Á., Stefova M., Stafilov T., Vojnoski B., Kilár B., Márk L., Rapid MALDI-TOF-MS Detection of Anthocyanins in Wine and Grape Using Different Matrices. *Food Analytical Methods* 4, DOI: 10.1007/s12161-010-9143-7, 108-115 (2011) (IF=1.400), 2011.
8. **Ivanova V.**, Dörnyei Á., Márk L., Vojnoski B., Stafilov T., Stefova M., Kilár F., Polyphenolic content of Vranec wines produced by different vinification conditions, *Food Chemistry*, 124(1) 316-325 (2011) (IF=3.146), 2011.
9. **Ivanova V.**, Stefova M., Chinnici F., Determination of polyphenol contents in Macedonian grapes and wines assessed by standardized spectrophotometric methods. *Journal of the Serbian Chemical Society*, 75:45-59 (2010) (IF=0.820).
10. **Ivanova V.**, Stefova M., Vojnoski B., Assay of the phenolic profile of Merlot wines from Macedonia: effect of maceration time, storage, SO<sub>2</sub> and temperature of storage. *Macedonian Journal of Chemistry and Chemical Engineering*, 28, 141-149 (2009) (IF=0.200).
11. **Ivanova V.**, Zendelovska D., Stafilov T., Stefova M., HPLC determination of verapamil in human plasma. *Journal of Biochemical and Biophysical Methods*, 70, 1297-1303 (2008) (IF=2.332).

#### 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
“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. Macedonia	Participant
FP7 Project “Reinforcement of the WBC research capacities for food quality characterization”	from 01.09.2008 to 27.12.2010	European Union	Participant

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

1. To coordinate and organize the project activities (*during the whole period of the project duration*),
2. To follow and control the development of HPLC and GC-MS methods for analysis of biogenic amines and aroma in wines (*Third 1 and 2, 2013*),
3. To follow and control the wine-making (*Third 3, 2013*),
4. To train junior researchers during the project activities, applying the most sophisticated techniques for wine analysis (*during the whole period of the project duration*),
5. 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 2 and 3, 2014*)
6. To prepare Reports (*at the end of the first and second project year, Third 3, 2013 and Third 3, 2014*).

## Principal investigator

Name Surname	<b>Violeta Dimovska</b>
Title	PhD of agricultural sciences
Position	Associate professor
Address	<b>University "Goce Delcev" – Stip, Faculty of agriculture, Krste Misirkov bb, 2000 Stip</b>
Tel./Fax.	<b>032 550 637 / 032 550 001</b>
e-mail	<a href="mailto:violeta.dimovska@ugd.edu.mk">violeta.dimovska@ugd.edu.mk</a>

### Short CV:

Born on 25.02. 1966 in Kavadarci, Republic of Macedonia. Primary and secondary school completed in Kavadarci

#### Education:

2000 *Ph.D.* - Faculty of Agriculture, Skopje. Title of doctoral dissertation: "THE EFFECTS OF SOME AMPELOTECHNICAL MEASURES IN TABLE GRAPE AND SEEDLESS GRAPE PRODUCTION "

1994 *M.Sc* - Faculty of Agriculture, Skopje. Title of master work: "COMPARABLE RESEARCHES OF INTRODUCED CULTIVARS OF GRAPE FOR PRODUCTION OF QUALITY AND PREMIUM WHITE WINES IN WINE GROWING DISTRICT OF TIKVES"

1989 *B.Sc* - Faculty of Agriculture, Skopje, Agronomy

#### Working experience (employment):

1990 – 2000- Institut of Agriculture, Skopje, Assistant of viticulture

2001 -2005 Institut of Agriculture, Skopje, Scientific colaborater

2006-2009= Institut of Agriculture, Skopje, Associate pofessor

2009 -current-University Goce Delcev, Faculty of agricultute, Stip. Associate professor

### 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. K. Beleski, Z. Bozinovic, **V. Dimovska**, K.Boskov, V. Bakeva (2007): Philometric study of some wine grapevine cultivar (*Vitis vinifera* L.) from the balcan subgrup (subconvarietas balcanica Negr.). XV International Symposium, GESCO. 637-644, vol.1. Porec, Croatia.
2. Boskov K., Bozinovic Z., Petkov M., **Violeta Dimovska**, Beleski K. (2007): The effect of pruning and cluster thinning for producing of dessert wines raw metrial from Semillon cultivar in Skopje wine district DISTRICT conditions. XV International Symposium, GESCO. 902-910, vol2. Porec, Croatia.
3. Biljana Markovska, Zvonimir Bozinovic, **Violeta Dimovska**, Elizabeta Angelova, Srebra Ilic-Popova (2007):Investigation of anatomical characteristics of some wine and table grapevine cultivars, in Skopje area vineyards. XV International Symposium, GESCO. 1016-1026, vol 2. Porec, Croatia.
4. Klime Beleski, **Violeta Dimovska**, Zvonimir Bozinovic (2008): Climate influence on the grapevine phenology and anthocyanins conten in wines from the Skopje vineyard area, Republic of Macedonia. VII<sup>th</sup> International terroir Congres, Nyon, Suisse.
5. **Violeta Dimovska**, Klime Beleski (2010): The influense of climate on the grapevine phenology and content of sugar and total acids in the must. VIII International Terroir congress, juni 14<sup>th</sup>-18<sup>th</sup>. Soave (Vr), Italy.
6. **Violeta Dimovska**, Violeta Ivanova, Fidanka Ilieva, Elenica Sofijanova, Petar Kletnikoski (2011): The state of table grape varieties in R. Macedonia.Sciense&Teshnologies vol.I, N<sub>0</sub> 6, page 30-34.
7. Violeta Ivanova, Marina Stefova, Borimir Vojnoski, Ágnes Dörnyei, László Márk, **Violeta Dimovska**, Trajče Stafilov, Ferenc Kilar (2011):Identification of polyphenolic compounds in red and white grape varieties and change of their content during ripening. Food Research International. 44. 2851-2860 (**impact factor 2,416**).
8. **Violeta Dimovska**, Violeta Ivanova, Ana Serafimovska, Borimir Vojnoski, Fidanka Ilieva
9. (2011): Comparasion of four merlot clonal selection from Skopje's vineyard region, R.Macedonia. Food science, engineering and technologies.Scientific works. Vol LVIII, Issue 2,43-48
10. **V. Dimovska**, V. Ivanova, F. Ilieva, E. Sofijanova (2011): Influence of bioregulator gibberellic acid on some technological characteristics of cluster and berry from some seedless grape varieties. Journal of Agricultural Science and Technology B 1, 1054-1058.
11. **Violeta Dimovska**, Klime Beleski, Violeta Ivanova, Krum Boskov, Fidanka Ilieva (2012): Agro-biological and technological characteristics of four Cabernet Franc (*Vitis vinifera* L.) clones grown in Republic of Macedonia. Proceedings. 47th Croatian and 7th International Symposium on Agriculture. Opatija. Croatia (756–760).

### Participation in research projects

Project title	Period	Financed by	Role in the project (PI or participant)
Production and technological characteristics of some introduction varieties and vine clones and determining the quality of the wine.	2004-2006	Ministry of Education and Science	Participant
Vegetative propagation of surfaces of fruits and vine and selection of varieties.	2004-2006	Ministry of Education and Science	Main researcher
Using local resources for microregional development of sustainable agribusiness and tourism in the Southern Balkan	2010-2012	TEMPUS	Participant

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

Following the dynamics of Vranec grape ripening (*Third 2 and 3, 2013*), including:

1. Determination of maturity degree of grapes, analyzing the content of sugar and total acids in must
2. Analysis of grape at every 7 days, starting from veraison till the maturity degree of 23 g/l sugar
3. Grape harvesting and vinification according to the project activities
4. Following the fermentation, stabilization of wine and bottling
5. 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 2 and 3, 2014*)

## Principal investigator

Name Surname	Marina Stefova
Title	PhD
Position	Associate Professor
Address	Ss Cyril and Methodius University, Faculty of Natural Sciences and Mathematics, Gazi baba bb, 1000 Skopje
Tel./Fax.	02 3 249 934 / 02 3226 865
e-mail	<a href="mailto:marinaiv@pmf.ukim.mk">marinaiv@pmf.ukim.mk</a>

### Short CV:

#### Education:

- 1988 - 1993 – Bachelor of Chemistry, Faculty of Natural Sciences and Mathematics (FNSM), Ss Cyril and Methodius University, Skopje
- 1997 – Master of Science in chemistry, FNSM, Ss Cyril and Methodius University, Skopje
- 2001. – PhD in chemistry, FNSM, Ss Cyril and Methodius University, Skopje

#### Employment:

- 1993 – demonstrator at the Institute of chemistry, FNSM, Ss Cyril and Methodius University
- 1996 – younger researcher at the Institute of chemistry, FNSM, Ss Cyril and Methodius University
- 1997, 2000 – young researcher at the Inst. chemistry, FNSM, Ss Cyril and Methodius University
- 2003 – assistant professor at the Inst. chemistry, FNSM, Ss Cyril and Methodius University
- 2007-current – associate professor at the Inst. chemistry, FNSM, Ss Cyril and Methodius University

#### Teaching:

- first cycle studies in chemistry – Instrumental analytical methods A, Methodics in chemistry 1 and 2
- second cycle studies in chemistry – Methodology of scientific research, Trace analysis, Forensic chemistry, Analysis of drugs

#### Research and professional activities:

- author/co-author of 56 scientific articles (32 in peer reviewed journals with impact factor), articles cited in SCI from last 5 years given below.
- author/co-author of 73 presentations at scientific conferences
- coordinator of one bilateral (Macedonian-Bulgarian) research project and two FP7 projects from the Research Potential program of the European Commission (given below)
- supervisor of 2 defended PhD thesis and 4 more PhD theses approved for realization
- 2006-2011 – member of the editorial board and from 2012, secretary of the *Maced. J. Chem. Chem. Eng.* published by the Society of chemists and technologists of Macedonia ((IF: 0,459 for 2010).

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

1. V. Ivanova, D. Zendelovska, M. Stefova, T. Stafilov, HPLC METHOD FOR DETERMINATION OF VERAPAMIL IN HUMAN PLASMA AFTER SOLID-PHASE EXTRACTION, *J. Biochem. Biophys. Methods* **70**, 1297-1303 (2008). (IF 2009: 2,332; 2008: 1,994)
2. K. I. Alipieva, E. P. Kostadinova, L. N. Evstatieva, M. Stefova, V. S. Bankova, AN IRIDOID AND A FLAVONOID FROM *Sideritis lanata* L., *Fitoterapia* **80**, 51-53 (2009). (IF 2009: 1,363; 2008: 1,200)
3. V. Ivanova, M. Stefova, B. Vojnoski ASSAY OF THE PHENOLIC PROFILE OF MERLOT WINES FROM MACEDONIA: EFFECT OF MACERATION TIME, STORAGE, SO<sub>2</sub> AND TEMPERATURE OF STORAGE, *Maced. J. Chem. Chem. Eng.*, **28**, 141-149 (2009). (IF 2009: 0,200)
4. V. Ivanova, M. Stefova, F. Chinnici, DETERMINATION OF POLYPHENOL CONTENTS IN MACEDONIAN GRAPES AND WINES ASSESSED BY STANDARDIZED SPECTROPHOTOMETRIC METHODS, *J. Serb. Chem. Soc.* **75**(1), 45-59 (2010). (IF 2009: 0,820)
5. K. Alipieva, J. Petreska, Á. Gil-Izquierdo, M. Stefova, L. Evstatieva, V. Bankova, INFLUENCE OF THE EXTRACTION METHOD ON THE YIELD OF FLAVONOIDS AND PHENOLICS FROM *Sideritis* spp. (Pirin mountain tea), *Natural Product Communications* **5**(1), 51-54, (2010). (IF 2009: 0,745)
6. S. Kostadinović, M. Stefova, D. Nikolova, D. Nedelcheva, N. Martinez, D. Lorenzo, E. Dellacassa, H. Mirhosseini, MULTIVARIATE ANALYSIS DISCRIMINATION OF VARIOUS COLD-PRESSED LEMON OILS FROM DIFFERENT GEOGRAPHICAL REGIONS, *Journal of Food, Agriculture & Environment* **8**(2), 132-136, (2010). (IF 2009: 0,349)
7. M.A. Shishovska, V.P. Trajkovska, M.T. Stefova, A SIMPLE HPLC METHOD FOR DETERMINATION OF PERMETHRIN RESIDUES IN WINE, *Journal of Environmental Science and Health, Part B*, **45**(7), 694-701 (2010). (IF 2009: 1,097)
8. M. Kajdžanoska, V. Gjamovski, M. Stefova, HPLC-DAD-ESI-MS<sup>n</sup> IDENTIFICATION OF PHENOLIC COMPOUNDS IN CULTIVATED STRAWBERRIES FROM MACEDONIA, *Maced. J. Chem. Chem. Eng.*, **29**(2), 181-195 (2010). (IF 2009: 0,200)
9. V. Ivanova, Á. Dörnyei, L. Márk, B. Vojnoski, T. Stafilov, M. Stefova, F. Kilár, POLYPHENOLIC CONTENT OF VRANEC WINES PRODUCED BY DIFFERENT VINIFICATION CONDITIONS, *Food Chemistry* **124**(1), 316-325 (2011). (IF 2009: 3,146)
10. J. Petreska; M. Stefova; F. Ferreres; D.A. Moreno; F.A. Tomás-Barberán; G. Stefkov; S. Kulevanova; Angel Gil-Izquierdo, POTENTIAL BIOACTIVE PHENOLICS OF MACEDONIAN *Sideritis* SPECIES USED FOR MEDICINAL "Mountain Tea", *Food Chemistry*, **125**(1), 13-20 (2011). (IF 2009: 3,146)
11. J. Petreska, G. Stefkov; S. Kulevanova, K. Alipieva, V. Bankova, M. Stefova, PHENOLIC COMPOUNDS OF MOUNTAIN



- TEA FROM THE BALKANS: LC/DAD/ESI/MSN PROFILE AND CONTENT, *Natural Product Communications* **6**(1), 21-30, (2011). (IF 2009: 0,745)
12. J. Petreska, M. Stefova, F. Ferreres, D.A. Moreno, F.A. Tomás-Barberán, G. Stefkov, S. Kulevanova, A. Gil-Izquierdo, DIETARY BURDEN OF PHENOLICS PER SERVING OF "MOUNTAIN TEA" (Sideritis) FROM MACEDONIA AND CORRELATION TO ANTIOXIDANT ACTIVITY, *Natural Product Communications* **6**(9), 1305-1314, (2011). (IF 2010: 0,894)
  13. V. Ivanova, Á. Dörnyei, Stefova, T. Stafilov, B. Vojnoski, F. Kilár, M. L. Márk, RAPID MALDI-TOF-MS DETECTION OF ANTHOCYANINS IN WINE AND GRAPE USING DIFFERENT MATRICES, *Food Analytical Methods* **4**(1), 108-115 (2011), DOI 10.1007/s12161-010-9143-7. (IF 2009: 1,400)
  14. V. Gavrilova, M. Kajdzanoska, V. Gjamovski, M. Stefova, SEPARATION, CHARACTERIZATION AND QUANTIFICATION OF PHENOLIC COMPOUNDS IN BLUEBERRIES AND RED AND BLACK CURRANTS BY HPLC-DAD-ESI-MS<sup>n</sup>, *J. Agric. Food. Chem.* **59**(8), 4009-4018 (2011). (IF: 2,469)
  15. M. Kajdzanoska, J. Petreska, M. Stefova, COMPARISON OF DIFFERENT EXTRACTION SOLVENT MIXTURES FOR CHARACTERIZATION OF PHENOLIC COMPOUNDS IN STRAWBERRIES. *J. Agric. Food Chem.* **59**(10) 5272-5278 (2011). (IF: 2,469)
  16. E. Veljanoska-Sarafiloska, M. Jordanoski, T. Stafilov, M. Stefova, STUDY OF ORGANOCHLORINE PESTICIDE RESIDUES IN WATER, SEDIMENT AND FISH TISSUE IN LAKE OHRID (MACEDONIA/ALBANIA), *Maced. J. Chem. Chem. Eng.* **30**(2), 163-180 (2011). (IF 2010: 0,459)
  - A. Petkovska, H. Babunovska, M. Stefova, FAST AND SELECTIVE HPLC-DAD METHOD FOR DETERMINATION OF PHOLCODINE AND RELATED SUBSTANCES, *Maced. J. Chem. Chem. Eng.* **30**(2), 139-150 (2011). (IF 2010: 0,459)
  17. V. Ivanova, B. Vojnoski, M. Stefova, EFFECT OF WINEMAKING PRACTICES AND AGING ON PHENOLIC CONTENT OD SMEDEREVKA AND VRANEC WINES, *Food and Bioprocess Technology* **4**(8), 1512-1518 (2011). (IF 2010: 3,576)
  18. V. Ivanova, M. Stefova, B. Vojnoski, Á. Dörnyei, L. Márk, V. Dimovska, T. Stafilov, F. Kilár, IDENTIFICATION OF POLYPHENOLIC COMPOUNDS IN RED AND WHITE GRAPE VARIETIES GROWN IN R. MACEDONIA AND CHANGES OF THEIR CONTENT DURING RIPPENING, *Food Research International* **44**(9), 2851-2860 (2011). (IF 2010: 2,416)
  19. Bogeski, R. Gulaboski, R. Kappl, V. Mirceski, M. Stefova, J. Petreska, M. Hoth, CALCIUM BINDING AND TRANSPORT BY COENZYME Q, *J. Am. Chem. Soc.*, **133**(24), 9293-9303 (2011). (IF 2010: 9,023).

#### Participation in research projects:

Project title, (Period), Financed by, Role in the project (PI or participant)

1. Chemical characterization of wild growing medicinal and aromatic plants of the *Lamiaceae* family and evaluation of the possibilities for their cultivation, (2005-2007) ,Ministry of Education and Science of Macedonia, Principal investigator
2. SWOT-CHEMISTRY-FOOD Evaluation of the Research Capacity and Development of a Strategy for Further Growth in Chemistry in General and in Food Science in Particular <http://www.chemistryfood.pmf.ukim.edu.mk/>, (01.02.2009-01.02.2010), FP7, European Commission, coordinator (principal investigator)
3. CHROMLAB-ANTIOXIDANT Reinforcement of the WBC Research Capacities for Food Quality Characterization <http://chromlab.pmf.ukim.edu.mk>, (01.02.2008- 31.01.2011), FP7, European Commission, coordinator (principal investigator)
4. Development of methods for chemical characterization of antioxidant and toxic substances in environmental and food samples, (2010-2012), Ministry of Education and Science of Macedonia, Participant

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

1. To follow development of HPLC and GC methods for analysis of biogenic amines and aroma in wines (*Third 1, 2013*)
2. To participate in training of junior researches during the projects, including training of HPLC-mass spectrometry technique (*Third 1 and 3, 2013*).
3. To give suggestions and to participate in discussions about the results, (*during the whole period of the project*) and to participate in discussions with the wineries.
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 2 and 3, 2014*).

**Junior researcher**

Name Surname	Krste Tašev
Title	MSc. in chemistry science
Position	PhD Student
Address	Institute of Chemistry, Faculty of Natural Sciences and Mathematics, Skopje
Tel./Fax.	++389 70 403 779
e-mail	tkrste@gmail.com

**Short CV:**

Born in Kavadraci on 23.12 1976, where he has finished elementary and secondary school.

**Education:**

1994-2002 – BSc in Chemical Sciences, Institute of Chemistry, Faculty of Natural Sciences and Mathematics, Skopje

2002-2007 – MSc in Chemical Sciences, Institute of Chemistry, Faculty of Natural Sciences and Mathematics, Skopje

(MSc thesis title: “Methods for determination of the total and chemical species of arsenic, iron and mercury in wine with atomic absorption spectrometry”)

**Working experience:**

2004-2007 - a junior expert for plant protection products on the project for Establishing of integrated phytosanitary system in R. Macedonia, as well as establishing of State Phytosanitary Laboratory

2007- current – collaborator and Head of department of chemical testing in the State Phytosanitary Laboratory, Ministry of agriculture forestry and water economy

**Training abroad, participation in several workshops:**

1. 7-14 March 2010 “Training for pesticides residues analysis in fruit and vegetable with GC/MS and LC/MS” in laboratory of AGRIQ in Wageningen Netherlands
2. 26 - 30 October 2009 NAK AGRO Netherlands Integrated management systems and audit
3. 8 – 19. 05. 2006 Central Scientific laboratory, York, UK Training for “pesticides formulation analysis techniques used at CSL, including determination of active substance and physical property tests using CIPAC methods and screening for impurities by GC-MS”
4. 28-02. 12 2005 Central laboratory for chemical testing, Sofia, R.Bulgaria “Training for laboratory management control and methods for analysis of pesticides formulation
5. 8-18. 11. 2005 training for „ Requirements to Food Quality Control (products of plant origin) “, Feldafing, Germany

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

6. K. Tašev, I. Karadjova, T. Stafilov DETERMINATION OF INORGANIC AND TOTAL ARSENIC IN WINES BY HYDRIDE GENERATION ATOMIC ABSORPTION SPECTROMETRY, *Microchim. Acta*, 2004
7. K. Tašev, I. Karadjova, S. Arpadjan, J. Cvetković, T. Stafilov, Liquid/liquid extraction and column solid phase extraction procedures for iron species determination in wines, *Food Control*, **17**, 484-488, 2006

**Participation in research projects**

Project title	Period	Financed by	Role in the project (PI or participant)
Development of methods for the determination of chemical species of toxic and essential elements in food and environmental samples, Bulgarian-Macedonian Intergovernmental S&T Cooperation N°17-2033/4 from 31.03. 2005	2004-2007	Ministry of education and science	participant

**Title of the MSci or PhD theses: „OPTIMIZATION OF ANALYTICAL METHODS FOR BIogenic AMINES CONTROL AND THEIR DETERMINATION IN MACEDONIAN WINES “****Tasks to be conducted in the frame of the project proposal (timetable)**

1. To be trained to use HPLC-MS and gas chromatography for analysis of biogenic amines and aroma in wine (*Third 1, 2 and 3, 2013*)
2. To participate in preparation of wine samples for extraction (*Third 1,2 and 3, 2013*)
3. To develop and validate method for HPLC and GC MS methods for biogenic amines and aroma in wines (*Third 1,2 and 3, 2013*)
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 2 and 3, 2014*).

**Junior researcher**

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

**Short CV:**

Born 8/11/12 Štip, Macedonia

**Education and Training:**

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

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

**Employment and working experience:**

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

2012 – current – Assistant, 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, Škopje, 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 Reuters (if any) of the journals in which each paper was published**

1. **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* (in press). **IF-1.67**
2. **Balabanova, B.**, Stafilov, T., Šajn, R., Bačeva, K. 2012: Total Deposited Dust as a Reflection of Heavy Metals Distribution in area with Intensively Exploited Copper Minerals, *Geologica Macedonica*, **25**, 1-9.
3. **Balabanova, B.**, Stafilov, T. Šajn, R Bačeva, K. 2011: Distribution of chemical elements in attic dust as reflection of their geogenic and anthropogenic sources in the vicinity of the copper mine and flotation plant, *Archives of Environmental Contamination and Toxicology*, **61**, 173-184. **IF-1.93**
4. **Balabanova, B.**, Stafilov, T. Bačeva, K., Šajn, R. 2010: Biomonitoring of atmospheric pollution with heavy metals in the copper mine vicinity located near Radoviš, Republic of Macedonia, *Journal of environmental science and health*, **12**, 1504-1518. **IF-1.263**
5. **Balabanova, B.**, Stafilov, T. Bačeva, K., Šajn, R., 2009: Atmospheric pollution with copper around copper mine and flotation, Bučim, Republic of Macedonia, using biomonitoring moss and lichen technique, *Geologica Macedonica*, **23**, 35-41.

**Participation in research projects**

Project title	Period	Financed by	Role in the project (PI or participant)
/	/	/	/

**Title of the MSci or PhD theses**

**"Litogenic and anthropogenic impact on various chemical elements distribution in soil and air in the river Bregalnica environs"**

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

1. To participate in preparation of the laboratory and laboratory equipment for extraction of biogenic amines and aroma (*Third 1, 2 and 3, 2013*)
2. To perform preparation of wines for GC-QQQ MS analysis, including liquid-liquid extraction of aroma compounds in Vranec wines (*Third 3, 2013*)
3. To be trained for using gas chromatography for analysis of wine aroma (*Third 1,2 and 3, 2013, Third 2, 2014*)
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 2 and 3, 2014*).

## Junior researcher

<b>Name Surname</b>	<b>Fidanka Ilieva</b>
<b>Title</b>	<b>MSc in agricultural sciences</b>
<b>Position</b>	<b>Assistant</b>
<b>Address</b>	<b>University "Goce Delcev" – Stip, Faculty of Agriculture, Krste Misirkov bb, 2000 Stip</b>
<b>Tel./Fax.</b>	<b>00389 75 478 178/ 00389 32 550 001</b>
<b>e-mail</b>	<b>fidanka.ilieva@ugd.edu.mk</b>

### Short CV:

Born on 04.11.1971 in Skopje, Republic of Macedonia Primary and secondary school has completed in Skopje.

### Education:

2005 – 2008: MSc in agricultural sciences, field Microbiology of soils and water, Faculty of Agricultural Sciences and Food in Skopje; MSc thesis titled "Application of pure cultures of microorganisms for purifying waste water from the collector system Ohrid Lake".

2010 – current: PhD studies at the University of Food Technology, Plovdiv, R. Bulgaria, Department for alcoholic and nonalcoholic beverages. The title of the PhD thesis: "Isolation and selection of yeasts for production of regional wines from the Tikveš region"

### Working experience:

2009 – current: Assistant at Faculty of Agriculture, University "Goce Delčev" - Štip

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

1. Stavreva-Veselinovska S., **Ilieva F.**, Application of Clean Cultures of Microorganisms in The Purification of the Collectro System "Ohridsko Ezero", International Conference on Plant & Environmental Pollution, Kayseri, Turkey, *Abstract book*, p. 23, (2009).
2. Stavreva-Veselinovska S., **Ilieva F.**, How Did Nature Select the Best Species of Eacs Generation? International Conference on Plant & Environmental Pollution, Kayser, Turkey, *Abstract book*, p. 129, (2009).
3. Stavreva-Veselinovska S., **Ilieva F.**, Using active board for accessible and effective education in primary schools, Uciteljski fakultet, Sombor, (2009).
4. **Ilieva F.**, Mihajlov Lj., Zlatkovski V. Organic production of Oyster mushroom in the Republic of Macedonia. International Conference on Organic Agriculture in Skope of Environmental Problems (2009).
5. **Ilieva F.**, Mihajlov Lj., Zlatkovski V. Purification of Lake Of Ohrid Sewage System Waste Waters By Use of Pure Microorganism Strains, Scientific Conference "Food Science, Engineering and Tehnologies" UFT-Plovdiv, (2010).
6. Violeta Dimovska, Violeta Ivanova, **Fidanka Ilieva**, Elenica Sofijanova, Petar Kletnikoski (2011): The state of table grape varieties in R. Macedonia. *Sciense&Teshnologies* vol.I, NO 6, page 30-34.
7. Violeta Dimovska, Violeta Ivanova, Ana Serafimovska, Borimir Vojnoski, **Fidanka Ilieva** (2011): Comparasion of four merlot clonal selection from Skopje's vineyard region, R.Macedonia. *Food science, engineering and technologies. Scientific works*. Vol LVIII, Issue 2, 43-48
8. V. Dimovska, V. Ivanova, **F. Ilieva**, E. Sofijanova (2011): Influence of bioregulator gibberellic acid on some technological characteristics of cluster and berry from some seedless grape varieties. *Journal of Agricultural Science and Technology B* 1, 1054-1058.
9. **Fidanka Ilieva**, Hristo Spasov, Violeta Dimovska, E.D.Barbareeva, Vasko Zlatkovski (2011): Production of biogas from waste waters using pure cultures from the strain *Methanosarcinabarkeri*. *Food science, engineering and tehcnologies. Scientific works*. Vol LVIII, Issue 2, 247-250.
10. Violeta Dimovska, Klime Beleski, Violeta Ivanova, Krum Boskov, **Fidanka Ilieva** (2012): Agro-biological and technological characteristics of four Cabernet Franc (*Vitis vinifera* L.) clones grown in Republic of Macedonia. *Proceedings. 47th Croatian and 7th International Symposium on Agriculture*. Opatija. Croatia (756–760).

### Title of the MSc or PhD theses

**PhD thesis: "Isolation and selection of yeasts for production of regional wines from the Tikveš region"**

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

1. To participate in wine-making and ensuring commercial wines from the wineries (*Third 2 and 3, 2013*)
2. To participate in prepration of the laboratory equipement for wine aroma extracion (*Third 1 and 2, 2013*)
3. To be trained for GC-MS analysis of wine (*Third 1 and 2, 2013*),
4. To participate in writing scientific papers and their publication in scientific journals with impact factor and scientific conferences (*Third 3, 2012; Third 3, 2013*).

**Junior researcher**

<b>Name Surname</b>	<b>Jasmina Petreska Stanoeva</b>
<b>Title</b>	<b>Master of science</b>
<b>Position</b>	<b>Young assistant</b>
<b>Address</b>	<b>Institute of Chemistry, Faculty of Natural Sciences and Mathematics, Arhimedova 5, 1000 Skopje</b>
<b>Tel./Fax.</b>	<b>+389 2 3249 935</b>
<b>e-mail</b>	<b><a href="mailto:jasmina.petreska@pmf.ukim.mk">jasmina.petreska@pmf.ukim.mk</a></b>

**Short CV:**

Date and place of birth: 30.07.1984, Prilep, R. Macedonia

Education:

2008-2010 - **M.Sc.** course student at the Institute of Chemistry, Faculty of Natural Science and Mathematics, Skopje, R. Macedonia

2003-2007 - **B.Sc.** Institute of Chemistry, Faculty of Natural Science and Mathematics, Sts. Cyril and Methodius University, Skopje, R. Macedonia

Direction: applied chemistry, analytical structure

Work experience:

- Working on projects of the structural chemistry i.e. examine the structure of the liquids
  - Volunteer work in “AD Pivara Prilep”, Prilep, R. Macedonia
  - Demonstrator – teaching the laboratory + numerical exercises for basic Analytical Chemistry course and course by Instrumental Analysis, Institute of Chemistry, Faculty of Natural Science and Mathematics, Skopje, R. Macedonia from 01.10.2007
  - Training: work with mass spectrometer in the *Department of Food Science and Technology, National Centre for Scientific Research (CSIC-CEBAS), Murcia, Spain (Oct-Dec 2008)*
  - Working on FP7 project: CHROMLAB-ANTIOXIDANT from 01. 09. 2008
  - Analytical skills development course at the laboratory of Finnish Institute for verification on Chemical Weapons, VERIFIN, Department of chemistry, University of Helsinki (28. 05. – 11. 06. 2010)
- Young assistant – Institute of Chemistry, Faculty of Natural Science and Mathematics, Skopje, R. Macedonia from 27.12.2010.

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

1. **J. Petreska**, Lj. Pejov, Comparison of methods for solving the vibrational Schrödinger equation in the course of sequential Monte-Carlo-quantum mechanical treatment of hydroxide ion hydration. *Macedonian Journal of Chemistry and Chemical Engineering* 2010 (29), 203-213. (**IF: 0,459**)
2. K. Alipieva, **J. Petreska**, A. G. Izquierdo, M. Stefova, Lj. Evstatieva, V. Bankova, Influence of the Extraction Method on the Yield of Flavonoids and Phenolics from *Sideritis* spp. (Pirin Mountain tea). *Natural Product Communications*, 2010 (5), 51-54. (**IF: 0,894**)
3. **J. Petreska**, M. Stefova, F. Ferreres; D.A. Moreno; F.A. Tomás-Barberán; G. Stefkov, S. Kulevanova, A. Gil-Izquierdo, Potential bioactive phenolics of Macedonian *Sideritis* species used for medicinal “Mountain Tea”. *Food Chemistry*, 2011 (125), 13-20. (**IF: 3,458**)
4. **J. Petreska**, G. Stefkov, S. Kulevanova, K. Alapieva, V. Bankova, M. Stefova, Phenolic compounds of mountain tea from the Balkans: LC/DAD/ESI/MS<sup>n</sup> profile and content. *Natural Product Communications*, 2011 (6), 21-30. (**IF: 0,894**)
5. M. Kajdžanoska, **J. Petreska**, M. Stefova, Comparison of different extraction solvent mixtures for characterization of phenolic compounds in strawberries. *Journal of Agricultural and Food Chemistry*, 2011, 59 (10), 5272–5278. (**IF: 2,816**)
6. I. Bogeski, R. Gulaboski, R. Kappl, V. Mirceski, M. Stefova, **J. Petreska**, M. Hoth, Calcium Binding and Transport by Coenzyme Q. *Journal of the American Chemical Society*, 2011, 133, 9293–9303. (**IF: 9,023**)
7. **J. Petreska**, M. Stefova, F. Ferreres, D. A. Moreno, F. A. Tomás-Barberán, G. Stefkov, S. Kulevanova, A. Gil-Izquierdo, Dietary burden of phenolics per serving of “Mountain Tea” (*Sideritis*) from Macedonia and correlation to antioxidant activity. *Natural Product Communications*, 2011, 6, 1305–1314. (**IF: 0,894**)
8. **J. Petreska Stanoeva**, D. Bagashovska, M. Stefova, Characterization of urinary bioactive phenolic metabolites excreted after consumption of a cup of mountain tea (*Sideritis scardica*) using liquid chromatography – tandem mass spectrometry. *Macedonian Journal of Chemistry and Chemical Engineering* 2012, in press. (**IF: 0,459**).

**Participation in research projects**

Project title	Period	Financed by	Role in the project (PI or participant)
Reinforcement of the WBC research capacities for food quality characterization	од 01. 09. 2008 до 27. 12. 2010	European Union	pi

**Title of the MSc theses: “A study of hydration of aqueous OH<sup>-</sup> ion by combined Monte Carlo – quantum mechanical methodology”**

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

1. To develop and validate HPLC and GC methods for biogenic amines analysis (*Third 1 and 2, 2013*),
2. To participate in writing scientific papers and their publication in scientific journals with impact factor and scientific conferences (*Third 3, 2012; Third 3, 2013*).

**Junior researcher** (use separate sheets for each participant, minimum 2 participants)

Name Surname	<b>Dalibor Jovanov</b>
Title	<b>MSc</b>
Position	<b>Assistant, University "Goce Delčev" - Štip, Faculty of Agriculture</b>
Address	<b>„Krstev Misirkov“ bb 2000, Štip, Republic of Macedonia</b>
Tel./Fax.	<b>+ 389 32 550 613</b>
e-mail	<b>dalibor.jovanov@ugd.edu.mk</b>

**Short CV:**

Born on 15.09.1980 in Sveti Nikole. Finished primary and secondary school in hometown. In 2009

Education:

2012 - PhD student at Faculty of Agricultural Sciences and food, Skopje

2007-2010 – Master of agricultural sciences, Faculty of Agriculture, Skopje

1999-2004 – BSc in agriculture, Faculty of Agriculture, Skopje

Working experience:

2007-2012 – Younger assistant at Faculty of Agriculture, University "Goce Delčev" Štip

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

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

1. **Dalibor Jovanov**, Tena Sijakova-Ivanova, Mite Ilievski (2012): *Moisture retention characteristics in the Vertisols of the Štip, Probitip and Sv. Nikole region*. *Agriculturae Conspectus Scientificus*, Vol. 77 (1-7).
2. **Dalibor Jovanov**, Tena Sijakova-Ivanova, Biljana Petkovska: *X - ray diffraction and mineralogical study of vertisol in eastern Macedonia*. *IIOABJ*, 2012; Vol.3 (1):26-30.
3. Mite Ilievski, Dragica Spasova, Milan Georgievski, Biljana Atanasova, **Dalibor Jovanov** (2011): *Quality of the grain of Macedonian wheat genotype in different production systems*. *Journal of Hygienic Engineering and Design* (231-233).
4. Mite Ilievski, Dragica Spasova, Milan Georgievski, Biljana Atanasova, **Dalibor Jovanov** (2011): *The characteristics of some Macedonian wheat genotypes in organic and conventional production*. 1st National Agriculture Congress and Exposition on behalf of Ali Numan Kirac with International Participation (2353-2361).

**Participation in research projects**

Project title	Period	Financed by	Role in the project (PI or participant)

**Title of the MSci or PhD theses**

**„Water, physical and physical-mechanical properties of vertisols of the Štip, Probitip and Sv. Nikole region“**

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

1. To participate in the process of following the grape maturity (*Third 2 and 3, 2013*),
2. To participate in wine-making and ensuring commercial wines from the wineries (*Third 2 and 3, 2013*)
3. To participate in preparation of the laboratory and laboratory equipment for extraction of wine aroma (*Third 1 and 2, 2013*)
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 2 and 3, 2014*).