

ŽIVILSTVO – TEORETIČNI PREDMETI

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Fizikalno-biokemijske metode
Course title:	Physical-biochemical methods

Študijski programi in stopnja	Študijska smer	Letnik	Semestri
Bioznanosti, tretja stopnja, doktorski	Živilstvo		Celoletni

Univerzitetna koda predmeta/University course code: 3868

Predavanja	Seminar	Vaje	Klinične vaje	Druge oblike študija	Samostojno delo	ECTS
10	10	20	0	0	85	5

Nosilec predmeta/Lecturer: Nataša Poklar Ulrih

Izvajalci predavanj:	Gregor Anderluh, Janez Plavec, Nataša Poklar Ulrih
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type: teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij	General conditions for enrolment in doctoral studies.

Vsebina:	Content (Syllabus outline):
Študentje se bodo srečali z osnovami fizikalne-biokemije bioloških molekul, interakcijami med molekulami, vezanjem majhnih molekul (antibiotiki, aditivi, antioksidanti, kovinski ioni, etc. na makromolekule). Za proučevanje stabilnosti, interakcij in strukture molekul bodo študentje spoznali kalorimetrijo in spektroskopske tehnike, ki imajo široko uporabnost v živilstvu, farmaciji, biokemiji, medicini in drugih področjih. Površinska plazmonska resonanca (SPR) je tehnika, ki se je v	Students will meet with the basics of physical-chemistry of biological molecules, interactions between molecules, binding of small molecules (antibiotics, additives, antioxidants, metal ions, etc..) to macromolecules. To study the stability, interactions and molecular structure, students will be introduced to differential scanning calorimetry and spectroscopic techniques, which have wide applicability in the food industry, pharmacy, biochemistry, medicine and other fields. Surface

zadnjih letih pokazala tudi kot zelo pomembno orodje v farmacevtski in prehrabeni industriji. Vključi se lahko v vse faze odkrivanja novih zdravil, izboljševanja njihovih lastnosti, saj je možno zelo enostavno in hitro pregledati večje število vezavnih partnerjev za potencialne terapevtske tarče. Tista, ki se močno vežejo na receptorje, lahko v naslednji stopnji analiziramo z drugimi metodami. SPR postaja pomembno orodje tudi v prehrabeni industriji, kjer ga lahko uporabimo za kontrolo kvalitete hrane. Iz kompleksne mešanice molekul lahko hitro in z veliko natančnostjo zasledimo vezavo že zelo majhnih količin iskane molekule. Opisane bodo tudi komplementarne metode za študij molekularnih interakcij kot so izotermalna mikrokalorimetrija in termoforeza. Študentje bodo spoznali tudi različne tipe biosenzorjev, tako tiste, ki za svojo detekcijo uporabljajo encime, imunološka protitelesa, celične strukture, kot tudi cele mikroorganizme. Pri tem se bodo študentje spoznali z osnovami različnih metod detekcije (elektrokemijske, optične, termične). Poseben poudarek bo na uporabi biosenzorjev za analize živil in za spremljanje biotehnoških procesov. V zadnjem obdobju se tehnike kot sta elektronska spinska resonanca (EPR) in nuklearna magnetna resonanca (NMR) vedno več uporabljata tudi v živilstvu za proučevanje strukture in interakcij med molekulami. Študentje bodo spoznali osnove teh tehnik in njihovo uporabnost. Študentom bo omogočeno tudi delo na teh inštrumentih in prenos znanja na nova področja aplikacij.

plasmon resonance (SPR) is a technique that has been shown in recent years as a very important tool in the pharmaceutical and food industry. It can be included in all phases of drug discovery, improve their properties, it is possible to very easily and quickly scan a large number of binding partners for potential therapeutic target. SPR is becoming an important tool in the food industry, which can be used for quality control. Complementary methods for studying molecular interactions, such as isothermal microcalorimetry and thermophoresis, will also be presented. Students will learn about the different types of biosensors. The ones, which for their detection are using enzyme-antibody immunological, cell structure, as well as whole organisms. The students will learn the basics of different detection methods (electrochemical, optical, and thermal). Special emphasis will be on the use of biosensors for food analysis and monitoring of biotechnological processes. Lately, techniques such as electron spin resonance (EPR) and nuclear magnetic resonance (NMR) and used in the food industry to study the structure and interactions between molecules. The emphasis of the subject is on the techniques and their applications in food science and industry. Students will work on these instruments and expand the application of these techniques into new areas of food science and technology.

Temeljna literatura in viri/Readings:

- Pare J.R.J., Belanger J.M.R. 1997. Instrumental methods in food analysis Elsevier, chapters: 4, 5
- Landbury J.E., Doyle, M.L. 2004. Biocalorimetry 2. Application of Calorimetry in the Biological Sciences, chapters: 1, 2, 10
- Belton P.S. 2003. Magnetic resonance in food science, Royal Society of Chemistry
- Malkhotra B.D., Turner A.P. 2003. Advances in Biosensors: Perspectives in Biosensors, JAI Press.
- Jeong-Yeol Yoon, Lonnie J. Lucas, 2013. Introduction to Biosensors, Springer-Verlag New York Inc.

Cilji in kompetence:

Študentje se seznanijo s fizikalnimi zakonitostmi, ki določajo lastnosti bioloških makromolekul v živilih. Spoznavanje fizikalno-kemijskih metod (inštrumentalnih metod), ki se v zadnjem času vedno bolj uporabljajo za proučevanje živil. Študentje se bodo v laboratoriju srečali s praktično uporabo nekaterih od naštetih inštrumentalnih tehnik v živilstvu, in biotehnologiji.

Objectives and competences:

Students will learn about the physical laws that determine the properties of biological macromolecules in food. Understanding the physical-chemical methods (instrumental methods) that have recently been increasingly used for the study of food. Students will meet in the lab to practical application of some of these instrumental techniques in the food industry, and biotechnology.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje: Predmet daje znanje, potrebno pri razvoju novih metod v raziskovalnem delu v živilski in prehranski stroki.	Knowledge and understanding: The course provides the knowledge necessary to develop new methods in research work in the food science and technology.
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Metode poučevanja in učenja: Predavanja, laboratorijsko delo, samostojna priprava seminarjev in predstavitev.	Learning and teaching methods: Lectures, seminars, project workshops, laboratory work.
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Načini ocenjevanja:	Delež/Weight	Assessment:
Seminar s predstavitvijo	50,00 %	Project with public presentation
Pisno preverjanje znanja	50,00 %	written exam

Reference nosilca/Lecturer's references:

Prof. dr. Nataša Poklar Ulrih

1. ABRAM, Veronika, BERLEC, Barbara, OTA, Ajda, ŠENTJURC, Marjeta, BLATNIK, Petra, POKLAR ULRIH, Nataša. Effect of flavonoid structure on the fluidity of model lipid membranes. *Food chemistry*, ISSN 0308-8146. [Print ed.], 2013, vol. 139, issues 1-4, str. 804-813, doi: [10.1016/j.foodchem.2013.01.100](https://doi.org/10.1016/j.foodchem.2013.01.100).
1. SKRT, Mihaela, BENEDIK, Evgen, PODLIPNIK, Črtomir, POKLAR ULRIH, Nataša. Interactions of different polyphenols with bovine serum albumin using fluorescence quenching and molecular docking. *Food chemistry*, ISSN 0308-8146. [Print ed.], 2012, vol. 135, str. 2418-2424, doi: [10.1016/j.foodchem.2012.06.114](https://doi.org/10.1016/j.foodchem.2012.06.114).
1. OTA, Ajda, ABRAMOVIČ, Helena, ABRAM, Veronika, POKLAR ULRIH, Nataša. Interactions of p-coumaric, caffeic and ferulic acids and their styrenes with model lipid membranes. *Food chemistry*, ISSN 0308-8146. [Print ed.], 2011, vol. 125, issue 4, str. 1256-1261, doi: [10.1016/j.foodchem.2010.10.054](https://doi.org/10.1016/j.foodchem.2010.10.054).
1. GMAJNER, Dejan, POKLAR ULRIH, Nataša. Thermotropic phase behaviour of mixed liposomes consist of archaeal diether and conventional diester lipids. *Journal of thermal analysis and calorimetry*, ISSN 1388-6150, 2011, vol. 106, str. 255-260, doi: [10.1007/s10973-011-1596-4](https://doi.org/10.1007/s10973-011-1596-4)
1. POKLAR ULRIH, Nataša, OTA, Ajda, ŠENTJURC, Marjeta, KURE, Sandra, ABRAM, Veronika. Flavonoids and cell membrane fluidity. *Food chemistry*, ISSN 0308-8146. [Print ed.], 2010, issue 1, vol. 121, str. 78-84, doi: [10.1016/j.foodchem.2009.12.006](https://doi.org/10.1016/j.foodchem.2009.12.006).
1. PREVC, Tjaša, ŠEGATIN, Nataša, POKLAR ULRIH, Nataša, CIGIČ, Blaž. DPPH assay of vegetable oils and model antioxidants in protic and aprotic solvents. *Talanta*, ISSN 0039-9140. [Print ed.], 2013, vol. 109, str. 13-19, doi: [10.1016/j.talanta.2013.03.046](https://doi.org/10.1016/j.talanta.2013.03.046). [COBISS.SI-ID [4228984](https://www.cobiss.si/id/4228984)]

Prof. dr. Janez Plavec

1. BUSSCHAERT, Nathalie, KARAGIANNIDIS, Louise E., WENZEL, Marco, HAYNES, Cally J.E., WELLS, Neil J., YOUNG, Philip G., MAKUC, Damjan, PLAVEC, Janez, JOLLIFFE, Katrina A., GALE, Philip A. Synthetic transporters for sulfate: a new method for the direct detection of lipid bilayer sulfate transport. *Chemical science*, ISSN 2041-6520, vol. 5, iss. 3, str. 1118-1127, doi: [10.1039/C3SC52006D](https://doi.org/10.1039/C3SC52006D). [COBISS.SI-ID [5420570](https://www.cobiss.si/id/5420570)]
1. MARUŠIČ, Maja, VEEDU, Rakesh N., WENGEL, Jesper, PLAVEC, Janez. G-rich VEGF aptamer with locked and unlocked nucleic acid modifications exhibits a unique G-quadruplex fold. *Nucleic Acids Research*, ISSN 0305-1048, 2013, vol. 41, no. 20, str. 9524-9536, doi: [10.1093/nar/gkt697](https://doi.org/10.1093/nar/gkt697). [COBISS.SI-ID [5373466](https://www.cobiss.si/id/5373466)]

1. BILJAN, Ivana, GIACHIN, Gabriele, ILC, Gregor, ZHUKOV, Igor, PLAVEC, Janez, LEGNAME, Giuseppe. Structural basis for the protective effect of the human prion protein carrying the dominant-negative E219K polymorphism. *Biochemical Journal*, ISSN 0264-6021, 2012, vol. 446, str. 243-251, doi: 10.1042/BJ20111940. [COBISS.SI-ID 5078554]
1. BILJAN, Ivana, ILC, Gregor, GIACHIN, Gabriele, PLAVEC, Janez, LEGNAME, Giuseppe. Structural rearrangements at physiological pH : nuclear magnetic resonance insights from the V210I human prion protein mutant. *Biochemistry*, ISSN 0006-2960. 2012, vol. 51, no. 38, str. 7465-7474, doi: 10.1021/bi3009856. [COBISS.SI-ID 5119514]
1. TRAJKOVSKI, Marko, WEBBA DA SILVA, Mateus, PLAVEC, Janez. Unique structural features of interconverting monomeric and dimeric G-quadruplexes adopted by a sequence from the intron of the N-myc gene. *Journal of the American Chemical Society*, ISSN 0002-7863, 2012, vol. 134, iss. 9, str. 4132-4141. doi/abs/10.1021/ja208483v. [COBISS.SI-ID 4920602]
1. ŠKET, Primož, PLAVEC, Janez. Tetramolecular DNA quadruplexes in solution : insights into structural diversity and cation movement. *Journal of the American Chemical Society*, ISSN 0002-7863, 2010, vol. 132, no. 36, str. 12724-12732. [COBISS.SI-ID 4487962]

Prof. dr. Gregor Anderluh

1. GUTIERREZ-AGUIRRE, Ion, HODNIK, Vesna, GLAIS, Laurent, RUPAR, Matevž, JACQUOT, Emmanuel, ANDERLUH, Gregor, RAVNIKAR, Maja. Surface plasmon resonance for monitoring the interaction of Potato virus Y with monoclonal antibodies. *Analytical biochemistry*, ISSN 0003-2697, 2013, 28 str., [doi: [10.1016/j.ab.2013.10.032](https://doi.org/10.1016/j.ab.2013.10.032)].
1. MIKELJ, Miha, PRAPER, Tilen, DEMIČ, Rok, HODNIK, Vesna, TURK, Tom, ANDERLUH, Gregor. Electroformation of giant unilamellar vesicles from erythrocyte membranes under low-salt conditions. *Analytical biochemistry*, ISSN 0003-2697, Apr. 2013, vol. 435, iss. 2, str. 174-180. <http://www.sciencedirect.com/science/article/pii/S0003269713000031>, doi: [10.1016/j.ab.2013.01.001](https://doi.org/10.1016/j.ab.2013.01.001). [COBISS.SI-ID [36978693](https://doi.org/10.1016/j.ab.2013.01.001)]
1. MARCHIORETTO, Marta, PODOBNIK, Marjetka, DALLA SERRA, Mauro, ANDERLUH, Gregor. What planar lipid membranes tell us about the pore-forming activity of cholesterol-dependent cytolysins. V: DI CERA, E. (ur.). XXI SIBPA Meeting, [17-19 September 2012, University of Ferrara, Ferrara, Italy], (Biophysical chemistry (Print), ISSN 0301-4622, Vol. 182, Dec. (2013)). Amsterdam: [s. n.], 2013, vol. 182, str. 64-70. doi: [10.1016/j.bpc.20106.015](https://doi.org/10.1016/j.bpc.20106.015).
1. POPOVIĆ, Matija, ZLATEV, Ventsislav, HODNIK, Vesna, ANDERLUH, Gregor, FELLI, Isabella C., PONGOR, Sándor, PINTAR, Alessandro. Flexibility of the PDZ-binding motif in the micelle-bound form of Jagged-1 cytoplasmic tail. *Biochimica et biophysica acta, Biomembranes*, ISSN 0005-2736. [Print ed.], 2012, vol. 1818, iss. 7, str. 1706-1716, ilustr., doi: [10.1016/j.bbamem.2012.03.012](https://doi.org/10.1016/j.bbamem.2012.03.012).
1. DE COLIBUS, Luigi, SONNEN, Andreas F.- P., MORRIS, Keith J., SIEBERT, C. Alistair, ABRUSCI, Patrizia, PLITZKO, Jürgen, HODNIK, Vesna, LEIPPE, Matthias, VOLPI, Emanuela, ANDERLUH, Gregor, GILBERT, Robert J. Structures of lysenin reveal a shared evolutionary origin for pore-forming proteins and its mode of sphingomyelin recognition. *Structure*, ISSN 0969-2126. [Print ed.], 2012, vol. 20, issue 9, str. 1498-1507, doi: [10.1016/j.str.2012.06.011](https://doi.org/10.1016/j.str.2012.06.011).
1. PRAPER, Tilen, SONNEN, Andreas F.- P., VIERO, Gabriella, KLADNIK, Aleš, FROELICH, Christopher J., ANDERLUH, Gregor, DALLA SERRA, Mauro, GILBERT, Robert J., et al. Human perforin employs different avenues to damage membranes. *The Journal of biological chemistry*, ISSN 0021-9258, 2011, vol. 286, issue 4, str. 2946-2955. doi: [10.1074/jbc.M110.169417](https://doi.org/10.1074/jbc.M110.169417).

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Kakovost in varnost živil
Course title:	Food quality and safety
Članica nosilka/UL Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni

Univerzitetna koda predmeta/University course code:	0037366
Koda učne enote na članici/UL Member course code:	3869

Predavanja	Seminar	Vaje	Klinične vaje	Druge oblike študija	Samostojno delo	ECTS
20	40	0	0	10	180	10

Nosilec predmeta/Lecturer: Sonja Smole Možina

Izvajalci predavanj:	Helena Abramovič, Jasna Bertoncej, Barbka Jeršek, Sonja Smole Možina
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type: teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij	General conditions for enrolment in doctoral studies.

Vsebina:	Content (Syllabus outline):
Vsebinski poudarki predmeta vključujejo naslednje teme: Celostno obvladovanje varnosti in kakovosti živil; Analiza tveganj v živilski proizvodnji, vključno s stranskimi proizvodi in odpadki agro-živilstva in možnostmi njihovega ponovnega vključevanja v proizvodno verigo kakovostne in varne hrane in krme s podaljšano obstojnostjo). Teoretične osnove procesov oksidativnih pretvorb v živilih; predstavitev sodobnih pristopov k določitvi in vrednotenju razvoja oksidativnih sprememb v	The main points in the contents of the subject are as follows: Integral concepts of food safety and quality management; Risk assessment in food processing (including risk assessment of food by-products and wastes for possible further processing into high quality and safe food or feed products or additives with prolonged shelf-life. Description of theoretical bases, which describe the processes of oxidative transformations in food; presentation of advanced approaches to

živilskih izdelkih ter njihovemu preprečevanju. Povezava omenjenih procesov s kemijsko sestavo in strukturnimi lastnostmi živil. Vpliv oksidacije sestavin živila na prehransko vrednost, varnost in senzorične lastnosti živil.

Termično in netermično procesiranje živil z vidika kakovosti in varnosti živilskih izdelkov.

Vrednotenje kakovosti hrane s fizikalno-kemijskimi parametri

Senzorična analiza v vlogi zagotavljanja kakovosti in obstojnosti živil.

Odkrivanje nedovoljenih postopkov in ponaredkov, ugotavljanje pristnosti živil, metodološki pristopi in primeri iz prakse.

Ocena kemijskih, bioloških (mikrobioloških, biotehnoloških), fizikalnih tveganj. Ocena vloge sodobnih nanotehnologij za zagotavljanje kakovosti in varnosti hrane.

Principi sledljivosti v proizvodno-prehranskih oskrbovalnih verigah. Kompetence in odgovornosti nosilcev dejavnosti od kmeta do kupca za zagotavljanje kakovosti in varnosti v proizvodno-prehranskih oskrbovalnih verigah. Vloga zunanjih dejavnikov (npr. državnih sistemov nadzora, javnih medijev, izobraževalnega sistema itd.) v sistemu preprečevanja tveganj oz. zagotavljanja varnosti in kakovosti hrane. Etika v sistemu zagotavljanja kakovosti in varnosti hrane. Predstavitev in analiza primerov iz prakse in raziskovalnih projektov. Kaj se lahko naučimo iz obojih?

Mikrobna fiziologija v pogojih minimalnega konzerviranja hrane v luči zahtev za zagotavljanje varnih živil.

Gensko spremenjeni organizmi v živilih – analitika in in sistem kakovosti po ISO 17025.

Novi tehnološki pristopi za zagotavljanje varnosti in kakovosti hrane (in krme) v razmerah minimalnega procesiranja (novi materiali za zmanjševanje problema adhezivnosti mikroorganizmov na površine, tvorbe mikrobnih biofilmov in drugih oblik perzistentnosti mikrobnih povzročiteljev kvarjenja in okužb, ki predstavljajo tveganje za varnost in kakovost živilskih proizvodov, razvoj novih protimikrobnih sredstev v boju proti odpornosti na klasične biocide oz. mikrobicide, strategije reševanja kot so aktivno pakiranje, biološka kontrola, kombinirano konzerviranje, higienski design itd.) Koncepti ocenjevanja varnosti v proizvodno-prehranski oskrbovalni verigi

determining and evaluation of the development of oxidative changes in food products and their prevention. Connection of these processes with chemical composition and structural properties of food. Impact of food component oxidation on nutritional value, safety and sensory properties of food.

Thermal and non-thermal processing of food – quality and safety aspects.

Physico-chemical parameters of food quality assessment.

Sensoric analysis of food products – its role in food safety and quality management and shelf-life determination.

Food authenticity; Detection of unacceptable procedures and falsification; Methodological approaches and case studies of food adulteration; Assessment of chemical, biological (microbiological and biotechnological) and physical hazards.

Assessment of advances in nanotechnologies for food quality and safety;

Principles of traceability in food production and supply chains. Competences and responsibilities of all stakeholders from the farmer to the consumer for ensuring quality and safety in the food chain. The role of extrinsic factors (e.g. national surveillance and inspection systems, public media, education system etc.) for risk management and ensuring quality and safety in food production and supply chains. Ethics in the system of food quality and safety. Analysis of case studies from the practice and from recent research projects. What we could learn from them?

Microbial physiology in minimal processing of foods in the light of food safety requirements.

Genetically modified organisms in food – novelties in analytics and requirements for food safety according to ISO 17025;

Novel technological principles for food and feed safety and quality management under conditions of minimal processing (e.g., role of new materials for reducing the problem of microbial adhesion on surfaces, microbial biofilm formation and other forms of persistence of microorganisms presenting the risk of food spoilage or transmission of diseases; the problem of increasing resistance to antimicrobial agents, novel strategies such as active packaging, biological control, hurdle technologies, hygienic design etc.). General concepts of safety assessment in the food production and supply chains.

Temeljna literatura in viri/Readings:

Irudayaraj, Joseph (Ur.), Reh, Christoph (Ur.). Nondestructive testing of food quality. 1st ed., Ames (Iowa): Blackwell Publishing/IFT Press, 2008, XIII, 364 str.

Shaw, I.C. Food Safety: The Science of Keeping Food Safe. Oxford, Wiley-Blackwell, 2013; 428 str. (izbrana poglavja)

Cho, Yong-Jin (Ur.), Kang, Sukwon (Ur.). Emerging technologies for food quality and food safety evaluation. Boca Raton: CRC/Taylor & Francis, 2011, 346 str. (izbrana poglavja).

Bartosz Grzegorz (Ur.), Food Oxidants and Antioxidants. Boca Raton : CRC/Taylor & Francis, 2014, 551 str. (poglavja 1-8; str. 1-233)

ŽEL, Jana, MILAVEC, Mojca, MORISSET, Dany, PLAN, Damien, EEDE, G. van den, GRUDEN, Kristina. How to reliably test for GMOs, (Springer briefs in food, health, and nutrition). New York [etc.]: Springer, 2012. X, 100 str., ilustr. ISBN 978-1-4614-1389-9. [COBISS.SI-ID 2460239]

Smole Možina S., Klančnik, A., Raspor, P. Mechanisms of microbial resistance in biofilms. V: Simoes, M. (ur.), Mergulhao, F. (ur.). *Biofilms in bioengineering*, (Microbiology research advances). New York: Nova Science Publishers, 2013, str. 311-332.

Smole Možina, S., Jeršek, B., Demšar, L. Vidrih, R., Raspor, P. Dosežki sodelavcev živilstva na področju varnosti živil = Research achievements in the field of food safety. V: Raspor, P. (ur.), Hočevar, I. (ur.). *Živilstvo in prehrana včeraj, danes za jutri : 50 let študija živilske tehnologije : Ljubljana, 29. in 30. september 2011*. Ljubljana: BF, Oddelek za živilstvo, 2011, str. 41-58.

Jeršek, B., Klančnik, A., Kurinčič, M., Mavri, A., Kovač, J., Piskernik, S., Raspor, P., Smole Možina, S. Presentation of food microbiology and food safety research at the Chair = Predstavitev raziskav na področju živilske mikrobiologije in varnosti živil na katedri. V: Pomen biotehnologije in mikrobiologije za prihodnost, Ljubljana, 27th -28th Sept. 2012. Raspor, P. (ur.), Smole Možina, S. (ur.). *Biotechnology and microbiology for knowledge and benefit*, (Pomen biotehnologije in mikrobiologije za prihodnost, 09). Ljubljana: Biotehniška fakulteta, Oddelek za živilstvo, Katedra za biotehnologijo, mikrobiologijo in varnost živil, 2012, str. 17-32.

Drugi aktualni revijalni članki s področja, tekoče periodike in drugih učnih gradiv

Cilji in kompetence:

Usposobitev kandidata za izvedbo najzahtevnejših nalog na področju in opravljanje raziskav, katerih rezultati bodo predstavljali pomembne prispevke temeljni ali aplikativni znanosti na področju kakovosti in varnosti živil.

Objectives and competences:

The candidate should acquire theoretical knowledge and skills for food quality and safety management and also for basic and applied research work that can provide important results in the field of food quality and safety.

Predvideni študijski rezultati:

Kandidatovo poznavanje in razumevanje procesov, ki so povezani z izgubo kakovosti hrane in tveganji za zdravje potrošnika, poznavanje pomena in uporabnosti klasičnih in sodobnih fizikalnih, kemijskih, senzoričnih, mikrobioloških in biotehnoloških principov in metod za nadzor in vrednotenje kakovosti in varnosti živilskih izdelkov oz. proizvodno-prehranskih oskrbovalnih verig.

Intended learning outcomes:

Knowledge and understanding of the processes associated with loss of food quality and safety, knowledge of the importance and usefulness of traditional and modern physical, chemical, sensory, microbiological and biotechnological approaches for determination and evaluation of quality and safety of food products and processes along the whole food production and supply chains.

Metode poučevanja in učenja:

Predavanja, samostojen študij in izdelava projektne naloge.

Learning and teaching methods:

Lectures, individual study, project work.

Načini ocenjevanja:

Ocena seminarskega dela
Ocena izpita

Delež/Weight

50,00 %
50,00 %

Assessment:

Assessment of the seminar work
Written examination

Reference nosilca/Lecturer's references:

Helena Abramovič

1. TERPINC, Petra, POLAK, Tomaž, MAKUC, Damjan, POKLAR ULRIH, Nataša, ABRAMOVIČ, Helena. The occurrence and characterisation of phenolic compounds in *Camelina sativa* seed, cake and oil. *Food chemistry*, ISSN 0308-8146. [Print ed.], 2012, vol. 131, issue 2, str. 580-589, doi: [10.1016/j.foodchem.2011.09.033](https://doi.org/10.1016/j.foodchem.2011.09.033). [COBISS.SI-ID [3944568](#)]
2. VIDRIH, Rajko, VIDA KOVIČ, Sergeja, ABRAMOVIČ, Helena. Biochemical parameters and oxidative resistance to thermal treatment of refined and unrefined vegetable edible oils. *Czech Journal of Food Sciences*, ISSN 1212-1800, 2010, vol. 28, no. 5, str. 376-384. [COBISS.SI-ID [3781752](#)]
3. KATALINIĆ, Višnja, SMOLE MOŽINA, Sonja, SKROZA, Danijela, GENERALIĆ, Ivana, ABRAMOVIČ, Helena, MILOŠ, Mladen, LJUBENKOV, Ivica, PISKERNIK, Saša, PEZO, Ivan, TERPINC, Petra, BOBAN, Mladen. Polyphenolic profile, antioxidant properties and antimicrobial activity of grape skin extracts of 14 *Vitis vinifera* varieties grown in Dalmatia (Croatia). *Food chemistry*, ISSN 0308-8146. [Print ed.], 2010, vol. 119, str. 715-723, doi: [10.1016/j.foodchem.2009.07.019](https://doi.org/10.1016/j.foodchem.2009.07.019). [COBISS.SI-ID [3652216](#)]
4. TERPINC, Petra, POLAK, Tomaž, POKLAR ULRIH, Nataša, ABRAMOVIČ, Helena. Effect of heat treatment of camelina (*Camelina sativa*) seeds on the antioxidant potential of their extracts. *Journal of agricultural and food chemistry*, ISSN 0021-8561, 2011, vol. 59, no. 16, str. 8639-8645, doi: [10.1021/jf2016072](https://doi.org/10.1021/jf2016072). [COBISS.SI-ID [3934072](#)]
5. HRASTAR, Robert, TERPINC, Petra, KOŠIR, Iztok Jože, ABRAMOVIČ, Helena. Effect of deodorization of camelina (*Camelina sativa*) oil on its phenolic content and the radical scavenging effectiveness of its extracts. *Journal of agricultural and food chemistry*, ISSN 0021-8561, 2013, vol. 61, str. 8098-8103, doi: [10.1021/jf400309j](https://doi.org/10.1021/jf400309j). [COBISS.SI-ID [4278136](#)]
6. HRASTAR, Robert, ABRAMOVIČ, Helena, KOŠIR, Iztok Jože. In situ quality evaluation of *Camelina sativa* landrace. *European journal of lipid science and technology*, ISSN 1438-7697. [Print ed.], 2012, vol. 114, issue 3, str. 343-351, doi: [10.1002/ejlt.201100003](https://doi.org/10.1002/ejlt.201100003). [COBISS.SI-ID [563596](#)]

Jasna Bertoncej

1. KOROŠEC, Mojca, GOLOB, Terezija, BERTONCELJ, Jasna, STIBILJ, Vekoslava, KOROUŠIĆ-SELJAK, Barbara. The Slovenian food composition database. V: 9th International Food Data Conference, September 14-17, 2011, Norwich, United Kingdom. FINGLAS, Paul M. (ur.). *Food composition and sustainable diets*, (Food chemistry, ISSN 0308-8146, Vol. 140, no. 3). Amsterdam [etc.]: Elsevier, 2013, str. 495-499, doi: [10.1016/j.foodchem.2013.01.005](https://doi.org/10.1016/j.foodchem.2013.01.005). [COBISS.SI-ID [4197496](#)]
2. BERTONCELJ, Jasna, POLAK, Tomaž, KROPF, Urška, KOROŠEC, Mojca, GOLOB, Terezija. LC-DAD-ESI/MS analysis of flavonoids and abscisic acid with chemometric approach for the classification of Slovenian honey. *Food chemistry*, ISSN 0308-8146. [Print ed.], 2011, vol. 127, str. 296-302, doi: [10.1016/j.foodchem.2011.01.003](https://doi.org/10.1016/j.foodchem.2011.01.003). [COBISS.SI-ID [3869048](#)]
3. BERTONCELJ, Jasna, GOLOB, Terezija, KROPF, Urška, KOROŠEC, Mojca. Characterisation of Slovenian honeys on the basis of sensory and physicochemical analysis with a chemometric approach. *International journal of food science & technology*, ISSN 0950-5423. [Print ed.], 2011, vol. 46, str. 1661-1671, doi: [10.1111/j.1365-2621.2011.02664.x](https://doi.org/10.1111/j.1365-2621.2011.02664.x). [COBISS.SI-ID [3903096](#)]
4. KROPF, Urška, KOROŠEC, Mojca, BERTONCELJ, Jasna, OGRINC, Nives, NEČEMER, Marijan, KUMP, Peter, GOLOB, Terezija. Determination of the geographical origin of Slovenian black locust, lime and chestnut honey. *Food chemistry*, ISSN 0308-8146. [Print ed.], 2010, vol. 121, no. 3, str. 839-846, doi: [10.1016/j.foodchem.2009.12.094](https://doi.org/10.1016/j.foodchem.2009.12.094). [COBISS.SI-ID [3739512](#)]
5. KROPF, Urška, GOLOB, Terezija, NEČEMER, Marijan, KUMP, Peter, KOROŠEC, Mojca, BERTONCELJ, Jasna, OGRINC, Nives. Carbon and nitrogen natural stable isotopes in Slovene honey: adulteration and botanical and geographical aspects. *Journal of agricultural and food chemistry*, ISSN 0021-8561, 2010, vol. 58, no. 24, str. 12794-12803, doi: [10.1021/jf102940s](https://doi.org/10.1021/jf102940s). [COBISS.SI-ID [24189223](#)]
6. NEČEMER, Marijan, KOŠIR, Iztok Jože, KUMP, Peter, KROPF, Urška, KOROŠEC, Mojca, BERTONCELJ, Jasna, OGRINC, Nives, GOLOB, Terezija. Application of total reflection X-ray spectrometry in combination with chemometric methods for determination of the botanical origin of Slovenian honey. *Journal of agricultural and food chemistry*, ISSN 0021-8561, 2009, vol. 57, no. 10, str. 4409-4414, doi: [10.1021/jf900930b](https://doi.org/10.1021/jf900930b). [COBISS.SI-ID [22578215](#)]

Sonja Smole Možina

1. MAVRI, Ana, SMOLE MOŽINA, Sonja. Development of antimicrobial resistance in *Campylobacter jejuni* and *Campylobacter coli* adapted to biocides. *International journal of food microbiology*, ISSN 0168-1605. [Print ed.], 2013, vol. 160, issue 3, str. 304-312, doi: [10.1016/j.ijfoodmicro.2012.11.006](https://doi.org/10.1016/j.ijfoodmicro.2012.11.006). [COBISS.SI-ID [4159864](#)]

2. KATALINIĆ, Višnja, SMOLE MOŽINA, Sonja, GENERALIĆ, Ivana, SKROZA, Danijela, LJUBENKOV, Ivica, KLANČNIK, Anja. Phenolic profile, antioxidant capacity, and antimicrobial activity of leaf extracts from six *Vitis vinifera* L. varieties. *International journal of food properties*, ISSN 1094-2912, 2013, vol. 16, issue 1, str. 45-60. doi: [10.1080/10942912.2010.526274](https://doi.org/10.1080/10942912.2010.526274). [COBISS.SI-ID [3814264](#)]
3. MAVRI, Ana, SMOLE MOŽINA, Sonja. Resistance to bile salt and sodium deoxycholate in macrolide- and fluoroquinolone-susceptible and resistant *Campylobacter jejuni* and *Campylobacter coli* strains. *Microbial drug resistance*, ISSN 1076-6294, 2013, vol. 19, issue 3, str. 168-174, doi: [10.1089/mdr.2012.0217](https://doi.org/10.1089/mdr.2012.0217). [COBISS.SI-ID [4187768](#)]
4. GENERALIĆ, Ivana, SKROZA, Danijela, ŠURJAK, Jana, SMOLE MOŽINA, Sonja, LJUBENKOV, Ivica, KATALINIĆ, Ana, ŠIMAT, Vida, KATALINIĆ, Višnja. Seasonal variations of phenolics and biological properties of sage. *Chemistry & biodiversity*, ISSN 1612-1872, 2012, vol. 9, issue 2, str. 441-457, doi: [10.1002/cbdv.201100219](https://doi.org/10.1002/cbdv.201100219). [COBISS.SI-ID [3965304](#)]
5. UZUNOVIĆ, Selma, SMOLE MOŽINA, Sonja. *Campylobacter* infections in Zenica-Doboj Canton, Bosnia and Herzegovina - a story. *Medicinski glasnik*, ISSN 1840-0132, 2013, vol. 10, no. 1, str. 1-11. [COBISS.SI-ID [4190072](#)]
6. MAVRI, Ana, ABRAMOVIČ, Helena, POLAK, Tomaž, BERTONCELJ, Jasna, JAMNIK, Polona, SMOLE MOŽINA, Sonja, JERŠEK, Barbara. Chemical properties and antioxidant and antimicrobial activities of Slovenian propolis. *Chemistry & biodiversity*, ISSN 1612-1872, 2012, vol. 9, issue 8, str. 1545-1558, doi: [10.1002/cbdv.201100337](https://doi.org/10.1002/cbdv.201100337). [COBISS.SI-ID [4052088](#)]
7. MAVRI, Ana, KURINČIČ, Marija, SMOLE MOŽINA, Sonja. The prevalence of antibiotic and biocide resistance among *Campylobacter coli* and *Campylobacter jejuni* from different sources. *Food technology and biotechnology*, ISSN 1330-9862, 2012, vol. 50, no. 3, str. 371-376. [COBISS.SI-ID [4051064](#)]
8. VALENČIČ, Vasilij, BANDELJ MAVSAR, Dunja, BUČAR-MIKLAVČIČ, Milena, BUTINAR, Bojan, ČADEŽ, Neža, GOLOB, Terezija, RASPOR, Peter, SMOLE MOŽINA, Sonja. The impact of production technology on the growth of indigenous microflora and quality of table olives from Slovenian Istria. *Food technology and biotechnology*, ISSN 1330-9862, 2010, vol. 48, no. 3, str. 404-410. [COBISS.SI-ID [1853651](#)]
9. ŠIKIĆ POGAČAR, Maja, KLANČNIK, Anja, SMOLE MOŽINA, Sonja, CENCIČ, Avrelija. Attachment, invasion, and translocation of *Campylobacter jejuni* in pig small-intestinal epithelial cells. *Foodborne pathogens and disease*, ISSN 1535-3141, 2010, issue 5, vol. 7, str. 589-595, doi: [10.1089/fpd.2009.0301](https://doi.org/10.1089/fpd.2009.0301). [COBISS.SI-ID [3737720](#)]
10. ŠIKIĆ POGAČAR, Maja, RUBEŠA-MIHALJEVIĆ, Roberta, KLANČNIK, Anja, BRUMINI, Gordana, ABRAM, Maja, SMOLE MOŽINA, Sonja. Survival of stress exposed *Campylobacter jejuni* in the murine macrophage J774 cell line. *International journal of food microbiology*, ISSN 0168-1605. [Print ed.], 2009, vol. 129, no. 1, str. 68-73, doi: [10.1016/j.ijfoodmicro.2008.11.010](https://doi.org/10.1016/j.ijfoodmicro.2008.11.010). [COBISS.SI-ID [3532920](#)]

Barbara Jeršek

1. VOLK, Helena, PISKERNIK, Saša, KURINČIČ, Marija, KLANČNIK, Anja, TOPLAK, Nataša, JERŠEK, Barbara. Evaluation of different methods for DNA extraction from milk. *Journal of food and nutrition research*, ISSN 1336-8672, 2014, str. [1-8, v tisku]. <http://www.vup.sk/download.php?bullID=1561>. [COBISS.SI-ID [4297592](#)]
2. KLANČNIK, Anja, PISKERNIK, Saša, BUCAR, Franz, VUČKOVIČ, Darinka, SMOLE MOŽINA, Sonja, JERŠEK, Barbara. Reduction of microbiological risk in minced meat by a combination of natural antimicrobials. *Journal of the Science of Food and Agriculture*, ISSN 0022-5142, 2014, str. [1-10, v tisku], doi: [10.1002/jsfa.6621](https://doi.org/10.1002/jsfa.6621). [COBISS.SI-ID [4334968](#)]
3. MAVRI, Ana, ABRAMOVIČ, Helena, POLAK, Tomaž, BERTONCELJ, Jasna, JAMNIK, Polona, SMOLE MOŽINA, Sonja, JERŠEK, Barbara. Chemical properties and antioxidant and antimicrobial activities of Slovenian propolis. *Chemistry & biodiversity*, ISSN 1612-1872, 2012, vol. 9, issue 8, str. 1545-1558, doi: [10.1002/cbdv.201100337](https://doi.org/10.1002/cbdv.201100337). [COBISS.SI-ID [4052088](#)]
4. KLANČNIK, Anja, PISKERNIK, Saša, SMOLE MOŽINA, Sonja, DEMŠAR, Lea, JERŠEK, Barbara. Investigation of some factors affecting the antibacterial activity of rosemary extracts in food models by a food microdilution method. *International journal of food science & technology*, ISSN 0950-5423. [Print ed.], 2011, vol. 46, str. 413-420. [COBISS.SI-ID [3836536](#)]
5. TOPLAK, Nataša, KOVAČ, Minka, PISKERNIK, Saša, SMOLE MOŽINA, Sonja, JERŠEK, Barbara. Detection and quantification of *Campylobacter jejuni* and *Campylobacter coli* using real-time multiplex PCR. *Journal of applied microbiology*, ISSN 1364-5072, 2012, vol. 112, issue 4, str. 752-764, doi: [10.1111/j.1365-2672.2012.05235.x](https://doi.org/10.1111/j.1365-2672.2012.05235.x). [COBISS.SI-ID [4039288](#)]
6. TRAUNŠEK, Urban, TOPLAK, Nataša, JERŠEK, Barbara, LAPANJE, Aleš, MAJSTOROVIČ, Tamara, KOVAČ, Minka. Novel cost-efficient real-time PCR assays for detection and quantitation of *Listeria monocytogenes*.

Journal of microbiological methods, ISSN 0167-7012. [Print ed.], 2011, vol. 85, issue 1, str. 40-46, doi:
10.1016/j.mimet.2011.01.018. [COBISS.SI-ID 3871608]

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet: Povezava senzoričnih in instrumentalnih metod
Course title: Interaction of sensory and instrumental methods

Študijski programi in stopnja	Študijska smer	Letnik	Semestri
Bioznanosti, tretja stopnja, doktorski	Živilstvo		Celoletni

Univerzitetna koda predmeta/University course code: 3870

Predavanja	Seminar	Vaje	Klinične vaje	Druge oblike študija	Samostojno delo	ECTS
10	0	0	0	25	90	5

Nosilec predmeta/Lecturer: Mojca Korošec

Izvajalci predavanj: Mojca Korošec, Tatjana Košmerl
Izvajalci seminarjev:
Izvajalci vaj:
Izvajalci kliničnih vaj:
Izvajalci drugih oblik:
Izvajalci praktičnega usposabljanja:

Vrsta predmeta/Course type: teoretični/theoretical

Jeziki/Languages:

Predavanja/Lectures:	Angleščina, Slovenščina
Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Splošni pogoji za vpis na doktorski študij.

Prerequisites:

General conditions for enrolment in Doctoral Study.

Vsebina:

Specifična znanja s področja senzorične analize. Sodobne senzorične metode: profiliranje arome, kvantitativna opisna analiza, profiliranje teksture, senzorični spekter, profiliranje po lastni izbiri. Aroma/tuja aroma: receptorji za zaznavanje. Sodobne senzorične in instrumentalne metode (GC/vohanje in HTLC/okušanje, elektronski nos, elektronski jezik) za določanje senzorično aktivnih snovi in za ugotavljanje pristnosti oziroma potvorjenosti živil. Povezave med različnimi parametri kakovosti (instrumentalnimi in senzoričnimi) in oblikovanje podatkovnih baz.

Content (Syllabus outline):

Specific knowledge in the field of sensory analysis. Modern methods of sensory analysis: flavour profiling, quantitative descriptive analysis, texture profiling, sensory spectrum, free choice profiling. Flavour/off flavour: receptors for flavour perception. Modern sensory and instrumental methods (GC/olfactometry and HTLC/gustatory testing, electronic nose, electronic tongue) for determining the aroma active components and to identify adulteration and authenticity of food. The interaction of different parameters (instrumental and sensory) and generation of the databases.

Temeljna literatura in viri/Readings:

Izbrana poglavja iz naslednjih publikacij:

- Chen, Jianse (Ur), Engelen, Lina (Ur), Food Oral processing. 1st ed., Wiley-BlackWell, 2012, 225-335.
- Irudayaraj, Joseph (Ur.), Reh, Christoph (Ur.). Nondestructive testing of food quality. 1st ed., Ames (Iowa): Blackwell Publishing/IFT Press, 2008, XIII, 1-33; 237-283.

in

- revijalni članki s področja, tekoča periodika, druga učna gradiva

Cilji in kompetence:

Osnovni cilj predmeta je poglobitev specifičnih znanj s področja senzorične in instrumentalne analize. Seznanjanje s tehnikami frakcioniranja vzorca in analizo senzorično aktivnih komponent s sodobnimi metodami GC/vohanje, HTLC/okušanje, E-nos in E-jezik. Usposobitev kandidata za kompleksno razumevanje deskriptorjev hlapnih in nehlapnih aromatičnih komponent (senzorično aktivnih komponent, komponente arome in tuje arome).

Objectives and competences:

The basic educational objective is to deepen specific knowledge in the field of sensory and instrumental analysis. Insight in the fraction techniques of samples and analysis of the sensory active components by the modern sensory and instrumental methods GC/olfactometry, HTLC/gustatory testing, E-nose, E-tongue). Training of candidates for a complex understanding of descriptors of odorous or aromatic components and flavouring substances (sensory active components, component of flavour and off flavour).

Predvideni študijski rezultati:

Znanje in razumevanje:
Kandidat je usposobljen za izvedbo raziskav na področju uporabe sodobnih senzoričnih in instrumentalnih tehnik, celovito in kritično ovrednotenje dobljenih rezultatov ter pravilno interpretacijo rezultatov. Kandidat v okviru predmeta pridobi znanje o nastajanju in uporabi podatkovnih baz.

Intended learning outcomes:

Knowledge and understanding:
Intended learning outcomes are to qualify a candidate for the execution of research applying the advanced sensory and instrumental techniques, comprehensive and critical evaluation of the obtained results and the correct interpretation of results. Candidates in this course will acquire knowledge on the generation and use of databases.

Metode poučevanja in učenja:

Predavanja, seminarji na temo izbranega primera (case study), laboratorijske vaje.

Learning and teaching methods:

Lectures, seminars on the topic of the selected case (case study), laboratory exercises.

Načini ocenjevanja:

Študent na izbrani temi pripravi projektno seminarsko nalogo, ki je pogoj za opravljanje izpita;
ustni izpit

Delež/Weight

30,00 %

70,00 %

Assessment:

Students prepare a paper project from the selected theme, which is a prerequisite for the exam;

oral exam

Reference nosilca/Lecturer's references:**KOROŠEC, Mojca**

1. **KOROŠEC, Mojca**, GOLOB, Terezija, BERTONCELJ, Jasna, STIBILJ, Vekoslava, KOROUŠIĆ-SELJAK, Barbara. The Slovenian food composition database. V: FINGLAS, Paul M. (ur.). Food composition and sustainable diets, 9th International Food Data Conference, September 14-17, 2011, Norwich, United Kingdom, (Food chemistry, ISSN 0308-8146, Vol. 140, no. 3). Amsterdam [etc.]: Elsevier, 2013, str. 495-499, doi: 10.1016/j.foodchem.2013.01.005. [COBISS.SI-ID 4197496], [JCR, SNIP, WoS do 4. 12. 2015: št. citatov (TC): 5, čistih citatov (CI): 2, Scopus do 26. 11. 2016: št. citatov (TC): 5, čistih citatov (CI): 2
2. BERTONCELJ, Jasna, GOLOB, Terezija, KROPF, Urška, **KOROŠEC, Mojca**. Characterisation of Slovenian honeys on the basis of sensory and physicochemical analysis with a chemometric approach. International journal of food science & technology, ISSN 0950-5423. [Print ed.], 2011, vol. 46, str. 1661-1671, doi:

10.1111/j.1365-2621.2011.02664.x. [COBISS.SI-ID 3903096], [JCR, SNIP, WoS do 6. 6. 2016: št. citatov (TC): 13, čistih citatov (CI): 13, Scopus do 17. 11. 2016: št. citatov (TC): 15, čistih citatov (CI): 15

3. BERTONCELJ, Jasna, POLAK, Tomaž, KROPF, Urška, **KOROŠEC, Mojca**, GOLOB, Terezija. LC-DAD-ESI/MS analysis of flavonoids and abscisic acid with chemometric approach for the classification of Slovenian honey. *Food chemistry*, ISSN 0308-8146. [Print ed.], 2011, vol. 127, str. 296-302, doi: 10.1016/j.foodchem.2011.01.003. [COBISS.SI-ID 3869048], [JCR, SNIP, WoS do 6. 9. 2016: št. citatov (TC): 33, čistih citatov (CI): 30, Scopus do 6. 10. 2016: št. citatov (TC): 37, čistih citatov (CI): 34]

4. KROPF, Urška, GOLOB, Terezija, NEČEMER, Marijan, KUMP, Peter, **KOROŠEC, Mojca**, BERTONCELJ, Jasna, OGRINC, Nives. Carbon and nitrogen natural stable isotopes in Slovene honey : adulteration and botanical and geographical aspects. *Journal of agricultural and food chemistry*, ISSN 0021-8561, 2010, vol. 58, no. 24, str. 12794-12803, doi: 10.1021/jf102940s. [COBISS.SI-ID 24189223], [JCR, SNIP, WoS do 7. 11. 2016: št. citatov (TC): 21, čistih citatov (CI): 18, Scopus do 23. 11. 2016: št. citatov (TC): 25, čistih citatov (CI): 22

5. GOLOB, Terezija, BERTONCELJ, Jasna, **KOROŠEC, Mojca**. Flevor - kompleksna senzorična zaznava. *Dietetikus*, 2013, letn. 15, št. 1/2, str. 25-28. [COBISS.SI-ID 4250232]

6. GOLOB, Terezija, BERTONCELJ, Jasna, KROPF, Urška, **KOROŠEC, Mojca**. *Senzorična analiza živil*. Ljubljana: Biotehniška fakulteta, Oddelek za živilstvo, 2006. 81 str., ilustr. ISBN 961-6333-42-9. [COBISS.SI-ID 223939072]

KOŠMERL, Tatjana

1. JENKO, Mojca, LISJAK, Klemen, **KOŠMERL, Tatjana**, ČUŠ, Franc. The influence of yeast strain combinations on the quality of sauvignon blanc wine. *Food science and technology research*, ISSN 1344-6606, 2013, vol. 19, no. 1, str. 7-15. [COBISS.SI-ID 4143464], [JCR, SNIP, Scopus do 16. 7. 2013: št. citatov (TC): 0, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0, normirano št. čistih citatov (NC): 0] kategorija: 1A3 (Z1); uvrstitev: Scopus (d,h), SCI, MBP; tipologijo je verificiral OSICB točke: 18.3, št. avtorjev: 4

2. RUSJAN, Denis, STRLIČ, Matija, **KOŠMERL, Tatjana**, PROSEN, Helena. Contribution of enzyme preparations to the linalool content of wines made from the non-aromatic grapevine variety 'Furmint' (*Vitis vinifera* L.). *Journal international des sciences de la vigne et du vin*, ISSN 1151-0285, 2012, vol. 46, no. 2, str. 139-143. [COBISS.SI-ID 7174777], [JCR, SNIP, WoS do 5. 3. 2013: št. citatov (TC): 1, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0.25, normirano št. čistih citatov (NC): 1, Scopus do 21. 8. 2013: št. citatov (TC): 1, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0.25, normirano št. čistih citatov (NC): 1] kategorija: 1A2 (Z1, A1/2); uvrstitev: SCI, Scopus, MBP; tipologijo je verificiral OSICB točke: 20.36, št. avtorjev: 4

3. BERTALANIČ, Laura, **KOŠMERL, Tatjana**, POKLAR ULRIH, Nataša, CIGIČ, Blaž. Influence of solvent composition on antioxidant potential of model polyphenols and red wines determined with 2,2-diphenyl-1-picrylhydrazyl. *Journal of agricultural and food chemistry*, ISSN 0021-8561, 2012, vol. 60, str. 12282-12288, doi: 10.1021/jf3041512. [COBISS.SI-ID 4186488], [JCR, SNIP, WoS do 17. 9. 2013: št. citatov (TC): 1, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0, normirano št. čistih citatov (NC): 0, Scopus do 29. 5. 2013: št. citatov (TC): 1, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0, normirano št. čistih citatov (NC): 0] kategorija: 1A1 (Z1, A'', A', A1/2); uvrstitev: SCI, Scopus, MBP; tipologijo je verificiral OSICB točke: 42.5, št. avtorjev: 4

4. BAVČAR, Dejan, BAŠA ČESNIK, Helena, ČUŠ, Franc, **KOŠMERL, Tatjana**. The influence of skin contact during alcoholic fermentation on the aroma composition of Ribolla Gialla and malvasia istriana *Vitis vinifera* (L.) grape wines. *International journal of food science & technology*, ISSN 0950-5423. [Print ed.], 2011, vol. 46, str. 1801-1808, doi: 10.1111/j.1365-2621.2011.02679.x. [COBISS.SI-ID 3596136], [JCR, SNIP, WoS do 11. 2. 2014: št. citatov (TC): 2, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0.50, normirano št. čistih citatov (NC): 1, Scopus do 30. 10. 2012: št. citatov (TC): 1, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0.25, normirano št. čistih citatov (NC): 1] kategorija: 1A2 (Z1, A1/2); uvrstitev: SCI, Scopus, MBP; tipologijo je verificiral OSICB točke: 20.52, št. avtorjev: 4

5. BAVČAR, Dejan, BAŠA ČESNIK, Helena, ČUŠ, Franc, VANZO, Andreja, DEMŠAR, Lea, **KOŠMERL, Tatjana**. Impact of alternative skin contact procedures on the aroma composition of white wine. *South African Journal for Enology and Viticulture*, ISSN 0253-939X, 2011, vol. 32, no. 2, str. 190-203. [COBISS.SI-ID 3685992], [JCR, SNIP, WoS do 5. 4. 2012: št. citatov (TC): 0, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0, normirano št. čistih citatov (NC): 0, Scopus do 28. 3. 2012: št. citatov (TC): 0, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0, normirano št. čistih citatov (NC): 0]

kategorija: 1A3 (Z1); uvrstitev: SCI, Scopus, MBP; tipologijo je verificiral OSICB

točke: 11.66, št. avtorjev: 6

6. KOŠMERL, Tatjana, ZLATIĆ, Emil. Determination of 2-aminoacetophenone in wines using the stir bar sorptive extraction method coupled with GC-MS and GC-NPD. *Mitteilungen Klosterneuburg Rebe und Wein, Obstbau und Fruchteverwertung*, ISSN 0007-5922, 2009, vol. 59, nr. 2, str. 121-126. [COBISS.SI-ID [3751544](#)], [JCR, WoS do 17. 1. 2013: št. citatov (TC): 1, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0.50, normirano št. čistih citatov (NC): 1]

kategorija: 1A4 (Z1); uvrstitev: SCI, MBP; tipologijo je verificiral OSICB

točke: 22.7, št. avtorjev: 2

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Sodobne tehnologije animalnih živil
Course title:	New technologies in food of animal origin

Študijski programi in stopnja	Študijska smer	Letnik	Semestri
Bioznanosti, tretja stopnja, doktorski	Živilstvo		Celoletni

Univerzitetna koda predmeta/University course code:

Predavanja	Seminar	Vaje	Klinične vaje	Druge oblike študija	Samostojno delo	ECTS
10	20	0	0	0	95	5

Nosilec predmeta/Lecturer:

Izvajalci predavanj:	Lea Demšar, Irena Rogelj
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij.	General conditions for enrolment in doctoral studies.

Vsebina:	Content (Syllabus outline):
<p>Meso:</p> <ul style="list-style-type: none"> sodobni procesi konzerviranja in kakovost mesa in mesnih izdelkov (aseptično procesiranje, mikrovalovno segrevanje, nove tehnologije, sous vide tehnologija, aktivno pakiranje, ...) problematika heterocikličnih aminov v toplotno obdelanih živilih živalskega izvora (poznavanje biosinteznih poti, njihova identifikacija, delovanje <i>in vitro</i>, fiziološko-zdravstveni učinki nekaterih heterocikličnih aminov in produkti Maillardove reakcije; načini zmanjševanja tvorbe) 	<p>Meat:</p> <ul style="list-style-type: none"> contemporary processes of preservation and quality of meat and meat products (aseptic processing, microwave heating, new technologies, <i>sous vide</i> technology, active packaging, ...) issue of heterocyclic amines in heat-treated foods of animal origin (knowledge of the biosynthetic pathway, their identification, activity <i>in vitro</i>, physiologically-health effects of some heterocyclic amines and Maillard reaction products; methods of reducing formation)

<ul style="list-style-type: none"> • problematika maščobnokislinskega profila mesa in mesnih izdelkov (vpliv prehrane živali, analitika, možnost razvoja funkcionalnega živila z optimalnim maščobnokislinskim profilom) <p>Mleko:</p> <ul style="list-style-type: none"> • kot izvor funkcionalnih sestavin: <i>bioaktivni peptidi</i> – pregled, primer ACE-inhibitornih peptidov, protimikrobnih peptidov, kazeinopeptidov (definicija, struktura, proizvodnja, varnost, aplikacija), <i>bakteriocini</i> mlečnokislinskih bakterij ter možnost njihove uporabe kot naravnih biokonzervansov – primer nisin, gassericini (definicija, sinteza, razvrstitev, lastnosti, delovanje, aplikacija, regulative), <i>oligosaharidi</i> (fiziološki učinki, sodobne analitske metode karakterizacije), <i>konjugirana linolna kislina</i> (naravni izvor, komercialno pridobivanje, analitske metode določanja, zdravju pozitivni učinki) • razvoj in oblikovanje funkcionalnih mlečnih izdelkov za posamezne kategorije potrošnikov (izdelki s prilagojeno sestavo - brezlaktozni mlečni izdelki ali z znižano vsebnostjo laktoze; izdelki obogateni s konjugirano linolno kislino, bioaktivnimi peptidi, antioksidanti, simbiotiki; zaščitne starterske kulture, pripravki na bazi serumskih beljakovin) 	<ul style="list-style-type: none"> • problems bound on fatty acid profile of meat and meat products (impact of animal nutrition, analytics, possibility of developing functional foods with optimal fatty acid profile) <p>Milk:</p> <ul style="list-style-type: none"> • as a source of functional components: <i>bioactive peptides</i> – overview, case study of ACE-inhibitory peptides, antimicrobial peptides, caseinopeptides (definition, structure, production, safety assessment, application); bacteriocins of lactic acid bacteria and their possible use as natural biopreservatives, case study of nisin, gassericins (definition, synthesis, classification, characteristics, mode of action, application, regulative); <i>oligosaccharides</i> (physiological functions, modern analytical methods for their characterization); <i>conjugated linoleic acid</i> (natural sources and commercial production of CLA, analytical methods, health benefits of CLA) • development and designing of functional products for particular category of consumers (products with adapted composition: reduced lactose or lactose-free dairy products; products enriched with conjugated linoleic acid, bioactive peptides, antioxidants and/or symbiotics; protective starter cultures; whey proteins based products)
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Temeljna literatura in viri/Readings:

Izbrana poglavja iz monografij:
Sun D.W. 2012. Thermal food processing: new technologies and quality issues. New York, CRC Press: 666 str.
Hui Y. H. 2012. Handbook of Meat and Meat Processing, Second Edition. New York, CRC Press: 1000 str.
Research and applications in bacteriocins. 2007. Riley M.A., Gillor O. (eds.). Wymondham, UK: Horizon Bioscience: 218 str.
Functional dairy products. 2003. Mattila-Sandholm T., Saarela M. (eds.). CRC Woodhead publishing Ltd., 1-312.
Introduction to Functional Food Science. 2013. Martirosyan, DM (ed.). Food Science Publisher, 6-58.
Revijalni članki s področja, tekoča periodika, druga učna gradiva...

Cilji in kompetence:

Temeljni izobraževalni cilj je poglobitev znanja za samostojno delo na področju raziskav predelave mesa in mleka, s poudarkom na seznanjanju s principi in tehnologijami predelave, tako tradicionalnih kot sodobnih, ter kakovostjo in zagotavljanjem varnosti živil živalskega izvora.

Objectives and competences:

The goals of the course are deepening and extending knowledge and skills for self-dependent work on the meat and milk technology area, with a focus on communicating the principles and techniques of processing, traditional and modern, as well as ensuring quality and safety of foods of animal origin.

Predvideni študijski rezultati:

Znanje in razumevanje:

Predviden študijski rezultat je kandidata usposobiti za izvedbo raziskav na področju raziskav predelave

Intended learning outcomes:

Knowledge and understanding:

Students acquire capacity to implement the in the field of meat and milk processing; the results of

mesa in mleka, rezultati katerih bodo predstavljali pomembne prispevke temeljni ali aplikativni znanosti na področju živilskih znanosti. Študent v okviru predmeta pridobi sposobnost identifikacije, kritične presoje in reševanja tehnoloških problemov, razvoja novih živil, zbiranja podatkov analiz in njihove interpretacije, uporabe domače in tuje strokovne literature preko knjižnice BF in IKT, timskega dela.	these studies will constitute an important contribution to basic or applied science in the field of food science. Students receive direction and indicate the possibility of potential research, critical thinking and solving technological problems, novel foods, use of data collection analysis in this area, as well as use of domestic and foreign literature through BF and IKT libraries, and get ready to write articles and work in a professional team.
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Metode poučevanja in učenja:

Predavanja, samostojna priprava seminarjev in predstavitev.

Learning and teaching methods:

Lectures, seminar, independent preparation and presentation.

Načini ocenjevanja:

Delež/Weight

Assessment:

a) oddana, pregledana in zagovarjana seminarska naloga	50,00 %	a) seminar
b) izpit (pisni ali ustni)	50,00 %	b) exam (oral or written)

Reference nosilca/Lecturer's references:

Lea Demšar

- Demšar, Lea, Skvarča, Marlena, Žlender, Božidar, Lušnic Polak, Mateja, Polak, Tomaž. Quality assessment of Slovenian krvavica, a traditional blood sausage : sensory evaluation. Journal of food processing and preservation, ISSN 1745-4549, 2014, vol. 38, str. 97-105, ilustr., doi: 10.1111/j.1745-4549.2012.00750.x. [COBISS.SI-ID 4080248]
- Lušnic Polak, Mateja, Polak, Tomaž, Demšar, Lea, Absec, Anton, Kirinčič, Stanislava, Kozolc, Brigita, Žlender, Božidar. Degradation of PCBs in a frankfurter-type meat emulsion : effects of a meat starter, its proteins extract and thermal treatments. Food and chemical toxicology, ISSN 0278-6915, 2012, vol. 50, str. 2643-2647. <http://www.sciencedirect.com/science/article/pii/S0278691512003857>, doi: 10.1016/j.fct.2012.05.042. [COBISS.SI-ID 4096888]
- Polak, Tomaž, Žlender, Božidar, Lušnic Polak, Mateja, Demšar, Lea. Effects of coenzyme Q10, [alpha]-tocopherol and ascorbic acid on oxidation of cholesterol in chicken liver pâté. Lebensmittel-Wissenschaft + Technologie, ISSN 0023-6438, 2011, vol. 44, str. 1052-1058, doi: 10.1016/j.lwt.2010.10.010. [COBISS.SI-ID 3834744]
- Polak, Tomaž, Andrenšek, Samo, Žlender, Božidar, Demšar, Lea. Effects of ageing and low internal temperature of grilling on the formation of heterocyclic amines in beef Longissimus dorsi muscle. Lebensmittel-Wissenschaft + Technologie, ISSN 0023-6438, 2009, vol. 42, str. 256-264, doi: 10.1016/j.lwt.2008.03.001. [COBISS.SI-ID 3417720]
- Polak, Tomaž, Došler, Dejan, Žlender, Božidar, Demšar, Lea. Heterocyclic amines in aged and thermally treated pork longissimus dorsi muscle of normal and PSE quality. Lebensmittel-Wissenschaft + Technologie, ISSN 0023-6438, 2009, vol. 42, str. 504-513, doi: 10.1016/j.lwt.2008.09.014. [COBISS.SI-ID 3513208]
- Demšar, Lea, Lukan, Bojan, Žlender, Božidar, Polak, Tomaž. Effects of skin and grilling method on formation of heterocyclic amines in chicken pectoralis superficialis muscle. Lebensmittel-Wissenschaft + Technologie, ISSN 0023-6438, 2009, vol. 42, str. 1313-1319, doi: 10.1016/j.lwt.2009.03.021. [COBISS.SI-ID 3635832]

Irena Rogelj

- GIANNOU, Eleni, KAKOURI, Athanasia, BOGOVIČ MATIJAŠIĆ, Bojana, ROGELJ, Irena, SAMELIS, John. Fate of Listeria monocytogenes on fully ripened Greek Graviera cheese stored at 4, 12, or 25°C in air or vacuum packages : in situ PCR detection of cocktail of bacteriocins potentially contributing to pathogen

- inhibition. *Journal of food protection*, ISSN 0362-028X, 2009, vol. 72, no. 3, str. 531-538. [COBISS.SI-ID 2443400]
2. BLEICHER, Anne, STARK, T., HOFMANN, T., BOGOVIČ MATIJAŠIĆ, Bojana, ROGELJ, Irena, SCHERER, Siegfried, NEUHAUS, K. Potent antilisterial cell-free supernatants produced by complex red-smear cheese microbial consortia. *Journal of dairy science*, ISSN 0022-0302, 2010, vol. 93, no. 10, str. 4497-4505. [COBISS.SI-ID 2740616]
 3. BOGOVIČ MATIJAŠIĆ, Bojana, ROGELJ, Irena. Bacteriocins of probiotics and enteric cytoprotection. V: MALAGO, J.J. (ur.), KONINKX, J.F.J.G. (ur.), MARINŠEK-LOGAR, Romana (ur.). *Probiotic bacteria and enteric infections : cytoprotection by probiotic bacteria*. Dordrecht [etc.]: Springer, cop. 2011, str. 313-354. [COBISS.SI-ID 2826632]
 4. TOMPA, Gorazd, LAINE, Aire, PIHLANTO, Anne, KORHONEN, Hannu, ROGELJ, Irena, MARNILA, Pertti. Chemiluminescence of non-differentiated THP-1 promocytes : developing an assay for screening anti-inflammatory milk proteins and peptides. *Luminescence (Chichester Engl.)*, 2011, vol. 26, no. 4, str. 251-258. <http://onlinelibrary.wiley.com/doi/10.1002/bio.1220/abstract>, doi: 10.1002/bio.1220. [COBISS.SI-ID 2757768]
 5. TRMČIĆ, Aljoša, MONNET, C., ROGELJ, Irena, BOGOVIČ MATIJAŠIĆ, Bojana. Expression of nisin genes in cheese : a quantitative real-time polymerase chain reaction approach. *Journal of dairy science*, ISSN 0022-0302, 2011, vol. 94, no. 1, str. 77-85. [COBISS.SI-ID 2799240]
 6. TOMPA, Gorazd, SUSIČ, Robert, ROGELJ, Irena, POMPE, Matevž. Cryotrap/SPME/GC/MS method for profiling of monoterpenes in cheese and their clustering according to geographic origin. *Acta chimica slovenica*, 2013, vol. 60, no. 3, str. 595-603. [COBISS.SI-ID 3267464]

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet: Sodobne tehnologije rastlinskih živil
Course title: Contemporary technologies of plant food

Študijski programi in stopnja	Študijska smer	Letnik	Semestri
Bioznanosti, tretja stopnja, doktorski	Živilstvo		Celoletni

Univerzitetna koda predmeta/University course code: 3872

Predavanja	Seminar	Vaje	Klinične vaje	Druge oblike študija	Samostojno delo	ECTS
10	15	15	0	0	85	5

Nosilec predmeta/Lecturer: Vidrih Rajko

Izvajalci predavanj: Vidrih Rajko
Izvajalci seminarjev:
Izvajalci vaj:
Izvajalci kliničnih vaj:
Izvajalci drugih oblik:
Izvajalci praktičnega usposabljanja:

Vrsta predmeta/Course type: izbirni/elective

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Splošni pogoji za vpis na doktorski študij

Prerequisites:

General conditions for enrolment in Doctoral study

Vsebina:

Usmerjati poobiravno fiziologijo sadja v skladišču (mejne vrednosti O₂ in temperature) v izboljšanje parametrov kakovosti, ki jih določajo potrošniki. Pilotna aplikacija dinamične atmosfere za skladiščenje sadja ter vpliv dinamične atmosfere na pojav fizioloških bolezni. Študij sinteze aromatskih spojin med zorenjem sadja ter pomembnost arome sadja s stališča potrošnika. Študij uporabe mejnih temperatur (0,2 °C nad zmrziščem sadja) kot alternativa uporabe 1-MCP. Študij fiziologije sadja in vrtnin pri pakiranju v modificirano atmosfero in uporaba plastičnih folij z namensko prepustnostjo ter uporaba adsorbentov CO₂ in O₂. Uporaba naravnih aditivov za izboljšanje funkcionalnih

Content (Syllabus outline):

Steer poobiravno physiology of fruit in storage (limiting O₂ and temperature) to improve the quality parameters as perceived by consumers. The application of pilot dynamic atmosphere storage of fruits and the impact of dynamic atmosphere on the occurrence of physiological diseases. Study of the synthesis of aroma compounds during ripening of fruit and the importance of fruit flavors from the perspective of the consumer. Study of the application of minimum temperature (0.2 °C above the freezing point of fruit) as an alternative to the use of 1-MCP. Study of the physiology of fruits and vegetables packed in a modified atmosphere and use of plastic films with a known permeability and

lastnosti moke in povečanje prehranske vrednosti kruha. Uporaba modernih tehnologije predelave grozdja (flotacija, makrooksigenacija) in pridelave vina (mikrooksigenacija, reduktivna tehnologija). Študij ohranjanja aromatičnih spojin vina (sortnih, fermentacijskih in zorilnih arom). Proučevanje dejavnikov, ki vplivajo na alkoholno in jabolčno-mlečnokislinsko fermentacijo. Študij optimalnega zorenja vina in drugih proizvodov iz grozdja in vina. Zmanjšanje uporabe enoloških sredstev ob zagotavljanju prehranske vrednosti vina kot varnega živila. Študij fizikalno-kemijske in mikrobiološke stabilnosti vina.

the use of CO₂ and O₂ adsorbents. The use of natural additives for improving the functional properties of flour and increasing the nutritional value of bread. The use of modern technologies for grape processing (flotation, macrooxygenation) and wine production (microoxygenation, reductive technology). Studies of preserving the aroma compounds of wine (varietal, fermentation and aging aromas). The study of factors affecting the alcoholic and malolactic fermentation. Study of optimal ripening of wine and other grape and wine products. Reduce the use of oenological agents while ensuring the nutritional value of wine as a safe food. Study of physico-chemical and microbiological stabilization of wine.

Temeljna literatura in viri/Readings:

Izbrana poglavja iz naslednjih publikacij:

- Ben-Yehoshua, S. 2005. Environmentally friendly technologies for agricultural produce quality, strani: 61 – 112; 133 – 148; 447 – 491.
- Ottaway, P. B. 2004. The international review of food science and technology, 142 str.
- Thompson, K., 2008. Fruit and Vegetables: Harvesting, Handling and Storage, 480 str.
- Rodrigues S., Fernandes FAN, 2012, Advances in Fruit Processing Technologies, 472 str.
- Arvanitoyannis I. 2012, Modified Atmosphere and Active Packaging Technologies, 826 str.
- Jackson, R.S. 2008. Wine science. Principles and applications. 3rd edition. Elsevier Inc., Oxford.
- Jackson, R.S. 2009. Wine tasting: A professional handbook. 2nd edition. Elsevier Inc., Oxford.
- Kilcast, D. 2010. Sensory analysis for food and beverage quality control: A practical guide. Woodhead Publishing Limited, Cambridge.
- Reynolds, A.G. 2010. Managing wine quality. Volume 1: Viticulture and wine quality. Woodhead Publishing Limited, Cambridge.
- Reynolds, A.G. 2010. Managing wine quality. Volume 2: Oenology and wine quality. Woodhead Publishing Limited, Cambridge.
- Ribéreau-Gayon, P., Glories, Y., Maujean, A., Dubourdieu, D. 2006. Handbook of enology, Volume 1: Microbiology of wine and vinifications, 2nd edition. John Wiley & Sons, Ltd., Chichester.
- Ribéreau-Gayon, P., Glories, Y., Maujean, A., Dubourdieu, D. 2006. Handbook of enology, Volume 2: Chemistry of wine stabilization and treatments, 2nd edition. John Wiley & Sons, Ltd., Chichester.
- »revijalni članki s področja, tekoča periodika, druga učna gradiva...«

Cilji in kompetence:

Znanje in razumevanje: Študentje se seznanijo s sodobnimi tehnološkimi postopki predelave rastlinskih živil, ki vključuje sadje, zelenjavo, poljščine in vino. Spoznajo tehnologijo, ki omogoča pridobitev kakovosti in stabilnosti pridelkov, ki jo vedno bolj zahtevajo potrošniki. Študentje se bodo v laboratoriju srečali s praktično uporabo nekaterih od naštetih tehnologij.

Objectives and competences:

Knowledge and Understanding: Students get acquainted with modern technological processes of plant foods, which include fruits, vegetables, cereals and wine. Learn about the technology, which will allow obtaining the quality and stability of products that consumers increasingly demand. Students will meet in the laboratory to practical application of some of these technologies.

Predvideni študijski rezultati:

Znanje in razumevanje: Predmet daje znanje, potrebno pri razvoju sodobnih tehnologij v živilski tehnologiji. Seznanjeni se s kritičnim ovrednotenjem prednosti in

Intended learning outcomes:

Knowledge and Understanding: The subject gives the knowledge needed in the development of modern technologies in food technology. Pair it with a critical evaluation of the

pomanjkljivosti novih tehnologij s stališča končnega proizvoda.	advantages and disadvantages of new technologies from the perspective of the end product.
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Metode poučevanja in učenja:

Predavanja, laboratorijsko delo, samostojna priprava seminarjev in predstavitev. Pisno preverjanje znanja.

Learning and teaching methods:

Lectures, laboratory work, independent preparation of seminars and presentations. Written examination.

Načini ocenjevanja:

Delež/Weight

Assessment:

seminar	50,00 %	seminar
pisni izpit	50,00 %	written exam

Reference nosilca/Lecturer's references:

Rajko Vidrih

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