ИЗБОРНОМ ВЕЋУ

ПОЉОПРИВРЕДНОГ ФАКУЛТЕТА

УНИВЕРЗИТЕТА У БЕОГРАДУ

У складу са Законом о науци и истраживањима ("Службени гласник РС" бр. 49/2019) и Правилником о стицању истраживачких и научних звања ("Службени гласник РС" бр. 80/2024) и на основу одлуке Изборног већа Пољопривредног факултета Универзитета у Београду бр. 500/1-7, 27.11.2025. године именовани смо у Комисију за спровођење поступка стицања звања, подношење извештаја и оцене научноистраживачког рада кандидаткиње Иване Перић, мастер биолога, за избор у звање истраживач сарадник у области биотехничких наука, грана – Прехрамбено инжењерство, научна дисциплина – Прехрамбена технологија, ужа научна дисциплина – Технолошка микробиологија.
На основу увида у достављену документацију, Комисија у саставу: др Милица Мирковић, ванредни професор, Пољопривредног факултета Универзитета у Београду, др Немања Мирковић, доцент Пољопривредног факултета Универзитета у Београду и др Душан Кекић, доцент Медицинског факултета Универзитета у Београду, подноси следећи:

ИЗВЕШТАЈ

Биографски подаци

Ивана Перић рођена је 19. априла 1998. године у Београду, где је завршила основну школу и Земунску гимназију. Пољопривредни факултет у Београду уписала је 2016. године на студијском програму Прехрамбена технологија, модул Микробиологија хране, где је дипломирала 2020. године. Тема дипломског рада била је „Карактеристике појединих контаминената хране". Мастер академске студије уписала је 2020. године на Биолошком факултету у Београду, на смеру Биологија, модулу Биологија микроорганизама. Мастер рад под насловом „Изоловање компонената екстрацелуларног матрикса и ћелија перзистера код сојева *Staphylococcus aureus*" одбранила је 2021. године.

Докторске академске студије на Пољопривредном факултету уписала је школске 2022/2023. године. Звање истраживач приправник је стекла 26. јануара 2023. године за област Биотехничке науке, грану: Прехрамбено инжењерство, научну дисциплину: Прехрамбена технологија, ужу научну дисциплину: Технолошка микробиологија.

Од фебруара 2023. године запослена је као истраживач приправник на Пољопривредном факултету Универзитета у Београду према Шестом позиву талентованим младим истраживачима – студентима докторских студија за укључивање у научноистраживачки рад у акредитованим организацијама које је објавило Министарство науке, технолошког развоја и иновација.

Одлуком Већа научних области биотехничких наука Универзитета у Београду од 14. октобра 2025. године (61206-3568/2-25) прихваћена је тема њене докторске дисертације

под називом: „Антибиотски резистентне бактерије у производњи млека: карактеризација изолата и детекција гена резистенције“.

Члан је пројектног тима Erasmus+ пројекта “European Excellence in Dairy Learning” (AEDIL Dairy CoVE). У оквиру пројекта учествовала је на летњој школи AEDIL Dairy CoVE Dairy Academy 2025, одржаној у јуну 2025. године у Атини, Грчка.

Део је промотивног тима факултета, где учествује у организацији и представљању факултета на различитим догађајима. Такође је учествовала на „Млекологија“ иновационом кампу као један од организатора, као и на Фестивалу науке.

Научноистраживачки рад

Кандидаткиња Ивана Перић показала је изразиту склоност ка научноистраживачком раду у области технолошке микробиологије, са интересовањем за проучавање микробиолошке безбедности хране и антибиотске резистенције микроорганизама, а посебно за истраживања која обухватају повезивање изолата из различитих извора и разумевање механизама ширења резистенције.

Активно је ангажована на Катедри за технолошку микробиологију, где учествује у извођењу вежби на предметима Индустријски микроорганизми у храни анималног порекла (III година, студијски програм Прехрамбена технологија, модул Микробиологија хране), Санитација погона (III година, студијски програм Прехрамбена технологија, модули Микробиологија хране и Управљање безбедношћу и квалитетом у производњи хране), Микробиологија хране (III година, студијски програм Прехрамбена технологија, модул Управљање безбедношћу и квалитетом у производњи хране), као и на предмету Општа микробиологија (II година, студијски програм Прехрамбена технологија).

Током досадашњег ангажмана на факултету, заједно са колегама објавила је два научна рада на SCI листи (M21, M22) и девет саопштења на више међународних конференција и стручних усавршавања.

Закључак и предлог

На основу поднете документације и анализе научноистраживачког и стручног рада истраживача приправника Иване Перић, мастер биолога, Комисија закључује да је кандидаткиња постигла запажен успех у научном раду. Резултати, усвајање метода научноистраживачког рада, као и залагање и ентузијазам у погледу научног напредовања квалификују је за избор у више истраживачко звање. Оваквим приступом она се развија у перспективног научног радника из области прехрамбене технологије.

Комисија је јединствена у оцени и закључку да истраживач приправник **Ивана Перић**, мастер биолог, испуњава све потребне услове дефинисане Законом о науци и истраживањима (“Службени гласник РС” бр. 49/2019) и Правилником о стицању истраживачких и научних звања (“Службени гласник РС” бр. 80/2024) и у складу са тим предлаже Изборном већу и Декану Пољопривредног факултета Универзитета у Београду

да Ивану Перић, мастер биолога, изабере у звање **истраживач сарадник** у области биотехничких наука, грана – прехрамбено инжењерство, научна дисциплина – прехрамбена технологија, ужа научна дисциплина – технолошка микробиологија.

Београд – Земун

Дана 20.11.2025. год.

ЧЛАНОВИ КОМИСИЈЕ

др Милица Мирковић, ванредни професор
Универзитет у Београду, Пољопривредни факултет
(ужа научна област: Технолошка микробиологија)

др Немања Мирковић, доцент
Универзитет у Београду, Пољопривредни факултет
(ужа научна област: Технолошка микробиологија)

др Душан Кекић, доцент
Универзитет у Београду, Медицински факултет
(ужа научна област: Микробиологија)

Прилог 1. Одлука Већа научних области биотехничких наука Универзитета у Београду о прихватању теме докторске дицертације

Прилог 2. Списак саопштених и објављених научних и стручних радова кандидаткиње

Прилог 3. Фотокопије саопштених и објављених научних и стручних радова

Прилог 1.

ТН 22/34

УНИВЕРЗИТЕТ У БЕОГРАДУ

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ВЕЋЕ НАУЧНИХ ОБЛАСТИ
БИОТЕХНИЧКИХ НАУКА

Београд, 14. октобар 2025. године
02-08 Број: 61206-3568/2-25
МЦ

На основу члана 48 став 5 тачка 3 Статута Универзитета у Београду („Гласник Универзитета у Београду", бр. 201/18, 207/19, 213/20, 214/20, 217/20, 230/21, 232/22, 233/22, 236/22, 241/22, 243/22, 244/23, 245/23, 247/23, 251/23, 258/24, 260/25 и 262/25) и члана 32 Правилника о докторским студијама на Универзитету у Београду („Гласник Универзитета у Београду", бр. 191/2016, 212/2019, 215/2020, 217/2020, 228/21, 230/21, 241/22 и 259/24), а на захтев Пољопривредног факултета, бр. 32/10-4.4. од 24. септембра 2025. године, Веће научних области биотехничких наука, на електронској седници одржаној 14. октобра 2025. године, донело је

О Д Л У К У

ДАЈЕ СЕ САГЛАСНОСТ на одлуку Наставно-научног већа Пољопривредног факултета о прихватању теме докторске дисертације ИВАНЕ ПЕРИЋ, под називом: „Антибиотски резистентне бактерије у производњи млека: карактеризација изолата и детекција гена резистенције" и одређивању проф. др Милице Мирковић за ментора.

П Р Е Д С Е Д Н И Ц А В Е Ћ А
проф. др Мирјана Оцокољић

Доставити:
- Факултету
- архиви Универзитета

Прилог 2. Списак саопштених и објављених научних и стручних радова кандидаткиње

Радови објављени у научним часописима међународног значаја (М20)

Рад у врхунском међународном часопису (М21)

1. Karabasil, N., Mirković, M., Vićić, I., **Perić, I.**, Zlatković, N., Luković, B., & Gajić, I. (2025). Antimicrobial Resistance in Diverse Ecological Niches—One Health Perspective and Food Safety. Antibiotics, 14(5), 443.

Рад у истакнутом међународном часопису (категорија М22)

1. Hovjecki, M., Radovanovic, M., Levic, S. M., Mirkovic, M., **Peric, I.**, Miloradovic, Z., Jurina, I.B., Miocinovic, J. (2024). Chia Seed Mucilage as a Functional Ingredient to Improve Quality of Goat Milk Yoghurt: Effects on Rheology, Texture, Microstructure and Sensory Properties. Fermentation, 10(8), 382.

Радови у истакнутом националном часопису (М52)

Рад у истакнутом националном часопису за биотехнологију и пољопривреду (категорија М52-1.5)

1. Oreščanin, E., **Perić, I**., Pešić, M., Stanojević, S. (2018). Koliko smo upoznati sa osobinama i prisustvom mikotoksina u hrani?/How much we know about properties and the presence of mycotoxins in the food? Hrana i ishrana, 59(2).

Саопштења са међународних скупова штампана у изводу (категорија М34)

1. Nenadović J., Mirković N., Mirković M., Bajčetić N., **Perić I**., Miloradović Z., Radulović Z. (2023). Molecular methods to detect adulteration of goat whey products. International Symposium on Animal Science ISAS 2023, 18-20 October 2023, Novi Sad, Serbia, Book of Abstract, 3.
2. Bajčetić, N., **Perić, I**., Nenadović, J., Mirković, N., Radulović, Z., Mirković, M. (2024): *Lactobacillus* sp. strains from Serbian traditional cheeses:characterization, antimicrobial activity and antibiotic resistance. XIII Congress of Microbiologist of Serbia-MIKROMED REGIO 5, 04-06.April 2024, Belgrade, Serbia. Abstract book, PP30.
3. Nenadović, J., **Perić, I**., Bajčetić, N., Radulović, Z., Mirković, M., Mirković, N. (2024): Lactic acid bacteria from fresh vegetables: isolation and selection for their potential use as starters for the fermentation of plant-based milk alternatives. XIII Congress of Microbiologist of Serbia-MIKROMED REGIO 5, 04-06.April 2024, Belgrade, Serbia. Abstract book, PP22.
4. Bajčetić, N., **Perić, I**., Nenadović, J., Cvijan, J., Mirković, N., Radulović, Z., Mirković, M. (2024): Microbiological quality of chocolate-coated confectionery from various manufacturers. UNIFooD2024 Conference, 28-29 June 2024, Belgrade, Serbia, Abstract book, 36.

5. **Perić, I**., Nenadović, J., Bajčetić, N., Mirković, N., Radulović, Z., Ilić, J., Mirković, M. (2024): Ready-to-eat sandwiches as a source of pathogenic bacteria. UNIFooD2024 Conference, 28-29 June 2024, Belgrade, Serbia, Abstract book, 146.
6. **Perić, I**., Nenadović, J., Bajčetić, N., Gajić, I., Kekić, D., Jovićević, M., Mirković, M. (2025): Raw Milk as a Reservoir of Carbapenem-Resistant and ESBL-Producing Bacteria: Insights from a Serbian Farm Study. FEMS MICRO 2025 Conference, 14-17 July 2025, Milan, Italy, Abstract book, 1517.
7. Bajčetić, N., **Perić, I**., Nenadović, J., Mirković, N., Radulović, Z., Popović, N., Mirković, M. (2025): Exploring the Traditional Serbian Cheeses as a Probiotic Goldmine: Promising Insights of Novel Lactobacillus Strains for Gut Health". FEMS MICRO 2025 Conference, 14-17 July 2025, Milan, Italy, Abstract book, 803.
8. Nenadović, J., **Perić, I.**, Bajčetić, N., Mirković, M., Radulović, Z., Mirković, N. (2025): Evaluation of Lactic Acid bacteria Strains for Fermentation of Soy Milk Based on Alternatives : Sugar Utilisation and Proteolytic Activity. FEMS MICRO 2025 Conference, 14-17 July 2025, Milan, Italy, Abstract book, 746.

Саопштење са скупа националног значаја штампано у изводу (M64)

1. **Perić, I**., Nenadović, J., Bajčetić, N., Mirković, N., Radulović, Z., Mirković, M. (2025): Detection of *Listeria monocytogenes* in food using real-time PCR and ISO method. Simpozijum Mikrobiologija hrane - IZAZOVI I PRILIKE, 15. maj 2025., Novi Sad, Srbija, Knjiga apstrakata, 25.

Прилог 3.

antibiotics

MDPI

Review

Antimicrobial Resistance in Diverse Ecological Niches—One Health Perspective and Food Safety

Nedjeljko Karabasil [1], Milica Mirković [2], Ivan Vićić [1,*], Ivana Perić [2], Nevena Zlatković [3], Bojana Luković [4] and Ina Gajić [5]

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Abstract: Antimicrobial resistance (AMR) is a multi-sectoral, systemic, and global issue worldwide. Antimicrobial use (AMU) is a key factor in the selection of resistant bacteria within different ecological niches, from agriculture to food-producing animals to humans. There is a question regarding the extent to which the use of antibiotics in livestock production and the primary food production sector influences the selection and transmission of resistant bacteria and/or resistant genes throughout the food chain and thus contributes to the complexity in the development of AMR in humans. Although the trends in the prevalence of foodborne pathogens have changed over time, the burden of ecological niches with resistance genes, primarily in commensal microorganisms, is of concern. The implementation of the harmonized surveillance of AMU and AMR would provide comprehensive insights into the actual status of resistance and further interventions leading to its reduction. Tracking AMR in different ecological niches by applying advanced genome-based techniques and developing shared AMR data repositories would strengthen the One Health concept.

Keywords: bacteria; pathogens; susceptibility; environment; animal; human; food

Academic Editors: Vladimir Kurćubić, Pavle Mašković, Milan Mitić and Nikola Stanišić

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1. Introduction

In recent years, antimicrobial resistance (AMR) has posed a significant challenge worldwide, affecting diverse ecological niches—from agriculture to human health—leading to economic losses and, ultimately, death [1–5]. The main driver for the emergence of AMR in bacteria is uncontrolled antimicrobial use (AMU), particularly in human health care and hospitals [6]. Recently, increasing attention has been paid to the AMU in food-producing animals as a significant source of environmental burden and the possible transmission of resistance to humans [7–9]. Possible transmission routes for the entry of resistant bacteria into the human population from animal sources are through direct contact, indirectly through food, or from the environment through water [10,11]. However, the exact pattern of transmission is still under investigation. While AMU has been identified as the leading cause of resistance, several factors may contribute to its development and further

fermentation

MDPI

Article

Chia Seed Mucilage as a Functional Ingredient to Improve Quality of Goat Milk Yoghurt: Effects on Rheology, Texture, Microstructure and Sensory Properties

Marina Hovjecki [1], Mira Radovanovic [1], Steva M. Levic [2], Milica Mirkovic [3], Ivana Peric [3], Zorana Miloradovic [1], Irena Barukcic Jurina [4,*] and Jelena Miocinovic [1]

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Abstract: In contact with water, chia seeds release mucilage (MC), which is a source of various health-promoting compounds including dietary fibres. MC has been previously used as a thickening agent in cow milk yoghurt, but there are no available data on its application in goat milk. In this study, three goat milk yoghurts (without—MC0, with 1.5%—MC15 and with 3% mucilage—MC30) were produced. The rheology, texture, microbial counts, syneresis, microstructure and sensory acceptance of the yoghurts were investigated. The MC addition resulted in a reduced hysteresis area, but increased yoghurt viscosity at lower shear rates. It also improved all texture parameters at both concentration levels, while syneresis values were reduced only in sample MC30. The MC addition promoted lactobacilli viability in both supplemented yoghurts. The texture perceived by sensory evaluation was rated the highest for the sample MC30, which was also the most accepted by consumers overall. Critical attributes that reduced the acceptability of all yoghurts were flavour and acidity. In conclusion, chia seed mucilage can be used as a functional ingredient in goat milk yoghurt to produce an innovative dairy product and meet consumer expectations.

Keywords: chia seed mucilage; goat milk yoghurt; rheology and texture; sensory properties; microbial counts

Citation: Hovjecki, M.; Radovanovic, M.; Levic, S.M.; Mirkovic, M.; Peric, I.; Miloradovic, Z.; Jurina, I.B.; Miocinovic, J. Chia Seed Mucilage as a Functional Ingredient to Improve Quality of Goat Milk Yoghurt: Effects on Rheology, Texture, Microstructure and Sensory Properties. *Fermentation* **2024**, *10*, 382. https://doi.org/10.3390/fermentation10080382

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1. Introduction

Goat milk is recognised as a nutritious food with positive effects on human health. The demand for this type of milk and its products is constantly increasing, due to the growing interest in artisanal products and the preference of health-conscious consumers. The main components of goat milk are present in a more favourable form and ratio than in cow's milk. For example, the fat globules in goat milk are smaller and more uniform, which makes this type of milk more digestible; the proportion of caseins and serum proteins is more favourable, the risk of allergies is lower and the content of various nutrients is higher [1–3].

Fermented dairy products are excellent carriers of functional ingredients that have a positive effect on human health. However, achieving an acceptable texture and stability of yoghurts made from goat's milk is often a challenge for manufacturers due to the specific protein profile of goat's milk, especially the low or absent content of αs1 casein, a protein responsible for the firm texture and favourable consistency of goat yoghurt [3]. Forecasts show that yoghurt is the fastest growing dairy product, both in terms of financial value

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Koliko smo upoznati sa osobinama i prisustvom mikotoksina u hrani?

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Kratak sažetak

Pojava mikotoksina u lancu ishrane je neizbežan i ozbiljan problem sa kojim se suočava svet. Zbog veoma vlažnih i toplih klimatskih uslova, može se očekivati da će Srbija ove i sledeće godine biti veoma pogodno tle za razvoj toksigenih gljiva. Moramo biti upoznati sa osobinama mikotoksina, hemijskom strukturom i osnovnim mehanizmima delovanja pojedinačnih mikotoksina, kako bismo imali osnove za razvoj protokola ili metoda za efikasno upravljanje problemima vezanim za mikotoksine, kao i da bi se razumeli njihovi biološki efekti. Cilj rada je bio da se napravi analiza koliko su studenti upoznati sa problemom pojave mikotoksina u hrani. Istraživanje je sprovedeno pomoću anonimnog upitnika, koji je uključivao pitanja koja se tiču mikotoksina i mikotoksikoza. Anketirani studenti su odabrani nasumično, tj. studenti osnovnih studija na Institutu za prehrambenu tehnologiju i biohemiju, Poljoprivrednog fakulteta, Univerziteta u Beogradu imali su jednake šanse da budu izabrani za uzorak. Anketa je bila edukativna za anketirane studente i pokazala je da su u veoma visokom procentu upoznati sa osnovnim karakteristikama mikotoksina, kao i da od predstavnika pojedinih grupa mikotoksina, najbolje poznaju karakteristike aflatoksina. Pored toga, studenti su pokazali relativno dobro poznavanje osnovnih karakteristika i drugih predstavnika mikotoksina. Relativno dobro predznanje anketiranih studenta o osobinama mikotoksina, može biti odlična osnova za dalji rad i usavršavanje.

Ključne reči: *mikotoksini, mikotoksikoze, hrana, anketno istraživanje*

UVOD

Mikotoksini su toksični sekundarni metaboliti mnogih filamentoznih gljiva [1,2]. Sam naziv mikotoksin potiče od grčke reči *mykes*, što znači plesan i latinske reči *toxicum*, što znači otrov [2]. Sintetišu se usled aktivnosti različitih enzima u procesima kondenzacija, oksido-redukcija, alkiliranja i haloganiranja, od biohemijski jednostavnih međuprodukata primarnog metabolizma (kao što su: malonat, acetat, mavalonat, serin, fenilalanin, alanin, triptofan) [3]. Glavni biohemijski putevi nastajanja mikotoksina su: terpenski (pr. nastaju trihoteceni), aminokiselinski (pr. nastaju: ergotamin, gliotoksini, malformin C, sporidezmin, ksantocilin, ciklohlorotin i ksantoascin), poliketidni (pr. nastaju: aflatoksini, zearalenoni, patulin, sterigmatocistin, citrinin, ohratoksini) i put trikarbonskih kiselina (pr. nastaju: rubratoksini) [4–6].

Zbog sposobnosti da proizvode mikotoksine u hrani, gljive su privukle posebnu pažnju u poslednjih 50 godina. Prisustvo toksigenih gljiva i mikotoksina u namirnicama životinjskog i biljnog porekla, začinima, lekovitom bilju, kao i u hrani za životinje, dokumentovano je od strane mnogih autora [6–14].

Najčešći kontaminenti zrna žita i proizvoda od žita su vrste gljiva iz rodova *Fusarium* i *Alternaria* (takozvane "poljske gljive" [15]), one se, pored vrsta iz rodova *Botrytis, Sclerotina, Rhizopus, Monilia, Mucor* i *Penicillium*, mogu naći kao česti uzročnici oboljevanja voća i povrća u polju [16–18]. Česti kontaminenti mesa i mleka su vrste gljiva iz rodova *Aspergillus, Penicillium, Cladosporium, Mucor, Geotrichum, Trichoderma* i *Sporotrichum* [19–22]. Vrste rodova *Penicillium, Aspergillus* i *Eurotium* su takozvane „skladišne gljive" koje se razvijaju na začinima [11], sušenom voću i povrću [23] i sličnim proizvodima (pr. kafa, kakao, seme susama i suncokreta, musli) [24–28].

Fungicidi su često prva odbrambena linija protiv mikotoksigenih gljiva. Međutim, neselektivna upotreba fungicida je dovela do pobune javnosti zbog njihovih štetnih efekata na životnu sredinu i zdravlje ljudi i životinja. Stoga se povećava javni pritisak za sigurniju i ekološku alternativu za kontrolu ovih organizama. U tom kontekstu, biološka kontrola koristi mikrobiološke antagoniste kao što su bakterija, gljivica i kvasci. Oni su se pokazali izvodljivom zamenom za smanjenje upotrebe hemijskih sredstava [1]. Pored toga, danas se na-

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MOLECULAR METHODS TO DETECT ADULTERATION OF GOAT WHEY PRODUCTS

JOVANA NENADOVIĆ[*1], *NEMANJA MIRKOVIĆ*[1], *MILICA MIRKOVIĆ*[1], *NIKOLA BAJČETIĆ*[1], *IVANA PERIĆ*[1], *ZORANA MILORADOVIĆ*[1], *ZORICA RADULOVIĆ*[1]

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SUMMARY

Do we really consume what we buy? Nowadays, more and more food products with altered compositions are put on the market. The intensity and frequency of food adulteration are increasing. For example, honey, olive oil, spices, and some dairy products, are the most popular counterfeit products.

The objective of this work was to determine whether goat whey was adulterated by the addition of cow whey by using a polymerase chain reaction (PCR) for qualitative detection. The reaction was based on the amplification of specific fragments of mitochondrial DNA (mDNA) using cow-specific primers. Ten goat whey samples were collected - eight samples from local supermarkets and specialty stores and two samples from small dairy farms. As a positive control, two samples of goat whey were prepared in the laboratory under controlled conditions. Total DNA was extracted from all samples using the phenol-chloroform method with some modifications.

The results of PCR reaction showed that six out of eight samples from the local market contained traces of cow whey, while no traces of cow whey were found in two samples from dairies and in the control samples. Based on the results, the PCR method for detecting cow whey in goat whey samples could be successfully used as a routine control test because it is highly sensitive, reproducible, rapid, simple, and not expensive. This study could provide a good basis for industrial control of goat whey products and verification of the content on the label of the products.

Keywords: goat whey, adulteration, extraction, DNA quality, PCR

INDUSTRIAL AND FOOD MICROBIAL BIOTECHNOLOGY

PP22

LACTIC ACID BACTERIA FROM FRESH VEGETABLES: ISOLATION AND SELECTION FOR THEIR POTENTIAL USE AS STARTERS FOR THE FERMENTATION OF PLANT-BASED MILK ALTERNATIVES

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In recent years, the consumption of plant-based milk alternatives (PBMA) derived from nuts, grains, legumes and seeds has increased due to their positive effects, including animal welfare, environmental sustainability and personal health. The aim of this study was to isolate and identify lactic acid bacteria (LAB) from vegetables that are capable of fermenting PBMA and to investigate their resistance to antibiotics. Seven samples of vegetables from Serbia were taken. Each sample was homogenized with LM17c (M17 with 0.5% [w/v] lactose) broth with cyclohexamide (0.5 mg/mL), and after overnight accumulation, all samples were incubated at LM17c and incubated at 30 °C for 48 h. All isolates were incubated overnight at 30 °C in LM17 broth and then inoculated in 5 mL of five commercially available PBMA (soy, almond, rice, cashew and coconut). After overnight incubation at 30 °C, each fermented PBMA was visually analyzed and the pH measured. The isolates that fermented each of the five commercially available PBMA were selected for further analysis. The total DNA of all LAB isolates was extracted using the phenol-chloform extraction method. For rep-PCR analysis, the total DNA of the different LAB isolates was used as a template for PCR amplifications with Random Amplified Polymorphic DNA (RAPD). Antibiotic resistance of selected isolates was determined using the Kirby-Bauer disk diffusion method according to the Clinical and Laboratory Standards Institute. The results show that 115 out of 143 isolates ferment each of the five commercially available PBMA. The measured pH of PBMA after fermentation decreased compared to the control PBMA (PBMA without isolates). The results of the rep-PCR analysis revealed 35 different isolates. Antibiotic resistance tests showed that all 35 strains were sensitive to penicillin, tetracycline, chloramphenicol, erytromycin and ampicillin. In addition, most strains were sensitive to vancomycin and all strains were resistant to streptomycin.

KEYWORDS: plant – based fermentation; lactic acid bacteria; antibiotic resistance

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READY-TO-EAT SANDWICHES AS ASOURCE OF PATHOGENICBACTERIA

***Ivana I. Perić**, Jovana N. Nenadović, Nikola D. Bajčetić, Nemanja L. Mirković, Zorica T. Radulović, Jovana P. Ilić, Milica M. Mirković*

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Ready-to-eat (RTE) foods can be consumed without significant preparation and could be one of the main routes for the spread of foodborne pathogens: *Enterobacteriaceae, Staphylococcus aureus, Salmonella* and *Listeria monocytogenes*. The aim of this study was to determine the frequency of occurrence of foodborne pathogens and to investigate the relationship between the seasons and the number of bacteria. The study included 372 sandwich samples that were analyzed in the period 2021-2022. The sandwiches were sampled in catering establishments in the territory of Belgrade, according to the ISO 6887 standard. The microbiological analyzes were performed according to the valid ISO methods (ISO 21528-2:2009, ISO 6888-1:2009, ISO 6579:2008, ISO 11290-2:2017). API tests were also used in this study. The presence of bacteria from the *Enterobacteriacae* family was confirmed in 30.37% of samples from 2021, most frequently in samples in July and September, while in 2022 it was confirmed in 21.96%, in July and April. The presence of *S. aureus* was confirmed in 6.73% of 2021 samples, most frequently in December and July, and in 9.54% of 2022 samples, most frequently in March and April. *Salmonella* spp. and *L. monocytogenes* were not detected in any of the samples. *Enterococcus faecalis, Enterobacter cloacae, Enterobacter aerogenes, Citrobacter* spp., *Proteus vulgaris, Proteus mirabilis* and *Hafnia alvei* were identified with API kits. After summarizing all the collected results, it can be concluded that RTE foods are suitable for increased occurrence of pathogenic bacteria, and also their occurrence in different months of the year. To reduce the number of bacteria in RTE foods, certain measures should be taken, such as improving hygiene and disinfection of surfaces, proper storage of food and creating suitable environmental conditions.

Key words: RTE food, foodborne pathogens, sandwiches, ISO methods, API

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MICROBIOLOGICAL QUALITY OF CHOCOLATE-COATED CONFECTIONERY FROM VARIOUS MANUFACTURERS

***Nikola D. Bajčetić*, Ivana I. Perić, Jovana N. Nenadović, Jovan I. Cvijan, Nemanja L. Mirković, Zorica T. Radulović, Milica M. Mirković**

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Confectionery has become a part of our daily lives due to its high energy value and the improvement of consumer mood through its consumption. Due to their composition and high moisture content, they provide a suitable environment for the growth and development of microorganisms. The aim of this study was to investigate the microbiological quality of chocolate-coated confectionery from different manufacturers, testing microbiological parameters that may affect the quality and also the safety of the product, according to the valid microbiological criteria guidelines. Eight chocolate-coated confectionery products from different manufacturers, which are on the market in the Republic of Serbia, were tested according to the valid ISO methods (ISO 4833, SRPS ISO 21527-2, ISO 21528-2, ISO 6888-1). In addition to the use of standard culture media prescribed by the ISO methods, Petrifilms were also used in this study. According to the Regulative, sample F showed an acceptable result for total aerobic mesophilic bacterial activity with a value of 3.37 log CFU/mL (limit values 3 log CFU/mL and 4 log CFU/mL). The unsatisfactory results of the microbiological examination showed the following samples: Sample labeled H showed the highest activity of Enterobacteriaceae with a count of 2.11 log CFU/mL (the maximum allowable value is 2 log CFU/mL); samples C and E showed the highest activity for yeasts and molds with a cell count of 2.96 log CFU/mL (maximum value is 2 log CFU/mL); the cell count of *Staphylococcus aureus* in sample E was 3.23 log CFU/mL (maximum value is 2 log CFU/mL), which is the highest activity for this microbiological parameter. In conclusion, the unsatisfactory results obtained with the above-mentioned ISO methods indicate improper performance of the production process. It is therefore necessary to work on improving hygiene practices and creating better conditions for product storage.

Key words: candy products, microbiological analysis, microbiological parameters, petrifilms

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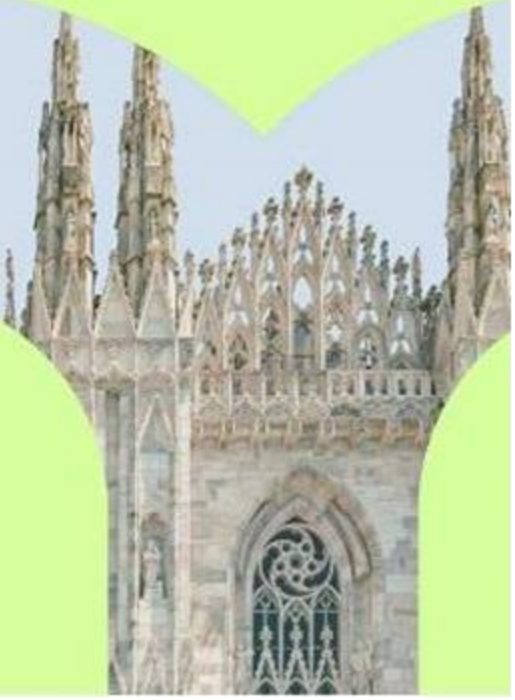

Abstract ID: 819 / Poster Number: 076.17P

Raw Milk as a Reservoir of Carbapenem-Resistant and ESBL-Producing Bacteria: Insights from a Serbian Farm Study

Presenting author: Ivana Peric, PhD, University of Belgrade Faculty of Agriculture, Belgrade, Serbia

Co-authors: *Jovana Nenadovic, Nikola Bajcetic, Ina Gajic, Dusan Kekic, Milos Jovicevic, Milica Mirkovic*

Antimicrobial resistance (AMR) in milk samples, particularly bacteria resistant to carbapenems and producing extended-spectrum beta-lactamases (ESBLs), poses a serious and growing threat to global health as resistant bacteria can spread through the food chain. The aim of this study was to determine the route of transmission and prevalence of these resistant bacteria, focussing on the isolation and identification of the pathogenic bacteria.

A total of 65 cow's milk samples, 28 goat's milk samples and 13 swab samples were taken from farms in Serbia. The samples were inoculated on ESBL and Carba Smart agar (Merck, Germany), which were developed for the detection of ESBL-producing and carbapenem strains. The isolated pathogenic bacteria were identified using the MALDI-TOF Mass Spectrometry method. In addition, a Quantum BT-Cef (ProGnosis Biotech, Greece) rapid test was performed to detect specific antibiotic groups in 30 samples of milk.

Among the resistant strains observed in milk, *Pseudomonas* spp. dominated (40.48%), followed by *Stenotrophomonas maltophilia* (17.46%), *Acinetobacter* spp. (7.54%), *Ochrobactrum* spp. (5.56%) and *Aeromonas* spp. (4.37%). *Pseudomonas* spp. (35.90%), *Empedobacter brevis* (15.38%) and *Lacticaseibacillus paracasei* (7.69%) were most frequently present in swab samples. One cow's milk sample were positive for the presence of β-lactams.

The results show that raw milk is important source of multi-resistant bacteria and resistance genes. Therefore, it is necessary to identify possible sources and vectors for the transmission of antibiotic resistance genes. To solve these problems, regular milk controls, staff training to improve hygiene practises and controlled use of antibiotics are required.

Abstract ID: 836 / Poster Number: 274.17P

Exploring the Tradicional Serbian Cheeses as a Probiotic Goldmine: Promising Insights of Novel Lactobacillus Strains for Gut Health

Presenting author: Mr. Nikola Bajcetic, University of Belgrade, Faculty of Agriculture, Belgrade, Serbia

Co-authors: *Ivana Peric, Jovana Nenadovic, Nemanja Mirkovic, Zorica Radulovic, Nikola Popovic, Milica Mirkovic*

Traditional cheeses from specific ecological regions are a reservoir of microbial diversity and often contain unique lactic acid bacteria (LAB) with probiotic potential. This study investigates lactobacilli isolates from five different semi-hard and white brined cheeses produced in a traditional way from raw milk from rural mountainous areas of Eastern Serbia.

Based on preliminary probiotic tests for survival under simulated gastrointestinal (GI) tract conditions and antimicrobial potential against pathogenic and spoilage microorganisms, four strains were selected to test their effects on a model of differentiated intestinal epithelial Caco-2 cells. *Lactiplantibacillus plantarum* 237, *Lactiplantibacillus plantarum* 337, *Lacticaseibacillus paracasei* KB and *Limosilactobacillus fermentum* KT showed high survival rates under harsh GIT conditions. In addition, the selected strains have a broad spectrum of antimicrobial activity against Gram-negative and Gram-positive pathogens. None of the strains tested exhibited cytotoxicity in the differentiated Caco-2 cell model, with approximately 5% adhering to the cell line. Gene expression analysis revealed a reduction in oxidative stress markers (*NRF-2* and *NQO-1*), enhanced autophagy (*p62* and *MAP1LC3B*) and upregulation of tight junction-related genes (*CLDN4* and *CDH1*).

This study highlights the importance of the discovery of novel autochthonous isolates with exceptional probiotic potential that can be further used as probiotics or probiotic starter cultures in the production of functional foods.

Abstract ID: 1494 / Poster Number: 294.17P

Evaluation of Lactic Acid Bacteria Strains for Fermentation of Soy Milk Based on Alternatives: Sugar Utilisation and Proteolytic Activity

Presenting author: Jovana Nenadovic, PhD, University of Belgrade, Faculty of Agriculture, Belgrade, Serbia

Co-authors: *Ivana Peric, Nikola Bajcetic, Milica Mirkovic, Zorica Radulovic, Nemanja Mirkovic*

The selection of lactic acid bacteria (LAB) strains is crucial for the successful fermentation of plant-based beverages such as soy beverages, as they influence both the taste and the nutritional content of the final product.

The ability of LAB to efficiently utilise sugars and break down proteins is crucial for improving the digestibility, taste and functional properties of soy beverages. This study investigates the sugar utilisation and proteolytic activity of different LAB strains during soy beverages fermentation with the aim of identifying the strains with the most efficient enzymatic activities to optimise the fermentation process.

Different strains from genera *Lactococcus, Lactobacillus* and *Leuconostoc*, isolated from fresh fruits and vegetables from Serbia were analysed for their ability to ferment soy milk based on alternative (SBMA). The sugar consumption pattern for glucose, lactose and sucrose was analysed in a synthetic medium. In addition, the proteolytic activity was analysed on the supernatant of the medium (cells and soy protein extract) after incubation at 30 °C for 4 hours on an SDS-polyacrylamide gel. In addition.

The results showed that almost all strains grew on sucrose and glucose. According to the results of the selection of 27 strains, 10 (1 *Lactococcus lactis*, 1 *Lactiplantibacillus plantarum*, 6 *Leuconostoc mesenteroides*, 1 *Lactobacillus pentosus*, 1 *Lactococcus lactis*) showed significant proteolytic activity in soy. Considering the results for all analysed parameters, these strains are considered particularly interesting candidates for the production of soy-based products.

The Federation of European Microbiological Societies

CERTIFICATE OF ATTENDANCE

This is to certify that

Ivana Peric

Serbia

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DETECTION OF LISTERIA MONOCYTOGENES IN FOOD USING REAL-TIME PCR AND ISO METHOD

Ivana Perić[1], Jovana Nenadović[1], Nikola Bajčetić[1], Nemanja Mirković[1], Zorica Radulović[1], Milica Mirković[1]

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Listeria monocytogenes can be transmitted through contaminated food and water and has become the subject of intense research due to its unique ability to survive and multiply under different conditions. The aim of this study was to investigate the presence of *L. monocytogenes* in smoked salmon, fermented sausage, brined white cheese, lettuce and Swiss chard using the traditional ISO method and Real Time PCR. The samples were taken from supermarkets and the open market. The IQ Check Listeria monocytogenes II kit (BioRad, USA) was used for real-time PCR, while ISO method 11290-1:2017 was used for the detection of *L. monocytogenes*.

When detecting *L. monocytogenes* from different food samples using the real-time PCR method, all negative results were obtained in a very short time. The whole experiment was completed in about 28 hours, while seeding on PALCAM agar with classical methods took 4-5 days, as we had to confirm the chard samples to obtain negative results. Early detection of pathogens is extremely important for the food industry in order to take hygiene measures as quickly as possible and prevent the spread of infections. The detection of pathogens in food using traditional methods is not only more time-consuming, but also requires more labour. The use of real-time PCR methods makes it possible to obtain reliable negative results in a very short time.

KEYWORDS: *Listeria monocytogenes*, food, real-time PCR, ISO method