



Book of Abstracts

5TH INTERNATIONAL CONFERENCE

ANTIMICROBIAL RESISTANCE - CURRENT STATE AND PERSPECTIVES

FROM SCIENCE TO PRACTICE



**28-30 MAY 2026
NOVI SAD, SERBIA**



ISBN: 978-86-7520-656-9

5th International Conference Antimicrobial Resistance - Current State
and Perspectives 2026

From Science to Practice

28th – 30th May, 2026. Novi Sad, Serbia

University of Novi Sad, Faculty of Agriculture

Book of Abstracts

University of Novi Sad, Faculty of Agriculture

21000 Novi Sad, Trg D. Obradovića 8

Tel.:++(021) 6350711; 4853-308;

polj.uns.ac.rs

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Antimicrobial resistance – current state and perspectives

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Dear colleagues,

It is our great pleasure to welcome you to the 5th International Conference “Antimicrobial Resistance – Current State and Perspectives”, held in Novi Sad, Serbia. Over the past five years, this conference has evolved into an important regional platform for interdisciplinary dialogue, scientific exchange, and collaborative action in addressing one of the most pressing global public health challenges – antimicrobial resistance (AMR).

This year’s conference is organized under the slogan “From Science to Practice”, reflecting our commitment to translating scientific knowledge into practical solutions and everyday professional practice. Within the One Health framework, the conference brings together experts from veterinary and human medicine, microbiology, pharmacology, food safety, agriculture, environmental sciences, and related disciplines, emphasizing the interconnectedness of human, animal, and environmental health.

The scientific and professional program includes more than 70 scientific contributions presented through lectures, short communications, poster presentations, and 6 practical workshops, covering a broad spectrum of current AMR-related topics. Special attention has been devoted to practical workshops intended for veterinarians and medical doctors, focusing on real-life clinical and field challenges, rational antimicrobial use, diagnostics, preventive strategies, and stewardship approaches.

This year’s conference addresses numerous contemporary challenges related to antimicrobial resistance, including AMR surveillance and monitoring, resistant zoonotic pathogens, food safety, residues of veterinary medicinal products in food, environmental dissemination of resistance genes, wastewater surveillance, and the growing role of microplastics and ecological niches in AMR spread.

Particular emphasis is placed on antimicrobial stewardship and responsible antibiotic use in both veterinary and human medicine, with dedicated sessions focusing on poultry, swine, companion animals, and public health. The program also highlights national and international initiatives developed with FAO support, promoting evidence-based approaches and harmonized strategies for combating AMR.

In line with this year’s slogan “From Science to Practice”, the conference additionally explores innovative preventive and therapeutic approaches aimed at reducing antimicrobial dependence, including biosecurity measures, microbiota-oriented therapies, probiotics, phytotherapeutics, and feed and food safety management. The practical character of the conference is further emphasized through workshops focused on companion animal dermatology, mastitis control, avian pathogenic *E. coli*, hospital hygiene, and responsible antimicrobial therapy.

This year’s conference further emphasizes the importance of interdisciplinary collaboration and coordinated action within the One Health framework. By bringing together experts from veterinary and human medicine, microbiology, pharmacology, food safety, agriculture, and environmental sciences, the conference aims to strengthen dialogue, exchange practical experiences, and support the development of evidence-based strategies for combating antimicrobial resistance.

We sincerely thank all participants, speakers, researchers, institutions, and partners for their contribution and dedication to this important mission. We hope that this conference will inspire meaningful discussions, new collaborations, and practical solutions in the global fight against antimicrobial resistance.

Dr Zorana Kovačević, associate professor
President of the Scientific and Program Committee

CONTENT

1.	THE PLASTISPHERE'S HIDDEN CARGO: MICROPLASTICS AS GLOBAL HIGHWAYS FOR RESISTANCE GENES - <i>Andreja Rajkovic, Irene Orega-Sanz, Maaïke Vercauteren and Elsa Gadoïn</i>	7
2.	FROM LAWS TO LIVESTOCK AND BEYOND: PRUDENT ANTIBIOTIC USE AND BENCHMARKING IN VETERINARY MEDICINE IN AUSTRIA - <i>Clair Firth</i>	9
3.	COMPLIANCE OF CURRENT LEGISLATION WITH USER REQUIREMENTS IN MICROBIOLOGICAL CONTROL OF FOODSTUFFS - <i>Dragana Plavšić</i>	11
4.	A MULTIDIMENSIONAL APPROACH TO ANTIMICROBIAL RESISTANCE IN COMPANION ANIMALS: BRIDGING MICROBIOLOGICAL EVIDENCE AND HUMAN BEHAVIOR - <i>Iskra Cvetkovikj, Ivana Shikoska, Bojana Chapkunovska and Aleksandar Cvetkovikj</i>	12
5.	BEYOND THE CLINIC: WASTEWATER SURVEILLANCE AS A GAME-CHANGER IN THE FIGHT AGAINST AMR - <i>Ivana Ćirković</i>	14
6.	MULTIRESISTANCE TO PANRESISTANCE - ANTIMICROBIAL RESISTANCE PATTERNS IN ANIMAL ISOLATES. HOW BIG IS THE PROBLEM WE ARE FACING? - <i>Ákos Jerzsele, Patrik Mag and Ádám Kerek</i>	15
7.	COMBATING ANTIMICROBIAL RESISTANCE IN THE ERA OF PLANETARY HEALTH: IS SHORTER ANTIBIOTIC THERAPY BETTER? - <i>Olga Sič and Zorana Kovačević</i>	17
8.	ANTIMICROBIAL RESISTANCE IN SERBIA: NATIONAL SURVEILLANCE DATA ON PREVALENCE, TRENDS AND RESISTANCE PATTERNS IN HUMAN MEDICINE - <i>Deana Medić</i>	18
9.	CO-CIRCULATION OF MULTIPLE LISTERIA MONOCYTOGENES CLONAL COMPLEXES IN SERBIA 2020-2025 - <i>Branko Velebit and Benjamin Felix</i>	20
10.	THE SIGNIFICANCE OF THE PRESCRIBING CASCADE IN ANTIMICROBIAL SELECTION FOR THE SUSTAINABILITY OF LIVESTOCK PRODUCTION - <i>Nenad Stojanac, Ognjen Stevančević and Zorana Kovačević</i>	22
11.	NEW REGULATIONS IN MONTENEGRO - NEW RULES IN THE FIGHT AGAINST ANTIMICROBIAL RESISTANCE - <i>Snežana Mugoša, Tatjana Babovic, Gordana Boljević – Stanojević, Tijana Mićović and Nevena Novaković</i>	24
12.	ACTIVITIES OF THE VETERINARY DIRECTORATE IN THE CONTROL OF BACTERIAL ANTIBIOTIC RESISTANCE IN THE REPUBLIC OF SERBIA - <i>Tatjana Labus, Jelica Uzelac, Dalibor Todorović, Dejan Krnjaić and Boban Đurić</i>	26

13.	ANTIBIOTICS IN VETERINARY PRACTICE: THERAPEUTIC AND NON-THERAPEUTIC USE IN ANIMAL PRODUCTION - <i>Lejla Velić, Toni Eterović and Amina Hrkić</i>	28
14.	TESTING OF ANTIMICROBIAL RESISTANCE AND BIOFILM FORMATION ABILITY OF SALMONELLA SPP. ISOLATES OF POULTRY ORIGIN - <i>Bojan Golić, Dejana Krneta, Ljiljana Božić, Drago Nedić and Dragan Knežević</i>	30
15.	MONITORING OF ANTIMICROBIAL RESISTANCE – RESULTS OF THE NATIONAL REFERENCE LABORATORY - <i>Dalibor Todorović, Tatjana Labus, Ljubica Andrić, Sava Leđanac, Smiljana Milošević, Bojana Prunić and Marko Pajić</i>	32
16.	GUIDELINES FOR THE RESPONSIBLE AND RATIONAL USE OF ANTIBIOTICS IN DOGS AND CATS IN SERBIA (WITH FAO SUPPORT) - <i>Dejan Krnjaić</i>	34
17.	EVIDENCE OF PROGRESS: CHANGES IN THE HUNGARIAN ANTIMICROBIAL STEWARDSHIP ACROSS THE HEALTH CARE SECTORS - <i>Andrea Szabó, Mária Matuz, Helga Hambalek, Roxána Rúzsza, Dezső Csupor and Ria Benkő</i>	36
18.	PHYTOGENICS AS A STRATEGY TO MITIGATE ANTIMICROBIAL RESISTANCE OF MAJOR BACTERIAL PATHOGENS IN MODERN SWINE PRODUCTION: ONE HEALTH OVERVIEW - <i>Aleksandra Evetović, Felipe Penagos-Tabares, Marko Vasiljević, Dragana Božić and Jelena Antić-Stanković</i>	38
19.	AMR PROFILE PHENOTYPIC HETEROGENEITY AND PERSISTENCE OF ESCHERICHIA COLI ISOLATES IN A DAIRY CATTLE FARM - <i>Serafeim C. Chaintoutis, Aikaterini Tzekou and Panagiotis D. Katsoulos</i>	40
20.	AVIATOR PROJECT: TRANSNATIONAL ASSESSMENT OF THREATS AND PREVENTION MODELS FOR RAPTORS IN THE DANUBE REGION – PRELIMINARY RESULTS FROM SERBIA - <i>Ana Vasić, Dimitrije Glišić, Ljubiša Veljović, Sofija Šolaja and Vesna Milićević</i>	42
21.	BENEATH OUR FEET: AN ANCIENT ARMS RACE SHAPING ANTIMICROBIAL RESISTANCE - <i>Vuk Vračar, Elena Radović, Bojana Prunić, Smiljana Milošević, Ivan Galić, Danijela Petrović, Gordana Kozoderović and Aleksandar Potkonjak</i>	44
22.	SUSTAINABLE BIO-BASED WASTE VALORIZATION AS A STRATEGY TO MITIGATE AMR RISKS IN THE FOOD-FEED CHAIN - <i>Jovana Grahovac, Vanja Vlajkov, Tatjana Dujković and Ivana Danilov</i>	46
23.	RATIO-DEPENDENT TRIMETHOPRIM-SULFONAMIDE INTERACTIONS IN PORCINE RESPIRATORY PATHOGENS - <i>Patrik Mag, Ádám Kerek and Ákos Jerzsele</i>	48

24.	FROM POLLUTANTS TO RESISTANCE: THE ROLE OF AQUATIC ECOSYSTEMS IN AMR SPREAD - <i>Dragana Šunjka, Sanja Lazić, Jelena Ećimović and Aleksandra Šušnjar</i>	49
25.	ACARICIDE RESIDUES IN COMMERCIAL BEESWAX AND THEIR IMPLICATIONS FOR ANTIPARASITIC RESISTANCE IN VARROA DESTRUCTOR - <i>Sava Leđanac, Ljubica Andrić, Slobodan Knežević, Dalibor Todorović, Marko Pajić, Milica Živkov-Baloš and Nada Plavša</i>	51
26.	MYCOTOXINS AS EMERGING DRIVERS OF ANTIMICROBIAL RESISTANCE: CURRENT STATE OF ART AND ONE HEALTH PERSPECTIVE - <i>Felipe Penagos-Tabares, Aleksandra Evetović, Jog Raj, Marko Vasiljević, Dragana Božić and Jelena Antić-Stanković</i>	53
27.	THE ROLE OF BACTERIAL INFECTIONS IN BROILER CHICKENS IN THE DEVELOPMENT OF ANTIMICROBIAL RESISTANCE - <i>Sajma Huremović, Dejana Krmeta, Selma Kunić and Bojan Golić</i>	55
28.	ANTIMICROBIAL RESISTANCE IN PLANT HEALTH MANAGEMENT - <i>Dragana Budakov, Tatjana Dudaš, Marta Loc, Mladen Petreš, Milica Meseldžija, Dobrila Radić, Jozef Gašparovski, Miljan Miljanović, Snežana Rajkov and Mila Grahovac</i>	57
29.	GUIDELINES FOR THE RESPONSIBLE AND RATIONAL USE OF ANTIBIOTICS IN POULTRY IN SERBIA (WITH FAO SUPPORT) - <i>Dejan Krnjaić</i>	58
30.	EXPOSURE TO ANTIBIOTICS IN THE PEDIATRIC SURGICAL INTENSIVE CARE UNIT: BALANCING CLINICAL NEED AND FEAR OF OVERUSE - <i>Izabella Fabri Galambos, Nikola Bošković and Anna Uram Benka</i>	60
31.	STRATEGIES FOR CONTROLLING ANTIMICROBIAL RESISTANCE OF AVIAN PATHOGENIC ESCHERICHIA COLI IN BROILER COLIBACILLOSIS CASES IN VOJVODINA - <i>Slobodan Knežević, Zoran Ružić, Milenko Rikić, Suzana Vidaković Knežević, Zorana Kovačević, Dalibor Todorović and Marko Pajić</i>	61
32.	ANTIMICROBIAL SUSCEPTIBILITY OF PSEUDOMONAS AERUGINOSA ISOLATES FROM CANINE BACTERIAL EAR INFECTIONS IN HUNGARY - <i>Adrienn Mercédesz Veres and Patrik Mag</i>	63
33.	HITCHHIKING ANTIMICROBIAL RESISTANCE IN URBAN DOG FECES - <i>Vuk Vračar and Zorana Kovačević</i>	64
34.	WASTEWATER-BASED AMR MONITORING IN SLOVENIA: A ONE HEALTH PERSPECTIVE - <i>Tom Koritnik, Verica Mioč, Vid Vedlin, Tea Janko, Maja Bolješić, Jošt Prevc, Mateja Pirš, Eva Drobnič, Natalija Kranjec, Veronika Učakar, Zoran Simonović, An Galičič, Andrej Steyer and Tjaša Cerar Kišek</i>	66

35.	TRACKING ANTIMICROBIAL RESISTANCE IN DIVERSE ECOLOGICAL NICHES THROUGH A ONE HEALTH PERSPECTIVE - <i>Miloš Jovičević, Dušan Kekić, Ivan Vičić, Nikola Bajčetić, Milica Mirković, Nemanja Mirković, Ana Tomić, Olja Šovljanski, Radmila Novaković, Nedjeljko Karabasil, Nataša Opavski and Ina Gajić</i>	68
36.	METHICILLIN RESISTANCE IN CLINICALLY HEALTHY HORSES - <i>Smiljana Milošević, Bojana Prunić, Dalibor Todorović, Tijana Kukurić and Mihajlo Erdeljan</i>	70
37.	ANTIMICROBIAL PROPHYLAXIS IN SURGERY - <i>Nenad Popović, Bojan Toholj, Ozren Smolec, Dušan Malešev, Ivan Stančić, Ivan Galić and Jovan Spasojević</i>	71
38.	COMMENSAL CLOSTRIDIUM PERFRINGENS AS A RESERVOIR OF ANTIMICROBIAL RESISTANCE IN HUNGARIAN POULTRY FLOCKS: SUSCEPTIBILITY PATTERNS AND TOXIN GENE PROFILES - <i>Ádám Kerek, Adrienn Mercédesz Veres, Patrik Mag and Ákos Jerzsele</i>	73
39.	ESSENTIAL OILS AGAINST SALMONELLA ENTERITIDIS IN POULTRY: TARGETING BIOFILMS AND ANTIMICROBIAL RESISTANCE IN THE FARM-TO-FORK CHAIN - <i>Suzana Vidaković Knežević, Jelena Vranešević, Stefan Dončić, Zoran Ružić, Marko Pajić, Dubravka Milanov and Slobodan Knežević</i>	75
40.	POSTHARVEST BIOFUMIGATION TREATMENT AGAINST MONILINIA FRUCTICOLA AND BOTRYTIS CINEREA - <i>Teodora Draganov, Renata Iličić, Ferenc Bagi, Ružica Ždero-Pavlović, Tatjana Jurić and Boris M. Popović</i>	77
41.	PERSISTENCE OF SALMONELLA IN ANIMAL FEED PRODUCTION FACILITIES AS A RISK FOR PRODUCTS RECONTAMINATION - <i>Bojana Prunić, Smiljana Milošević, Dalibor Todorović and Dragana Ljubojević Pelić</i>	78
42.	DIAGNOSTIC APPROACH TO CANINE OTITIS: CYTOLOGY AS A GUIDE TO RATIONAL ANTIBIOTIC USE - <i>Sandra Nikolić, Jovan Spasojević, Ivan Galić, Annamaria Galfi Vukomanović, Nenad Popović, Mira Majkić, Marko Cincović, Tijana Kukurić and Dušan Malešev</i>	80
43.	PRESENCE OF ANTIBIOTIC AND SULFONAMIDE RESIDUES IN RAW AND STERILIZED BOVINE MILK - <i>Stefan Dončić, Jelena Vranešević, Smiljana Milošević and Suzana Vidaković Knežević</i>	82
44.	RISK ASSESSMENT OF THE PRESENCE OF AFLATOXIN M1 IN MILK AND ITS IMPLICATIONS FOR PUBLIC HEALTH - <i>Dragan Tomović, Vesna Samardžić, Katica Arar, Slobodan Dojčinović and Sanin Tanković</i>	84
45.	PATHOGENICITY AND VIRULENCE OF SALMONELLA ENTERICA IN THE ERA OF ANTIMICROBIAL RESISTANCE - <i>Smiljana Milošević, Bojana Prunić and Vuk Vračar</i>	86

46.	HEAVY METALS AND ANTIMICROBIAL RESISTANCE: CO-SELECTION MECHANISMS IN WILDLIFE WITHIN A ONE HEALTH FRAMEWORK - <i>Dejan Beuković, Miroslav Urošević, Marko Vukadinović, Miroslava Polovinski-Horvatović, Vukan Lavadinović and Zoran Popović</i>	87
47.	ANTIFUNGAL ACTIVITY OF BIOLOGICAL AGENTS AGAINST FUSARIUM PROLIFERATUM ON ONION BULBS: UNDERLYING SOURCE OF INHIBITION - <i>Jozef Gašparovski, Dobrila Radić, Milica Meseldžija, Marta Loc, Tatjana Konja, Dragana Budakov and Mila Grahovac</i>	89
48.	TRIFLOXYSTROBIN RESISTANCE IN PENICILLIUM EXPANSUM ASSOCIATED WITH APPLE BLUE MOLD IN SERBIA - <i>Tatjana Konja, Marija Čoti, Mladen Petreš, Marta Loc, Jelena Vukotić, Mila Grahovac and Dragana Budakov</i>	91
49.	THE SILENT PANDEMIC – IRRATIONAL USE OF ANTIBIOTICS IN MONTENEGRO - <i>Gordana Boljević–Stanojević, Lidija Čizmović, Snežana Mugoša and Tijana Mićović</i>	92
50.	THE ROLE OF FARM ANIMALS IN THE SPREAD OF ANTIMICROBIAL RESISTANCE - <i>Jovan Stanojević, Miodrag Radinović, Zorana Kovačević, Marija Pajić and Katarina Pajić</i>	93
51.	ANALYSIS OF ANTIBIOTIC RESIDUES IN MILK AND THEIR IMPACT ON FOOD SAFETY AND STARTER CULTURES IN THE YOGURT PRODUCTION PROCESS - <i>Ksenija Čobanović, Marija Pajić, Miodrag Radinović, Miroslav Urošević and Anka Miloradov</i>	95
52.	ENHANCED ANTIMICROBIAL AND ANTIOXIDANT ACTIVITY OF RESVERATROL IN PANTHENOL-BASED NADES SYSTEMS - <i>Milica Petković, Jelena Radević, Denis Uka and Boris M. Popović</i>	97
53.	PREVALENCE OF COLISTIN RESISTANT ESBL/AmpC/CARBAPENEMASE PRODUCING ESCHERICHIA COLI ON PIG FARMS - <i>Ljubica Andrić, Katarina Pajić, Zdravko Tomić, Sava Leđanac, Biljana Đurđević, Marko Pajić and Dalibor Todorović</i>	99
54.	ANTIMICROBIAL RESISTANCE AND ANIMAL WELFARE: ETHICAL TENSIONS IN VETERINARY ANTIMICROBIAL STEWARDSHIP - <i>Marija Pajić, Radoslava Savić Radovanović and Katarina Pajić</i>	101
55.	SILENT CARRIAGE OF β -LACTAM RESISTANCE GENES IN STAPHYLOCOCCUS SPP. FROM HEALTHY OWNED DOGS IN NORTH MACEDONIA - <i>Ivana Shikoska, Zagorka Popova Hristovska, Bojana Chapkunovska, Nenad Dimkovski, Igor Djadjovski, Aleksandar Cvetkovikj and Iskra Cvetkovikj</i>	103
56.	BEEES AND THE CIRCULAR ECONOMY: BUILDING SUSTAINABLE AGRI-FOOD SYSTEMS - <i>Dragana Novaković, Ivan Pihler, Dragan Milić, Tihomir Novaković and Mirela Tomaš Simin</i>	105

57.	SHARING IS CARING: FECAL MICROBIOTA TRANSPLANTS AND CANINE HEALTH - <i>Iva Zečević, Diana Brozić and Matko Perharić</i>	107
58.	INTESTINAL INTEGRITY IN BROILERS AND ANTIMICROBIAL RESISTANCE MITIGATION - <i>Dragoljub Marić, Slobodan Stojanović, Zorana Kovačević, Zoran Ružić and Zdenko Kanački</i>	109
59.	ANTIMICROBIAL USE IN CATTLE PRODUCTION AND RESIDUES DETECTED IN MILK WITHIN THE ONE HEALTH FRAMEWORK - <i>Katarina Pajić, Ksenija Čobanović, Radoslava Savić Radovanović, Miodrag Radinović, Jovan Stanojević, Dalibor Todorović and Marija Pajić</i>	111
60.	REPRODUCTION UNDER PRESSURE: ANTIBIOTICS AND ANTIMICROBIAL RESISTANCE - <i>Ivan Butković, Juraj Šavorić, Ivan Tomić and Antonela Miletić</i>	113
61.	WHEN NO ONE OWNS THE DECISION: ANTIBIOTIC MISUSE IN ONCOLOGY AND ITS IMPACT ON RESISTANCE - <i>Mate Adam Balazs, Gyongyver Szentmartoni and Magdolna Dank</i>	115
62.	IMPACT OF ANTIBIOTIC ADMINISTRATION IN LACTATING DOGS ON NEONATAL PUPPIES - <i>Ivan Galić, Ivan Stančić, Jovan Spasojević, Jelena Apić, Dušan Malešev, Ivan Butković, Stevan Rodić, Nenad Popović, Vuk Vračar and Zorana Kovačević</i>	117

ESSENTIAL OILS AGAINST *SALMONELLA* ENTERITIDIS IN POULTRY: TARGETING BIOFILMS AND ANTIMICROBIAL RESISTANCE IN THE FARM-TO-FORK CHAIN

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ABSTRACT

Salmonella enterica serovar Enteritidis remains a major foodborne pathogen in Europe and worldwide, predominantly associated with poultry products. *Salmonella* spp. has consistently been the second most reported foodborne zoonotic agent in the EU over the past decade. Although most salmonellosis cases are self-limiting, the emergence of strains resistant to clinically relevant antimicrobials increase treatment efficacy and increases the public health burden. Increasing trends in ciprofloxacin resistance were observed for *S. Enteritidis* in 15 countries from 2014 to 2024, highlighting the urgency of implementing effective control measures. In 2024 alone, *S. Enteritidis* was the most frequently reported *Salmonella* serovar in human cases (29,761 infections) and the most common serovar in laying hens, underscoring the persistent risk along the poultry-to-consumer food chain.

Essential oils derived from oregano, cinnamon, rosemary, clove, and thyme have emerged as promising natural alternatives due to their antimicrobial and antibiofilm properties. In our studies, the antibacterial activity of these essential oils against *S. Enteritidis* isolates from poultry was evaluated using disc diffusion and broth microdilution assays. Oregano essential oil exhibited the highest antibacterial activity, with minimal inhibitory concentrations ranging from 0.04 to 0.23 $\mu\text{L/mL}$ and minimal bactericidal concentrations ranging from 0.09 to 0.45 $\mu\text{L/mL}$, followed by cinnamon, clove, rosemary, and thyme.

The biofilm-forming capacity of *S. Enteritidis* was assessed under different nutrient conditions and temperatures (37 °C, 15 °C, 5 °C), simulating host-associated and food storage environments. Treatment of preformed biofilms with essential oils at their minimal bactericidal concentrations resulted in reductions ranging from 36.98% to 74.83%, with

scanning electron microscopy confirming disruption of bacterial cell integrity and biofilm architecture. Their activity is likely associated with disruption of bacterial membranes and interference with biofilm matrix integrity.

Importantly, this study integrates antimicrobial and antibiofilm assessment under different temperature conditions relevant to the food chain, providing insight into the behavior of poultry-derived isolates beyond standard laboratory settings.

These results demonstrate that selected essential oils, particularly oregano, cinnamon, rosemary, clove, and thyme, can effectively inhibit *S. Enteritidis* growth and reduce biofilm formation. Considering the high prevalence of *S. Enteritidis* in poultry products, the increasing ciprofloxacin resistance, and the persistent public health burden, the integration of essential oils as complementary interventions offers a practical and timely strategy to enhance food safety and mitigate antimicrobial resistance along the farm-to-fork continuum, particularly in poultry production systems.

Key words: *Salmonella Enteritidis; Poultry; Biofilms; Antimicrobial resistance; Essential oils.*

Acknowledgments: This research was funded by Ministry of Science, Technological Development and Innovation of Republic of Serbia by the Contract of implementation and funding of research work of NIV-NS in 2026, Contract No: 451-03-33/2026-03/200031.

CIP – Каталогизација у публикацији
Библиотеке Матице српске, Нови Сад

619:616:636(048.3)

**INTERNATIONAL Conference Antimicrobial Resistance -
Current State and Perspectives (5 ; 2026 ; Novi Sad)**

Book of abstracts / 5th International Conference
Antimicrobial Resistance – Current State and Perspectives,
28–30 May 2026, Novi Sad, Serbia ; [editor in chief Zorana
Kovačević]. – Novi Sad : Faculty of Agriculture, 2025 (Novi
Sad : Constanta). – 119 str. ; 30 cm

Tiraž 500.

ISBN 978-86-7520-656-9

а) Ветеринарска медицина -- Апстракти

COBISS.SR-ID 195459081