PUBLIC HEALTH
PERSPECTIVES

Scientific articles published in 2025.

PHP

2025

TEACHING INSTITUTE
OF PUBLIC HEALTH
PRIMORJE-GORSKI KOTAR COUNTY

TEACHING INSTITUTE OF PUBLIC HEALTH
PRIMORJE - GORSKI KOTAR COUNTY

PUBLIC HEALTH PERSPECTIVES

Scientific articles published in 2025

Teaching Institute of Public Health Primorje-Gorski Kotar County

Rijeka, 2026.

Publisher

Teaching Institute of Public Health Primorje-Gorski Kotar County

Head Department

Department for Scientific and Teaching Activity

Krešimirova 52a, Rijeka, Croatia

ISSN

2991-9959

Notebook III

Contents

1. ORIGINAL SCIENTIFIC ARTICLE 1

1.1. IMPLEMENTATION OF A VALUE-BASED APPROACH FOR OLDER PEOPLE WHO HAVE SUFFERED AN ACUTE MYOCARDIAL INFARCTION: STUDY PROTOCOL 2

1.2. IMPACT OF FACE-TO-FACE AND ONLINE MINDFULNESS-BASED PUBLIC HEALTH INTERVENTIONS ON HEALTH-RELATED QUALITY OF LIFE IN OLDER PEOPLE: A COMPARATIVE STUDY 4

1.3. BREAKING THE CYCLE: ENHANCING CARDIOVASCULAR HEALTH IN THE ELDERLY THROUGH GROUP EXERCISE 6

1.4. THE HIDDEN LEGACY OF DIMETHOATE: CLAY BINDING EFFECTS ON DECREASING LONG-TERM RETENTION AND REDUCING ENVIRONMENTAL STABILITY IN CROATIAN SOILS 8

1.5. ROLE OF MMP-2, MMP-9, TIMP-1, AND TIMP-2 IN CHILDREN WITH VENTRICULAR SEPTAL DEFECT 10

1.6. APPLICATION OF A REAL-TIME REVERSE TRANSCRIPTION POLYMERASE CHAIN REACTION FOR RAPID DETECTION OF *ESCHERICHIA COLI* IN DRINKING WATER: AN EU REPRESENTATIVE STUDY 12

1.7. PREVALENCE OF METABOLIC SYNDROME AMONG STUDENTS: ASSOCIATIONS WITH DIETARY HABITS, PHYSICAL ACTIVITY, AND SOCIODEMOGRAPHIC FACTORS 15

1.8. AN ORAL HEALTH PROMOTION MODEL IMPLEMENTED IN THE PRIMORJE-GORSKI KOTAR COUNTY 17

1.9. HIGH-POWER ULTRASOUND AND HIGH-VOLTAGE ELECTRICAL DISCHARGE-ASSISTED EXTRACTIONS OF BIOACTIVE COMPOUNDS FROM SUGAR BEET (*BETA VULGARIS* L.) WASTE: ELECTRON SPIN RESONANCE AND OPTICAL EMISSION SPECTROSCOPY ANALYSIS 19

1.10. INTEGRATED SEDIMENT AND MUSSEL CHEMICAL ANALYSIS FOR ENVIRONMENTAL QUALITY ASSESSMENT IN ROVINJ'S COASTAL WATERS (NORTHERN ADRIATIC, CROATIA) 21

1.11. CHARACTERIZATION AND DIFFERENTIATION OF BEECH AND CHESTNUT HONEYDEW HONEYS: A COMPARATIVE STUDY 23

1.12. INTEGRATED CHEMICAL AND BIOLOGICAL EVALUATION OF LINDEN HONEYDEW HONEY FROM BOSNIA AND HERZEGOVINA: COMPOSITION AND CELLULAR EFFECTS 25

1.13. CHEMICAL COMPOSITION, QUALITY, AND BIOACTIVITY OF *LAURUS NOBILIS* L. HYDROSOLS FROM THE ADRIATIC REGIONS OF CROATIA: IMPLICATIONS FOR DERMATOLOGICAL APPLICATIONS 27

1.14. CHEMICAL CHARACTERIZATION OF RARE UNIFLORAL HONEYS OF AILANTHUS (*AILANTHUS ALTISSIMA*), FENNEL (*FOENICUM VULGARE*), AND RASPBERRY (*RUBUS IDAEUS*) AND THEIR ANTIMICROBIAL AND ANTIOXIDANT ACTIVITY 29

1.15. DISRUPTION OF EARLY STREPTOCOCCUS MUTANS BIOFILM DEVELOPMENT ON ORTHODONTIC ALIGNER MATERIALS 31

1.16. QUALITATIVE AND QUANTITATIVE MASS SPECTROMETRY APPROACHES FOR THE ANALYSIS OF PHENOLIC COMPOUNDS IN COMPLEX NATURAL MATRICES 33

1.17. ADHERENCE TO THE PLANETARY HEALTH DIET AND ITS ASSOCIATION WITH DIET QUALITY AND ENVIRONMENTAL OUTCOMES IN CROATIAN UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY 35

1.18. PRELIMINARY INSIGHTS INTO THE CYTO/GENOPROTECTIVE PROPERTIES OF PROPOLIS AND ITS CONSTITUENT GALANGIN IN VITRO 37

1.19. LATENT PROFILES IN THE 5C POSITIVE YOUTH DEVELOPMENT FRAMEWORK: INSIGHTS INTO WELL-BEING, MENTAL HEALTH, AND BEHAVIORAL OUTCOMES 39

1.20. THE RELATIONSHIP BETWEEN POSITIVE YOUTH DEVELOPMENT AND SCHOOL CLIMATE – RESULTS OF A LONGITUDINAL PANEL STUDY 41

1.21. BIDIRECTIONAL ASSOCIATIONS BETWEEN POSITIVE YOUTH DEVELOPMENT AND CONTRIBUTION: IMPLICATIONS FOR PROGRAMS AND POLICIES 42

1.22. FECAL MICROBIOTA TRANSPLANTATION IN REFRACTORY IMMUNE-MEDIATED COLITIS: CASE SERIES AND REVIEW OF THE LITERATUR 43

1.23. *LEGIONELLA SHELTONII* SP. NOV., A NOVEL SPECIES ISOLATED ON A CRUISE SHIP DURING ROUTINE MONITORING 45

1.24. GLUTAMATE UTILIZATION FUELS RAPID PRODUCTION OF MITOCHONDRIAL ROS IN DENDRITIC CELLS AND DRIVES SYSTEMIC INFLAMMATION DURING TULAREMIA 47

1.25. RE-EMERGENCE OF USUTU VIRUS AND SPREADING OFWEST NILE VIRUS NEUROINVASIVE INFECTIONS DURING THE 2024 TRANSMISSION SEASON IN CROATIA 49

1.26. SEASONAL SHIFTS AND SMART STATS: IMPROVING BIODRYING IN WASTE MANAGEMENT 51

1.27. SILICON-MEDIATED MODULATION OF OLIVE LEAF PHYTOCHEMISTRY: GENOTYPE-SPECIFIC AND STRESS-DEPENDENT RESPONSES 53

1.28. OPTIMISING OLIVE LEAF PHENOLIC COMPOUNDS: CULTIVAR AND TEMPORAL INTERACTIONS 55

1.29. THE INFLUENCE OF STANDARD AND FREEZE-DRIED TOFU ON THE PHENOLS AND QUALITY OF VIRGIN OLIVE OIL USED AS AN IMMERSION MEDIUM 57

1.30. COMPARATIVE METABOLIC FINGERPRINTING OF OLIVE (*OLEA EUROPAEA* L.) CULTIVARS UNDER BORON FOLIAR FERTILISATION 58

2. REVIEW 60

2.1. LIVING WITH BAD BUGS (*CIMEX LECTULARIUS*): BIOLOGICAL INSIGHTS, HEALTH RISKS, AND EFFECTIVE CONTROL METHODS 61

2.2. FALLS IN THE THIRD AGE OF LIFE – PUBLIC HEALTH PERSPECTIVE AND CHALLENGES FOR THE FUTURE 62

2.3. TICKS AS VECTORS OF ZOONOTIC PATHOGENS: PUBLIC HEALTH ASPECTS IN THE ISTRIA COUNTY .. 63

2.4. ABSORPTION OF TOXICANTS FROM THE OCULAR SURFACE: POTENTIAL APPLICATIONS IN TOXICOLOGY 65

3. EDITORIAL 67

3.1. MIND, BODY, PLATE: INVESTIGATING DISORDERED EATING IN THE ACTIVE POPULATION 68

4. INDEX OF AUTHORS 69

FOREWORD

Dear Readers,

It is a great pleasure to present the third issue of our annual journal, Public Health Perspectives, prepared by the team of the Teaching Institute of Public Health of the Primorje - Gorski Kotar County.

This publication continues to bring together the scientific and professional work of our staff, reflecting their knowledge, responsibility, and daily commitment to public health. Through their research and practice, our colleagues contribute to a better understanding of the close connection between environment and health—an area that remains essential to the well-being of our community.

The new issue includes a range of contributions that address current public health topics and challenges. The diversity of subjects once again shows the strength of our multidisciplinary approach and the value of cooperation between different fields. Public health today requires exactly this kind of collaboration—linking science, professional expertise, and practical experience.

Behind every paper stands a dedicated group of researchers and professionals who, alongside their regular duties, invest time and effort into scientific work. Their academic achievements and professional integrity form the foundation of our institution's reputation and ongoing development.

This journal is not only a collection of published papers; it is also a reflection of our shared goal—to improve health through knowledge, evidence, and teamwork. I hope that this third issue will encourage further research, new ideas, and continued collaboration within our institution and beyond.

I would like to thank all authors, reviewers, and members of the editorial board for their valuable contribution and commitment.

Editor-in-Chief

Associate professor Željko Linšak, PhD

Public health perspectives 2025. in digital version available for download from

Web address: https://zzjzpgz.hr/zbornik-radova/

Digital identifier

EDITORIAL NOTE

The articles included in this publication are reproduced from their original sources. Minor editorial and typographical adjustments have been made where necessary to ensure consistency in formatting and layout. These adjustments do not affect the scientific content, authorship, or bibliographic data of the original articles.

1 Original scientific article

1.1. IMPLEMENTATION OF A VALUE-BASED APPROACH FOR OLDER PEOPLE WHO HAVE SUFFERED AN ACUTE MYOCARDIAL INFARCTION: STUDY PROTOCOL

Front Public Health 2025; 12: 1518469. DOI: 10.3389/fpubh.2024.1518469

Impact factor: 3.4; SJR: 1.027; Q1

Juraga D[1], Rukavina T[1,2], Marinović Glavić M[1], Bilajac L[1,2,3], Racz A[4], Bally ELS[5], Zanutto O[6], Alhambra-Borrás T[7], Ferrando M[8], Subotić A[9], Raat H[5], Vasiljev V[1]

[1]Department of Social Medicine and Epidemiology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[2]Teaching Institute of Public Health of Primorje-Gorski Kotar County, Rijeka, Croatia

[3]Department of Public Health, Faculty of Health Studies, University of Rijeka, Rijeka, Croatia

[4]University of Applied Health Sciences, Zagreb, Croatia

[5]Department of Public Health, Erasmus University Medical Centre, Rotterdam, Netherlands

[6]European Project Office Department, Istituto Per Servizi Di Ricovero E Assistenza Agli Anziani (Institute for Hospitalization and Care for the Elderly), Treviso, Italy

[7]Polibienestar Research Institute, University of Valencia, Valencia, Spain

[8]R&D+I Consultancy, Kveloce I+D+i (Senior Europa SL), Valencia, Spain

[9]Department of Emergency Medicine, Velika Gorica, Croatia

Abstract

Introduction: Due to the rapid aging of the global population, new approaches are required to improve the quality of life of older people and to reduce healthcare system expenditures. One of the approaches that can be used is value-based healthcare. This article describes a value-based solution for older people who have suffered a myocardial infarction. Methods: This solution combines the work of healthcare professionals and informal caregivers and the use of modern and user-friendly technologies to support the achievement of patients' values. Patients older than 65 years who have suffered a myocardial infarction will be divided into control and

intervention groups within a pre-post-controlled design research study. Members of the intervention group will be provided with a personalized plan developed by healthcare professionals and based on the results from the baseline questionnaire. Discussion: Two ValueCare digital solution components will be developed: a mobile application for the participants and a web platform for the professionals, researchers, and informal caregivers. Together with smartwatches, which will track important health aspects, and applications, this approach would enable older people to improve their health through correct lifestyle choices and their professional and informal caregivers to track their progress. With the use of the described technology and the multidisciplinary approach, the unmet needs and values of participants could be achieved. Using this approach, it could be possible to reduce overall healthcare expenses through the active involvement of both older people and their informal caregivers through a shared decision-making process with healthcare professionals. Clinical trial registration: The ISRCTN registry number is 25089186. The date of trial registration is 16/11/2021.

Keywords: elderly; myocardial infarction; decision making; shared, value-based health care; health care professionals

1.2. IMPACT OF FACE-TO-FACE AND ONLINE MINDFULNESS-BASED PUBLIC HEALTH INTERVENTIONS ON HEALTH-RELATED QUALITY OF LIFE IN OLDER PEOPLE: A COMPARATIVE STUDY

Int J Environ Res Public Health 2025; 22 (10): 1588. DOI: 10.3390/ijerph22101588

Impact factor: 4.614; SJR: 0.919; Q2

Juraga D[1], Rukavina T[1,2], Marinović Glavić M[1], Roviš D[1,2], Racz A[3], Bilajac L[1,2,4], Antonić M[5], Raat H[6], Vasiljev V[1]

[1] Department of Social Medicine and Epidemiology, Faculty of Medicine, University of Rijeka, 51000 Rijeka, Croatia

[2] Teaching Institute of Public Health of Primorje-Gorski Kotar County, 51000 Rijeka, Croatia

[3] Department of Public Health and Epidemiology, University of Applied Health Sciences, 10000 Zagreb, Croatia

[4] Department of Public Health, Faculty of Health Studies, University of Rijeka, 51000 Rijeka, Croatia

[5] Department of Microbiology and Parasitology, Faculty of Medicine, University of Rijeka, 51000 Rijeka, Croatia

[6] Department of Public Health, Erasmus MC-University Medical Centre Rotterdam, 3015 Rotterdam, The Netherlands

Abstract

Health-related quality of life (HRQoL) is an important indicator of well-being among older people, especially those living with chronic diseases. Mindfulness-based interventions have shown promise in improving HRQoL. However, in the literature there is a limited number of studies that compare the effectiveness of face-to-face and online mindfulness-based public health interventions. This study aimed to evaluate and compare the effectiveness of face-to-face and online mindfulness-based public health interventions on HRQoL among older people with chronic conditions. A quasi-experimental pre-test–post-test non-randomized study design with non-equivalent groups was conducted among 388 participants aged 65 and older in Rijeka, Croatia. Participants chose to join either a seven-week face-to-face or online mindfulness

program or were included in a control group. HRQoL was measured using the SF-12 and EQ-5D-5L questionnaires at baseline and six months post-intervention. Participants in the online intervention showed significant improvements in subjective HRQoL perception regarding physical ($p < 0.001$, $\eta 2 = 0.066$) and mental dimension ($p = 0.052$; $\eta 2 = 0.010$) as well as self-assessed health (EQ-5D-5L = $p < 0.001$, $\eta 2 = 0.055$; EQ-VAS = $p < 0.001$, $\eta 2 = 0.067$) compared to the control group. The face-to-face group also showed improvements, although to a lesser extent. The control group showed no significant change. Both face-to-face and online mindfulness-based interventions may be associated with improvements in HRQoL among older people with chronic conditions, with the online approach demonstrating slightly greater effects. These findings support the use of online approach in community-based public health interventions targeting older populations.

Keywords: mindfulness; public health; health-related quality of life; aged

1.3. BREAKING THE CYCLE: ENHANCING CARDIOVASCULAR HEALTH IN THE ELDERLY THROUGH GROUP EXERCISE

Life 2025; 15(2): 206. DOI: 10.3390/life15020206

Impact factor: 3.4; SJR: 0.824; Q1

Bilajac L[1,2,3], Marinović Glavić M [1], Zulle K[2], Bilobrk M[3], Juraga D[1], Jelaković A[1,4], Rukavina T[1,3], Vasiljev V [1], Jelaković B[4,5]

[1]Department of Social Medicine and Epidemiology, Faculty of Medicine, University of Rijeka, 51000 Rijeka, Croatia

[2]Faculty of Health Studies, University of Rijeka, 51000 Rijeka, Croatia

[3]Teaching Institute of Public Health of Primorje—Gorski Kotar County, 51000 Rijeka, Croatia

[4]Department of Nephrology, Hypertension, Dialysis and Transplantation, University Hospital Center Zagreb, 10000 Zagreb, Croatia

[5]School of Medicine, University of Zagreb, 10000 Zagreb, Croatia

Abstract

The global increase in aging populations underscores the urgency of addressing cardio–kidney metabolic health indicators, particularly among sedentary elderly individuals. This study investigates the impact of an 8-month structured group exercise program on cardiovascular health indicators among 320 women aged 60 and older living independently in Rijeka. Participants engaged in biweekly sessions designed to improve mobility, balance, and strength. Key metrics, including blood pressure (BP), body mass index (BMI), waist-to-hip (WHR) and waist-to-height ratio (WHtR), and hand grip strength, were measured before and after the intervention. Results revealed significant reductions in systolic blood pressure (mean −3.4 mmHg) and pulse pressure among hypertensive participants, highlighting improved cardiovascular function. BP control significantly improved (7.2%), and 19% of untreated hypertensive subjects at the start became normotensive at the end of follow-up. Although BMI changes were minimal, WHtR improvements indicated reductions in central obesity and muscle fat redistribution. Hand grip strength increased significantly on both arms, correlating

with physical capacity. The results underline the benefits of group training for improving health even in the elderly population through an organized exercise program. While these preliminary results demonstrate promising health improvements, further research with longer follow-up and inclusion of diverse participant groups is recommended to validate these outcomes and refine intervention strategies.

Keywords: cardiovascular risks; elderly; hypertension; physical activity; waist-to-hip ratio (WHtR)

1.4. THE HIDDEN LEGACY OF DIMETHOATE: CLAY BINDING EFFECTS ON DECREASING LONG-TERM RETENTION AND REDUCING ENVIRONMENTAL STABILITY IN CROATIAN SOILS

Toxics 2025; 13(3): 219. DOI: 10.3390/toxics13030219

Impact factor: 4.1; SJR: 1.012; Q1

Karleuša R[1], Marinić J[1], Tomić Linšak D[2,3], Dubrović I[4], Antunović D[1], Broznić D[1]

[1]Department of Medical Chemistry, Biochemistry and Clinical Chemistry, Faculty of Medicine, University of Rijeka, Braće Branchetta 20, 51000 Rijeka, Croatia

[2]Department for Health Ecology, Faculty of Medicine, University of Rijeka, Braće Branchetta 20, 51000 Rijeka, Croatia

[3]Department for Scientific and Teaching Activity, Teaching Institute of Public Health County of Primorje-Gorski Kotar, Krešimirova 52a, 51000 Rijeka, Croatia

[4]Department of Environmental Health, Teaching Institute of Public Health of Primorje-Gorski Kotar County, Krešimirova 52a, 51000 Rijeka, Croatia

Abstract

Understanding the dynamics of sorption and desorption is essential for assessing the persistence and mobility of pesticides. These processes continue to influence ecological outcomes even after pesticide use has ended, as demonstrated by our study on dimethoate behavior in distinct soil samples from Croatia, including coastal, lowland, and mountainous regions. This study focuses on the sorption/desorption behavior of dimethoate in soil, explores the relationship between its molecular structure and the properties of soil organic and inorganic matter, and evaluates the mechanisms of the sorption/desorption process. The behavior of dimethoate was analyzed using a batch method, and the results were modeled using nonlinear equilibrium models: Freundlich, Langmuir, and Temkin models. Soils with a higher organic matter content, especially total organic carbon (TOC), showed a better sorption capacity compared to soils with a lower TOC. This is probably due to the less flexible structures in the glassy phase, which, unlike the rubbery phase in high TOC soils, do not allow dynamic and flexible binding of dimethoate within the organic

matter. The differences between the H/C and O/C ratios indicate that in high TOC soils, flexible aliphatic compounds, typical of a rubbery phase, retain dimethoate more effectively, whereas a higher content of oxygen-containing functional groups in low TOC soils provides strong association. The lettered soils showed stronger retention of dimethoate through interactions with clay minerals and metal cations such as Mg^{2+}, suggesting that clay plays a significantly more important role in enhancing dimethoate sorption than organic matter. These results highlight the importance of organic matter, clay, and metal ions in the retention of dimethoate in soil, indicating the need for remediation methods for those pesticides that, although banned, have had a long history of use.

Keywords: clay content; dimethoate sorption; metal ions; organic matter; organophosphate pesticides; pesticide stability

1.5. ROLE OF MMP-2, MMP-9, TIMP-1, AND TIMP-2 IN CHILDREN WITH VENTRICULAR SEPTAL DEFECT

Biomol Biomed 2025; 25(7): 1459-1469. DOI: 10.17305/bb.2024.11162

Impact factor: 2.2; SJR: 0.872; Q2

Marić N[1,2], Mrakovčić Šutić I[3], Predojević Samardžić J[1,2], Djukić J[1], Bulog A[4,5], Šutić I[6]

[1]Clinic for Children's Diseases, University Clinical Centre of the Republic of Srpska, Banja Luka, Bosnia and Herzegovina

[2]Department of Paediatrics, Medical Faculty, University of Banja Luka, Banja Luka, Bosnia and Herzegovina

[3]Department of Physiology, Immunology and Pathophysiology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[4]Department of Health Ecology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[5]Teaching Institute of Public Health, Primorsko-Goranska County, Rijeka, Croatia

[6]Department of Family Medicine, Medical Faculty, University of Rijeka, Rijeka, Croatia·

Abstract

Ventricular septal defect (VSD) is the second most common congenital heart anomaly. In most cases, it closes spontaneously in the first year of life, but it sometimes requires surgical closure due to the risk of serious complications. This is why it is important to identify markers that could help predict its course. Findings that matrix metalloproteinases (MMPs) and tissue inhibitors of metalloproteinases (TIMPs) play an important role in the cleavage of the extracellular matrix were the reasons to investigate their role in cardiogenesis. In prior studies on this topic, their concentrations were studied in the blood. The aim of this prospective study was to investigate the role of MMP-2, MMP-9, TIMP-1, and TIMP-2 in the etiology and pathophysiology of VSD using urine samples, as an innovative non-invasive approach, and the enzyme-linked immunosorbent assay (ELISA) method. It involved 52 children with isolated VSD and 20 healthy children up to one year of age.We found that these MMPs and TIMPs are significantly (P=0.000) higher in children with VSD, and the

correlations between their concentrations and the size of the defect are positive, especially for MMP-9 and TIMP-1. MMP-9 was significantly (P=0.044) higher in cases in which VSD did not close in the first year of life compared to cases in which it closed. Our results suggest the role of MMP-2, MMP-9, TIMP-1, and TIMP-2 in the aetiopathogenesis of VSD and that their urinary concentrations, especially of MMP-9, in combination with echocardiographic and clinical monitoring, could be useful in predicting its natural course.

Keywords: ventricular septal defect (VSD); matrix metalloproteinases (MMPs); tissue inhibitor of metalloproteinases; urine

1.6. APPLICATION OF A REAL-TIME REVERSE TRANSCRIPTION POLYMERASE CHAIN REACTION FOR RAPID DETECTION OF *ESCHERICHIA COLI* IN DRINKING WATER: AN EU REPRESENTATIVE STUDY

Environ Res 2025; 279; 121786. DOI: 10.1016/j.envres.2025.121786

Impact factor: 7.7; SJR: 1.822; Q1

Gómez L[a], Brandão J[b], Navarro A[c], Martines A[d], Sanseverino I[a], Porcel-Rodríguez E[a], Marinov D[e], Ableitner O[f], Allerberger F[f], Atsma A[g], Briancesco R[h], Cenov A[i], Cíchová M[j], Coccia AM[h], Della Liber SA[h], De Maeyer K[k], De Vries HJ[i], Elsiga G[m], Heijnen L[m], Hokajärvi AM[n], Janská V[j], Hrabar J[o,p], Huse-Kutowska M[q], Jozić S[o], Klatovsky S[f], Kornschober C[f], Kohls K[r], Krom A[s], Luden K[r], Mikula-Pratschke C[f], Pitkänen T[n,t], Poje M[u], Prokšová M[j], Retelj M[v], Rozwadowska B[w], Rytkönen A[n,t], Sarekoski A[n,t], Schlager S[f], Springer B[f], Stojan I[o], Stroobach E[s], Sučić N[i], Valério E[b], Van Pelt G[x], Vranken J[y], Vrdoljak Tomaš A[o], Vukić Lušić D[i], Włos E[z], Wubbels W[l], Ziombska M[z], Zelenik K[v], Ziuziakowski M[q], Lettieri T[a]

[a] European Commission, Joint Research Centre (JRC), Ispra, Italy

[b] INSA National Institute of Health Doutor Ricardo Jorge, CE3C - Centre for Ecology, Evolution and Environmental Changes, Faculdade de Ci^encias da Universidade de Lisboa, Lisboa, Portugal

[c] ZeClinics Carrer de Laure`a Mir´o, 408-410, Barcelona, Spain

[d] Centro Ricerche Gruppo CAP, Segrate, Italy

[e] ARHS Developments S.A., 4370, Belvaux, Luxembourg

[f] AGES Agency for Health and Food Safety, Graz, Austria

[g] Vitens Water Expertise Centre Leeuwarden, the Netherlands

[h] ISS Italian National Institute of Health, National Center for Water Safety (CeNSia) Rome, Italy

[i] Teaching Institute of Public Health of Primorje Gorski Kotar County, Rijeka, Croatia

[j] WRI Water Research Institute, Bratislava, Slovakia

[k] Pidpa, Antwerp, Belgium

[l] WLN, Glimmen, the Netherlands

[m] KWR Water Research Institute, Nieuwegein, the Netherlands

[n] Finnish Institute for Health and Welfare, Kuopio, Finland

[o] Institute of Oceanography and Fisheries, Split, Croatia

[p] Faculty of Science, University of Split, Croatia

[q] Voivodship Sanitary and Epidemiological Station in Bydgoszcz, Unit of the State Sanitary Inspection, Poland

[r] NLGA Lower Saxony State Health Office, Hannover, Germany

[s] Het Waterlaboratorium, Haarlem, the Netherlands

[t] University of Helsinki, Helsinki, Finland

[u] Environmental Agency of the Republic of Slovenia, Ljubljana, Slovenia

[v] National Laboratory of Health, Environment and Food, Ljubljana, Slovenia

[w] Voivodship Sanitary and Epidemiological Station in Katowice, Unit of the State Sanitary Inspection, Poland

[x] AQZ, Werkendam, the Netherlands

[y] De Watergroep, Heverlee, Belgium

[z] Voivodship Sanitary and Epidemiological Station in Olsztyn, Unit of the State Sanitary Inspection, Poland

Abstract

The microbiological quality of water intended for human consumption in the EU is regulated by the recast Drinking Water Directive 2020/2184 (DWD), which sets strict parametric values for intestinal enterococci and *Escherichia coli* (*E. coli*), allowing no more than zero colony-forming units per 100 mL. Detection and enumeration of E. coli typically rely on culture-based reference methods or the most probable number approach, which require 1–2 days to produce results—potentially delaying timely action during contamination events. In contrast, molecular techniques can deliver results within hours. The DWD permits the use of alternative methods if they are as reliable as the reference method and developing and validating such methods requires multiple laboratory trials in line with ISO standard 16140-2. Following this, we conducted a representative EU study to validate a molecular method based on real-time reverse transcription polymerase chain reaction for rapid E. coli detection in drinking water. In a concerted action, the first of its kind for drinking water, nineteen laboratories across ten Member States participated. To ensure consistency, drinking water was artificially contaminated with *E. coli*. The alternative method showed slightly lower sensitivity than the reference method (91.1 % vs. 97.2 %) but delivered much faster results, making it a valuable screening tool. It can support rapid decision-making during contamination events, reducing the risk of waterborne outbreaks and

protecting public health. For reliable routine performance, appropriate training in this alternative method is strongly recommended.

Keywords: drinking water; *Escherichia coli*; faecal contamination; detection; alternative method validation; real-time reverse transcription PCR

1.7. PREVALENCE OF METABOLIC SYNDROME AMONG STUDENTS: ASSOCIATIONS WITH DIETARY HABITS, PHYSICAL ACTIVITY, AND SOCIODEMOGRAPHIC FACTORS

J Clin Med 2025; 14(13): 4389. DOI: 10.3390/jcm14134389
Impact factor: 2.9; SJR: 0.919; Q1

Dejhalla E[1,2], Zavidić T[2], Popović B[2], Čulina T[2]

[1]Medical Centre for Occupational Health, Verdieva 8, 51000 Rijeka, Croatia
[2]Department of Family Medicine, Faculty of Medicine, University of Rijeka

Abstract

Background/Objectives: The prevalence of metabolic syndrome (MetS) among youth is rising, and the increase is closely linked to unhealthy lifestyle patterns. This study aimed to determine the prevalence of MetS among University of Rijeka students and investigate its associations with dietary habits, physical activity, gender, and faculty type (health and non-health faculties). Methods: A cross-sectional study conducted from September 2024 to March 2025 involved 217 randomly selected students from 16 faculties. The validated questionnaires Mediterranean Diet Adherence Screener (MEDAS) and International Physical Activity Questionnaire Short Form (IPAQ-SF), as well as a general data questionnaire, were used alongside anthropometric (height, weight, waist circumference) and biochemical measurements (fasting plasma glucose, triglycerides, HDL cholesterol). MetS was diagnosed using a combination of International Diabetes Federation (IDF) criteria and Polish Experts Consensus (2022) criteria. Statistical analyses included descriptive statistics, t-tests, ANOVA, Spearman's correlation, and multivariate logistic regression. Results: MetS was identified in 5.5% of students. Significant risk factors included obesity (body mass index, BMI, $p < 0.05$), low physical activity (IPAQ-SF, $p < 0.05$), elevated blood pressure ($p < 0.01$), high triglyceride levels ($p < 0.05$), and increased waist-to-height ratio (WHtR, $p < 0.01$). Female students reported lower physical activity than males ($p < 0.05$), while students from non-health faculties had lower adherence to the Mediterranean diet (MEDAS, p

< 0.05) and reduced physical activity ($p < 0.05$). Higher adherence to the Mediterranean diet correlated with lower BMI and triglyceride levels ($p < 0.05$), whereas lower adherence was associated with reduced physical activity (Spearman's $r = -0.35$, $p < 0.01$). Logistic regression with WHR as the dependent variable showed waist circumference (WC) as the strongest predictor (OR = 45.925, 95% CI: 5.238–402.666, $p = 0.001$), followed by triglycerides (OR = 3.395, 95% CI: 1.322–8.718, $p = 0.011$). BMI was inversely associated with WHR (OR = 0.068, 95% CI: 0.006–0.780, $p = 0.031$). HDL cholesterol, systolic and diastolic blood pressure, and fasting glucose were not significant predictors ($p > 0.05$), indicating limited predictive power in this model. Conclusions: The 5.5% MetS prevalence underscores the need for targeted interventions promoting Mediterranean diet adherence and physical activity, particularly among non-health faculty students and females. Longitudinal studies are warranted to assess intervention efficacy.

Keywords: metabolic syndrome; students; diet; physical activity

1.8. AN ORAL HEALTH PROMOTION MODEL IMPLEMENTED IN THE PRIMORJE-GORSKI KOTAR COUNTY

Medicina 2025; 61(2): 217. DOI: 10.3390/medicina61020217

Impact factor: 2.4; SJR: 0.71; Q2

Bakarčić D[1], Vlah N[2], Cicvarić O[1], Petrović D[1], Šimunović-Erpušina M[1], Janković S[2], Dragaš Zubalj N[2], Kresina S[2], Mohorić S[2], Gržić R[3], Glibotić Kresina H[2], Ivančić Jokić N[1]

[1]Department of Pediatric Dentistry, Faculty of Dental Medicine, University of Rijeka, Clinical Hospital Center Rijeka, Croatia

[2]Department of Public Health, Teaching Institute of Public Health of Primorje-Gorski Kotar County, 51000 Rijeka, Croatia

[3]Department of Prosthodontics, Faculty of Dental Medicine, University of Rijeka, Clinical Hospital Center Rijeka, 51000 Rijeka, Croatia

Abstract

Background and Objectives: Global research has shown that 60–90% of school children have caries, and that oral health care is of great public health significance. We present the data of an oral health promotion Program conducted in the Primorje-Gorski Kotar County (PGC), Croatia, from 2008 to 2019. The Program includes comprehensive preventive oral status assessments of first- and fifth-grade elementary school students, as well as oral health promotional and preventative activities for preschool children, pregnant women, and new mothers. Here, we aimed to analyze the Program data and determine its applicability and sustainability. Materials andMethods: We assessed the changes in caries prevalence in first- and fifth-grade PGCstudents by comparing the 2008–2019 dental registry data on decayed, missing, and filled teeth for primary teeth (dmft)/decayed, missing, and filled teeth for permanent teeth (DMFT) index means. We also analyzed the data from the administrative Program reports. Results: We analyzed the dental registry data of 44,422 children in the PGC (21,714 first and 22,708 fifth grade). The average Programresponse rate was 83%. We noted a dmft/DMFT index decrease from 4.66 to 3.73 (first graders) and from 2.50 to 1.00 (fifth graders). The 2017–2019 dmft was significantly smaller than that of 2008–

2009. There were 2336 workshops conducted in kindergartens, 1240 in first grades, and 1015 in fifth grades; health visitors educated 26,559 women. There was an increasing trend in the number of insured people under the age of six using pediatric oral health care. Conclusions: The Program improved the behavior and oral health of children and included various stakeholders, avoided additional financial expenses, increased the number of children in care, and proved its necessity and sustainability. It has been recognized on a national level and has led to the creation of two oral health care programs.

Keywords: child; dentistry; health promotion; oral health; preventive medicine

1.9. HIGH-POWER ULTRASOUND AND HIGH-VOLTAGE ELECTRICAL DISCHARGE-ASSISTED EXTRACTIONS OF BIOACTIVE COMPOUNDS FROM SUGAR BEET (*BETA VULGARIS* L.) WASTE: ELECTRON SPIN RESONANCE AND OPTICAL EMISSION SPECTROSCOPY ANALYSIS

Molecules 2025; 30(4): 796. DOI: 10.3390/molecules30040796

Impact factor: 4.6; SJR: 0.865; Q1

Dukić J[1], Režek Jambrak A[1], Jurec J[2], Merunka D[2], Valić S[2,3,4], Radičić R[5], Krstulović N[5], Nutrizio N [1], Dubrović I[6]

[1]Faculty of Food Technology and Biotechnology, University of Zagreb

[2]Ruđer Bošković Institute, Zagreb, Croatia

[3]Department of Medical Chemistry, Biochemistry and Clinical Chemistry, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[4]Centre for Micro- and Nanosciences and Technologies, University of Rijeka, Rijeka, Croatia

[5]Institute of Physics, Croatia

[6]Department of Environmental Health, Teaching Institute of Public Health of Primorje-Gorski Kotar County, Rijeka, Croatia

Abstract

To achieve sustainable extractions, this study examines the impact of different extraction methods to utilize waste from the sugar industry. In addition to conventional thermal extraction, the impact of high-power ultrasound (US) and high-voltage electrical discharge (HVED)-assisted extractions on the yield of bioactive compounds and the antioxidant capacity (AC) value of sugar beet leaf extracts was determined. US extraction proved to be an excellent method for extracting bioactive compounds, while HVED extraction proved to be an excellent method for extracting Vitexin. AC was measured both spectrophotometrically (DPPH and FRAP) and spectroscopically via electron spin resonance (ESR). The AC results correlate with each other, and the highest AC values were found in the US-treated samples with 25% ethanol solution as the extraction solvent. Characterization of the plasma via optical

emission spectroscopy (OES) showed that neither the solvent nor the sample influenced the plasma spectra, only the gas used (nitrogen/argon). All of the obtained results provide an excellent basis for future research into the utilization of food waste and by-products.

Keywords: high-voltage electrical discharge; high-power ultrasound; sugar beet leaves; bioactive compounds; antioxidant capacity; electron spin resonance spectroscopy; optical emission spectroscopy

1.10. INTEGRATED SEDIMENT AND MUSSEL CHEMICAL ANALYSIS FOR ENVIRONMENTAL QUALITY ASSESSMENT IN ROVINJ'S COASTAL WATERS (NORTHERN ADRIATIC, CROATIA)

J Mar Sci Eng 2025; 13(11): 2212. DOI: 10.3390/jmse13112212
Impact factor: 2.8; SJR 0.579; Q2

Pelikan J[1,2], Grozić K[1], Smodlaka Tanković M[1], Privileggio L[1], Pikelj K[2] , Pavičić-Hamer D[1], Glad M[3,4], Hamer B[1]

[1]Center for Marine Research, Ruđer Bošković Institute, Rovinj, Croatia
[2]Department of Geology, Faculty of Science, University of Zagreb, Zagreb, Croatia
[3]Teaching Institute for Public Health of Primorsko-Goranska County, Rijeka, Croatia
[4]Faculty of Medicine, University of Rijeka, 51000 Rijeka, Croatia

Abstract

Marine sediments are a key component of aquatic ecosystems, linking diverse water uses, functions, and services. Chemical contamination of sediments is a global concern, with many jurisdictions striving to prevent future pollution and manage existing contamination. This study evaluates the contamination status of Rovinj's coastal waters using an integrated approach that combines sediment and biota chemical analyses. Sediments were analyzed to assess long-term contaminant accumulation (D8.C1), while the Mediterranean mussel (*Mytilus galloprovincialis*) served as a bioindicator of bioavailable contaminants and their cumulative effects on marine habitats (D8.C2). Sediment samples were collected from five sites (S1–S5), and mussels were caged using Mussel Watch installations for approximately 120 days at a control site (Lim Bay) and within Rovinj harbor. Both matrices were analyzed for heavy metals (As, Cd, Cu, Cr, Hg, Ni, Pb, and Zn), polycyclic aromatic hydrocarbons (16 PAHs), and polychlorinated biphenyls (PCBs), following the EU Water Framework Directive. All sampled locations showed a reduction in sediment contamination relative to 2011 data, with most concentrations below ecotoxicological thresholds. Exceptions included elevated ΣPAH and PCB concentrations in the harbor (S1 = 3.18 mg/kg DW; 0.33 mg/kg

DW) and marina (S2 = 3.64 mg/kg DW; 0.89 mg/kg DW), as well as Ni levels (S3 = 30 mg/kg DW; S4 = 34 mg/kg DW). Despite higher contaminant loads at some locations, mussel contaminant bioaccumulation remained limited, and their vitality and survival were only moderately affected in the harbor. Although localized increases in some contaminants were detected, all calculated QPECm values remained below 1.0, indicating no significant ecological risk. However, a moderate-to-high probability of toxic effects (P) may occur with long-term exposure for biota inhabiting harbor and marina areas. The results of this study demonstrate continued improvement in the environmental quality of Rovinj's coastal waters compared to the previous decade.

Keywords: sediment chemistry; mussels; bioavailability; heavy metals; organic contaminants; environmental monitoring; coastal contamination

1.11. CHARACTERIZATION AND DIFFERENTIATION OF BEECH AND CHESTNUT HONEYDEW HONEYS: A COMPARATIVE STUDY

Food Chem 2025; 477; 143446. DOI: 10.1016/j.foodchem.2025.143446

Impact factor: 9.8; SJR: 1.952; Q1

Barbarić A[a], Saftić Martinović L[b,c], Milinčić DD[c], Pešić MB[d], Marijanović Z[e], Jakac M[c,f], Brčić Karačonji I[g,h], Brekalo H[i], Petrović D[i], Pavlešić T[j,k], Mišetić Ostojić D[l], Gobin I[c,m]

[a] Faculty of Health Studies, University of Mostar, Mostar, Bosnia and Herzegovina

[b] Faculty of Biotechnology and Drug Development, University of Rijeka, Rijeka, Croatia

[c] Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[d] Department of Chemistry and Biochemistry, Faculty of Agriculture, University of Belgrade, Belgrade, Serbia

[e] Department of Food Technology and Biotechnology, Faculty of Chemistry and Technology, University of Split, Split, Croatia

[f] Department of Epidemiology, Teaching Institute of Public Health of Istra County, Pula, Croatia

[g] Division of Toxicology, Institute for Medical Research and Occupational Health, Zagreb, Croatia

[h] Department of Basic Medical Sciences, Faculty of Health Studies, University of Rijeka, Rijeka, Croatia

[i] Faculty of Agriculture and Food Technology, University of Mostar, Mostar, Bosnia and Herzegovina

[j] Center for Viticulture, Enology and Edible Oils Analysis, Croatian Agency for Agriculture and Food, Zagreb, Croatia

[k] University of Rijeka, Rijeka, Croatia

[l] Croatian Veterinary Institute, Veterinary Center Rijeka, Rijeka, Croatia

[m] Teaching Institute of Public Health of Primorje-Gorski Kotar County, Rijeka, Croatia

Abstract

This study compares beech (*Fagus sylvatica*) and chestnut (*Castanea sativa*) honeydew honeys through analyses of physicochemical properties, pollen composition, phenolic and volatile compounds, and bioactivity. Beech honey exhibited higher antioxidant

activity (up to 1.81 mmol TE/kg) compared to chestnut honey (0.79 mmol TE/kg), though both had similar total phenolic and flavonoid content. A total of 37 phenolic compounds, including propolis-derived flavonoids, were detected, with taxifolin and phenylamides as potential markers of botanical origin. Volatile profiles distinguished the types, with beech honey rich in 2-furanmethanol and nonanal, while chestnut honey had unique benzaldehyde and furfural notes. Both honeys demonstrated strong antimicrobial activity, with inhibition zones up to 20 mm and effective MICs (0.025–0.2 g/mL). Although not currently classified by botanical origin in EU regulations, the study highlights distinctive polyphenol and volatile profiles, as well as bioactive properties, between beech and chestnut honeydew honeys.

Keywords: beech honeydew honey; chestnut honeydew honey; comparative analysis; phenolics; pollen analysis; volatile compounds, bioactivity

1.12. INTEGRATED CHEMICAL AND BIOLOGICAL EVALUATION OF LINDEN HONEYDEW HONEY FROM BOSNIA AND HERZEGOVINA: COMPOSITION AND CELLULAR EFFECTS

Foods 2025; 14(10): 1668. DOI: 10.3390/foods14101668

Impact factor: 5.6; SJR: 1.021; Q1

Barbarić A[1,2], Saftić Martinović L[2,3], Marijanović Z[4], Juretić L[5], Jurič A[5], Petrović D[1,6], Šoljić V[1,7], Gobin I[2,8]

[1]Faculty of Health Studies, University of Mostar, Mostar, Bosnia and Herzegovina

[2]Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[3]Faculty of Biotechnology and Drug Development, University of Rijeka, Rijeka, Croatia

[4]Department of Food Technology and Biotechnology, Faculty of Chemistry and Technology, University of Split, Split, Croatia

[5]Division of Toxicology, Institute for Medical Research and Occupational Health, Zagreb, Croatia

[6]Faculty of Agriculture and Food Technology, University of Mostar, Mostar, Bosnia and Herzegovina

[7]Laboratory of Morphology, Department of Histology and Embryology, School of Medicine, University of Mostar, Mostar, Bosnia and Herzegovina

[8]Teaching Institute of Public Health of Primorje-Gorski Kotar County, Rijeka, Croatia

Abstract

Honeydew honey (HH) is a distinctive type of honey known for its dark colour, high mineral and polyphenol content, and pronounced biological activity. This study continues previous research on beech and chestnut honeydew honeys by presenting a comprehensive analysis of linden honeydew honey (LHH) from Bosnia and Herzegovina-a variety that, until now, has not been characterised in detail. Physicochemical parameters confirmed its classification as HH, with high electrical conductivity (1.21 mS/cm) and low moisture (15.1%). GC-MS analysis revealed a unique volatile profile dominated by α-terpinolene (17.4%), distinguishing LHH from other HH types. The sample exhibited high total phenolic content (816.38 mg GAE/kg)

and moderate antioxidant capacity (1.11 mmol TE/kg). Antimicrobial testing demonstrated strong activity against *Staphylococcus aureus* and Methicillin-resistant *Staphylococcus aureus* (MRSA), with lower efficacy against Gram-negative bacteria. No cytotoxic effects were observed in HaCaT keratinocytes at concentrations up to 60 mg/mL, and wound healing assays showed improved scratch closure reaching approximately 30% after 24 h and 41% after 48 h compared to the control. These results indicate that LHH possesses promising bioactive properties and potential for dermatological application. Further studies with broader sample sets are needed to explore variability and confirm the therapeutic relevance of LHH in comparison to other honeydew types.

Keywords: HaCaT cells; Tilia spp.; antimicrobial activity; antioxidant activity; cytotoxicity; linden honeydew honey; phenolic profile; physicochemical properties; volatile compounds; wound healing

1.13. CHEMICAL COMPOSITION, QUALITY, AND BIOACTIVITY OF *LAURUS NOBILIS* L. HYDROSOLS FROM THE ADRIATIC REGIONS OF CROATIA: IMPLICATIONS FOR DERMATOLOGICAL APPLICATIONS

Antioxidants 2025; 14(6): 688. DOI: 10.3390/antiox14060688

Impact factor: 7.3; SJR: 1.484; Q1

Juretić L[1], Dunkić V[2], Gobin I[1,3], Inić S[4], Kremer D[5], Nazlić M[2], Pollak L[6], Mežnarić S[1], Barbarić A[1,7], Jurišić Grubešić R[1]

[1] Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[2] Faculty of Science, University of Split, Split, Croatia

[3] Teaching Institute of Public Health of Primorje-Gorski Kotar County, Rijeka, Croatia

[4] Faculty of Pharmacy and Biochemistry, University of Zagreb, Zagreb, Croatia

[5] Faculty of Agriculture, University of Zagreb, Zagreb, Croatia

[6] Croatian Institute of Public Health, Zagreb, Croatia

[7] Faculty of Health Studies, University of Mostar, Mostar, Bosnia and Herzegovina

Abstract

Laurus nobilis L., Lauraceae, bay laurel, has been traditionally used for its various therapeutic properties, and in recent years has been gaining interest for its potential applications in skincare products. However, the biological effects of bay laurel, particularly its hydrosols, a water fraction obtained during essential oil production, remain unexplored. The objective of this study was to identify the volatile compounds in L. nobilis hydrosols (LnHYs) from different coastal regions of Croatia (north, middle, and south Adriatic) and to evaluate their potential safety and efficacy for dermatological applications. Upon isolating LnHYs using microwave-assisted extraction, LnHY volatiles were identified and quantified using gas chromatography and mass spectrometry. Oxygenated monoterpenes were the dominant compounds in all LnHYs (61.72–97.00%), with 1,8-cineole being the most abundant component (52.25–81.89%). The physical and chemical parameters of LnHYs were investigated to assess their purity and quality. Biological activity (cytotoxicity and wound-healing

effect) was tested on the human keratinocyte cell line (HaCaT), selected as the experimental model due to its relevance to skin biology. Additionally, contents of polyphenolic substances, antioxidative effects using the Oxygen Radical Absorbance Capacity (ORAC) and 2,2-diphenyl-1-picrylhydrazyl (DPPH) methods, and the antimicrobial activity of LnHYs toward five skin microorganisms were determined. All tested hydrosols showed similar biological activity, with only minor differences. Cytotoxicity studies indicated the safety of the dermatological application of LnHYs, and the results of the wound-healing assay showed their neutral to mildly positive effect. Considering the growing use of bay laurel preparations in pharmaceutical and cosmetic applications, extensive studies on their biological activity, quality, and safety are essential to either support or regulate their use in humans.

Keywords: antioxidant capacity; antimicrobial activity; gas chromatography-mass spectrometry; *Laurus nobilis* hydrosol; microwave extraction; quality; polyphenols; volatile compounds; wound-healing assay

1.14. CHEMICAL CHARACTERIZATION OF RARE UNIFLORAL HONEYS OF AILANTHUS (*AILANTHUS ALTISSIMA*), FENNEL (*FOENICUM VULGARE*), AND RASPBERRY (*RUBUS IDAEUS*) AND THEIR ANTIMICROBIAL AND ANTIOXIDANT ACTIVITY

Agric Res 2025; 14:130-142. DOI: 10.1007/s40003-024-00754-2

Impact factor: 1.1; SJR: 0.338; Q2

Saftić Martinović L[1,2], Birkic N[1], Pavlešić T[3,4], Planinić A[5], Gobin I[2], Mišetić Ostojić D[6], Pedisić S[7]

[1]Department of Biotechnology, University of Rijeka, 51000 Rijeka, Croatia

[2]Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[3]Faculty of Health Studies, University of Rijeka, Rijeka, Croatia

[4]University of Rijeka, Rijeka, Croatia

[5]Faculty of Health Studies, University of Mostar, Mostar, Bosnia and Herzegovina

[6]Laboratory for Analytical Chemistry and Residues, Croatian Veterinary Institute, Veterinary Institute Rijeka, Rijeka, Croatia

[7]Faculty of Food Technology and Biotechnology, University of Zagreb, Zadar, Croatia

Abstract

Characterization of unifloral honey is of great importance for the definition of quality standards and the confirmation of the authenticity of honey. In this study, standard physicochemical analyses, pollen analyses, determination of total phenolic and flavonoid content, analysis of antioxidant capacity and antimicrobial activity, and qualitative and quantitative analyses of phenolic compounds by LC–MS/MS method were performed in three rare uniofloral honeys—ailanthus (*Ailanthus altissima*), fennel (*Foeniculum vulgare*), and raspberry (*Rubus idaeus*) honeys. The results showed that each honey type has specific physicochemical properties and phenolic content, which consequently influence its biological activity. All honey samples showed good characteristics, according to the compositional and quality criteria of the standard codex for honey. Generally, the ailanthus honey samples had a higher total phenolic

and flavonoid content, while the fennel samples showed greater variability. The ailanthus honey samples also showed higher DPPH antioxidant activity, and the ABTS and ORAC assays revealed no differences between the honey types analysed, with the exception of the raspberry honey. In ailanthus honey, the flavonoids chrysin, quercetin, and the phenolic acid 3,4-DHBA were the most abundant. Several quercetin derivatives, including quercetin-3-glucuronide, quercitrin, and quercetin methyl ether, were detected in the fennel honey. In addition, raspberry honey exhibited a distinct phenolic profile containing catechin, epicatechin, quercetin rhamnoside, sakuranetin, tectochrysin, quercetin dimethyl ether, rhamnetin, caffeic acid benzy ether, and pinobanksin-3-O-pentanoate. The strongest results for antibacterial activity came from ailanthus honey. The increased antimicrobial activity of ailanthus honey was found especially against *S. aureus* and *E. coli* and moderately against *A. baumannii*. This study is the first step towards a thorough characterization of ailanthus, fennel, and raspberry honeys and may contribute to the recognition of these rare honeys and provide a good basis for their use in the pharmaceutical industry.

Keywords: unifloral honey; chemical characterization; pollen analysis; antimicrobial activity; antioxidant activity

1.15. DISRUPTION OF EARLY STREPTOCOCCUS MUTANS BIOFILM DEVELOPMENT ON ORTHODONTIC ALIGNER MATERIALS

Processes 2025; 13(10): 3069. DOI: 10.3390/pr13103069

Impact factor: 2.8; SJR: 0.554; Q2

Badnjević M[1,2], Petković Didović M[2], Jelovica Badovinac I[3], Lučić Blagojević S[4], Perčić M[5], Špalj S[1,6], Gobin I[2,7]

[1] Faculty of Dental Medicine, University of Rijeka, Rijeka, Croatia

[2] Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[3] Centre for Micro- and Nanosciences and Technologies, Faculty of Physics, University of Rijeka, Croatia

[4] Faculty of Chemical Engineering and Technology, University of Zagreb,

Zagreb, Croatia;

[5] Centre for Micro- and Nanosciences and Technologies, Faculty of Engineering, University of Rijeka, Rijeka, Croatia

[6] Faculty of Dental Medicine and Health, Josip Juraj Strossmayer University of Osijek, Osijek, Croatia

[7] Teaching Institute of Public Health of Primorje-Gorski Kotar County, Rijeka, Croatia

Abstract

Background: This study aimed to determine the optimum parameters for the treatment of *Streptococcus mutans* bio□lm on clear dental aligners. Methods: A 24-h-old *S. mutans* bio□lm was grown on polyurethane (PU) and poly(ethylene terephthalate glycol) (PETG) aligners. These samples were treated with three chlorhexidine digluconate (CHX)-based antiseptic solutions, manual brushing, and a combination of both, with varying exposure times. The number of adhered bacteria was determined in both untreated and treated samples after sonication. Materials were analyzed with atomic force and scanning electron microscopy, and surface free energy (SFE) values were determined using three different models. Results: Our findings indicated that control strategies do not depend on the type of material. PU

and PETG surfaces exhibited similar SFE values (41–45 mJ/m2). Differences in surface roughness were insu cient to cause signifcant changes in *S. mutans* behavior. The highest efficacy of all three tested antiseptics was established for the exposure time of 1 min, with efficacy deteriorating just after 3 min. Conclusions: The efficacy of CHX against *S. mutans* early biofilm is material-independent and time-dependent. The optimal exposure time of 1 min should be combined with brushing, with a general recommendation of the antiseptic-frst approach.

Keywords: chlorhexidine; antiseptic; PETG; PU; biofilm

1.16. QUALITATIVE AND QUANTITATIVE MASS SPECTROMETRY APPROACHES FOR THE ANALYSIS OF PHENOLIC COMPOUNDS IN COMPLEX NATURAL MATRICES

Appl Sci 2025; 15(23): 12529. DOI: 10.3390/app152312529
Impact factor: 2.8; SJR: 0.521; Q2

Saftić Martinović L[1], Barbarić A[1,2], Gobin I[1,3]

[1] Faculty of Medicine, University of Rijeka, Rijeka, Croatia
[2] Faculty of Health Studies, University of Mostar, Mostar, Bosnia and Herzegovina
[3] Teaching Institute of Public Health of Primorje-Gorski Kotar County, Rijeka, Croatia

Abstract

Phenolic molecules represent one of the most prevalent and biologically important categories of secondary metabolites. Within this diverse group, phenolic acids and flavonoids are the most extensively studied categories, primarily due to their structural diversity and broad spectrum of reported bioactivities. We first provide an overview of the physicochemical characteristics of flavonoids and phenolic acids and discuss how these properties relate to mass spectrometry (MS) fragmentation patterns and chromatographic behavior, including retention characteristics and isomer resolution. Next, we systematically examine the utilization of MS-based procedures for the characterization of flavonoids and phenolic acids in complex natural matrices. We initially examine targeted liquid chromatography–tandem mass spectrometry (LC–MS/MS) utilizing triple-quadrupole (QQQ) platforms, focusing on selected/multiple reaction monitoring (SRM/MRM) and associated scanning techniques (product-ion and precursor-ion scans). We summarize validated methodologies and strategies for both absolute and relative quantification, including stable-isotope dilution, matrix-matched calibration or standard addition, and internal-standard normalization. We subsequently analyze untargeted high-resolution mass spectrometry methodologies (direct injection and coupled to liquid chromatography), highlighting recent progress in data acquisition while addressing ongoing challenges in computational processing.

Finally, we present a brief evaluation of commonly used extraction and clean-up processes, highlighting their practical impact on phenolic recoveries.

Keywords: phenolic compounds; phenolic acids; flavonoids; mass spectrometry; quantitative analysis; qualitative analysis; LC-MS/MS; complex natural matrices

1.17. ADHERENCE TO THE PLANETARY HEALTH DIET AND ITS ASSOCIATION WITH DIET QUALITY AND ENVIRONMENTAL OUTCOMES IN CROATIAN UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY

Nutrients 2025. May 29; 17(11): 1850. DOI: 10.3390/nu17111850

Impact factor: 5.0; SJR: 1.473; Q1

Kenđel Jovanović G[1,2], Krešić G[3] , Dujmić E[3], Pavičić Žeželj S[1,2]

[1] Department of Health Ecology, Teaching Institute of Public Health of Primorsko-Goranska County, Rijeka, Croatia;

[2] Department of Health Ecology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[3] Department of Food and Nutrition, Faculty of Tourism and Hospitality Management, University of Rijeka, Croatia

Abstract

Background/Objectives: University students are at a critical life stage in terms of establishing lifelong dietary habits, yet little is known about the sustainability of their diets, especially in Croatia. This study aimed to assess the sustainability and environmental impacts of university students' dietary patterns at the University of Rijeka using the Planetary Health Diet Index (PHDI) and to explore the associations with demographic, lifestyle, nutritional, and environmental variables. Methods: A cross-sectional study was conducted from October 2023 to March 2024 among 224 students (54% male, mean age 22.7 ± 2.2 years). Data collection included sociodemographic information, physical activity, and dietary intake (semi-quantitative FFQ). Diet quality was assessed using the PHDI, Mediterranean Diet Score (MDS), and Dietary Inflammatory Index. Environmental impact indicators (carbon, water, and ecological footprints) were calculated using energy-adjusted intake dana and standardized life cycle assessment data. Results: Students exhibited moderate adherence to the Planetary Health Diet (mean PHDI: 55.5). Higher PHDI scores were significantly associated with vigorous physical activity, higher MDS, and anti-inflammatory dietary

patterns (all $p < 0.001$). Despite male students showing slightly higher PHDI scores, their diets had significantly greater environmental impacts. A one-point increase in the PHDI correlated with smaller environmental footprints (carbon: $\beta = -7.94$; water: $\beta = -13.88$; ecological: $\beta = -3.15$; all $p < 0.001$), with a significant decrease observed particularly in the lowest- and highest-adherence groups, while no consistent or significant effects were found in the intermediate groups. The nutrient and food group analysis supported the health-promoting profile of diets aligned with the PHDI. Conclusions: This study highlights the moderate sustainability of students' diets, with significant associations between diet quality and environmental impacts. University settings present key opportunities for the promotion of sustainable, health-oriented eating behaviors among young adults.

Keywords: diet quality; environmental impact; planetary health diet; students; sustainable nutrition

1.18. PRELIMINARY INSIGHTS INTO THE CYTO/GENOPROTECTIVE PROPERTIES OF PROPOLIS AND ITS CONSTITUENT GALANGIN IN VITRO

Toxics 2025, 13(3): 194. DOI: 10.3390/toxics13030194

Impact factor: 4,1; SJR1,012; Q1

Jakac M[1], Brčić Karačonji I[2,3], Jurič A[2], Lušić D[3,4,5], Danijel Milinčić D[6], Dramićanin A[7], Pešić M[6], Landeka N[1], Kopjar K[2]

[1] Department of Epidemiology, Teaching Institute of Public Health of Istria County, Pula, Croatia

[2] Division of Toxicology, Institute for Medical Research and Occupational Health, Zagreb, Croatia

[3] Department of Basic Medical Sciences, Faculty of Health Studies, University of Rijeka, Rijeka, Croatia

[4] Department of Health Ecology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[5] Teaching Institute of Public Health of Primorje-Gorski Kotar County, Rijeka, Croatia

[6] Department of Chemistry and Biochemistry, Faculty of Agriculture, University of Belgrade, Belgrade, Serbia

[7] Department of Analytical Chemistry, Faculty of Chemistry, University of Belgrade, Belgrade, Serbia

Abstract

Propolis has been well known for centuries as a natural preventive and therapeutic agent. Its numerous health benefits are mainly attributed to its high content of phenolic compounds that have a remarkable antioxidant activity. Since phenolics may exert a dual nature (pro-oxidant and antioxidant) the aim of this study was to investigate the safety profile of the ethanolic extract of propolis and the related flavonoid galangin and their ability to protect lymphocytes from irinotecan-induced cyto/genotoxicity in vitro. Isolated human peripheral blood lymphocytes were exposed for 3 h to three concentrations of propolis extract and galangin corresponding to the average daily dose of 0.25 mL of extract [propolis in 70% ethanol (3:7, w/w)], as well as a five- and ten-fold higher concentration. Cyto- and genoprotective effects were

tested using a cytokinesis-block micronucleus cytome assay. Treatment with propolis and galangin in the selected concentrations exerted high biocompatibility with lymphocytes and diminished the level of cytogenetic damage caused by irinotecan. Propolis at the same concentration offered a stronger protective effect than single galangin. Also, apoptosis was the prevailing mechanism of cell death in our experimental conditions. These preliminary results speak in favour of future investigations of propolis using other available cytogenetic methods and cell models.

Keywords: propolis; galangin; phenolics; irinotecan; cytokinesis-block micronucleus cytome assay; lymphocytes

1.19. LATENT PROFILES IN THE 5C POSITIVE YOUTH DEVELOPMENT FRAMEWORK: INSIGHTS INTO WELL-BEING, MENTAL HEALTH, AND BEHAVIORAL OUTCOMES

BMC Psychol 2025; 13(1): 1238. DOI: 10.1186/s40359-025-03546-7
Impact factor: 3.0; SJR: 1.030; Q1

Roviš D[1,2], Novak M[3], Gacal H[3], Maglica T[4], Mihić J[3], Sutic Barbaric L[3], Vrdoljak G[5]

[1]Faculty of Medicine, University of Rijeka, Rijeka, Croatia
[2]Teaching Institute of Public Health of Primorsko-Goranska County, Rijeka, Croatia
[3]Faculty of Education and Rehabilitation Sciences, University of Zagreb, Zagreb, Croatia
[4]Faculty of Humanities and Social Sciences, University of Split, Split, Croatia
[5]Faculty of Humanities and Social Sciences, Josip Juraj Stossmayer University of Osijek, Osijek, Croatia

Abstract

Background This study employs latent profile analysis (LPA) to identify distinct profiles of positive youth development (PYD) based on the 5C model (connection, competence, confidence, character, and caring). While extensive research has established associations between PYD indicators and adolescent mental health, well-being, and behavioral outcomes, a person-centered approach allows for a deeper exploration of how different patterns of PYD characteristics are related to these distal outcomes. Methods Unlike previous studies, this research uses 15 PYD indicators, capturing all subdimensions of each of the four Cs, with caring treated as a unidimensional construct. The study was conducted on a national cross-sectional sample of 3,559 first-year high school students (aged 15.1 years). Latent profiles were identified via maximum likelihood estimation, and model fit was evaluated through multiple fit indices. The BCH method was used to assess profile associations with distal outcomes. Results Six distinct profiles were identified along with their relationships with distal outcomes (Vulnerable Youth: Distressed and Risk Behaving, Caring but Struggling: Distressed but Reserved, Balanced Achievers: Resilient Contributors, Self-

Centred Underachievers: Risk Behaving, Confident but Detached: High-Performing Rebels, and Thriving Stars: Thriving and Contributing). The results highlight how strengths in one area (e.g., confidence, competence, and caring) can coexist with significant risks (e.g., binge drinking, antisocial behaviour, and mental health), whereas adolescents with poor mental health or risk behaviour may possess very different internal and external resources. Among the below-average PYD groups, students with very low levels of character and caring but preserved confidence are prone to risk behaviors while being somewhat protected from mental health issues. Others, characterized by high diversity and caring but very low confidence, show vulnerability to mental health challenges without risk behaviors. Additionally, high-risk behaviors can either cooccur with mental health issues in extremely low-PYD students or emerge independently in confident, competent adolescents lacking character, caring, and school connections. Conclusions By revealing unique developmental pathways, this study enhances the understanding of youth development diversity, emphasizing the necessity of examining both observable behaviors and underlying developmental traits for developing targeted interventions that support strengths and address challenges within distinct adolescent subgroups.

Keywords: positive youth development; 5C; developmental profiles; mental health; risk behaviors

1.20. THE RELATIONSHIP BETWEEN POSITIVE YOUTH DEVELOPMENT AND SCHOOL CLIMATE – RESULTS OF A LONGITUDINAL PANEL STUDY

Soc Res 2025; 34; 2. DOI: 10.5559/di.34.2.05
Impact factor: 0.6; SJR: 0.54; Q2

Šutić L[1], Roviš D[2], Mihić J[1]

[1] University of Zagreb, Faculty of Education and Rehabilitation Sciences, Zagreb, Croatia

[2] University of Rijeka, Medical faculty, Rijeka, Croatia

Abstract

The 5C model seeks to explain how adolescents' interactions with their environment contribute to positive youth development, with the indicators of positive development being competence, confidence, character, caring and connection. Previous cross-sectional research has shown that a positive school climate significantly predicts greater development of these indicators, but also that these indicators predict a more positive school climate. This longitudinal study examined the relationship between the 5C model and school climate and their mutual influence over time. The results show that a positive school climate contributes to the development of all 5C indicators, while students with a developed sense of responsibility and social awareness and good relationships with peers and teachers contribute to a better school climate. These findings deepen the understanding of the bidirectional links between the school environment and adaptive developmental outcomes and emphasise the importance of promoting cooperation and an individualised approach for students with different competencies and academic performance.

Keywords: positive youth development; 5C model; school climate; adolescence

1.21. BIDIRECTIONAL ASSOCIATIONS BETWEEN POSITIVE YOUTH DEVELOPMENT AND CONTRIBUTION: IMPLICATIONS FOR PROGRAMS AND POLICIES

Appl Dev Sci 2025; 1-13. DOI: 10.1080/10888691.2025.2515952
Impact factor: 1.5; SJR: 1.032; Q1

Šutić L[a], Novak M[a], Gačal H[a], Maglica T[b], Mihić J[a], Roviš D[c], Vrdoljak G[d]

[a]University of Zagreb, Faculty of Education and Rehabilitation Sciences, zagreb, Criatia
[b]University of Split Faculty of Humanities and Social Sciences, Split, Croatia
[c]University of Rijeka Faculty of Medicine, Rijeka, Croatia
[d]University of Osijek Faculty of Humanities and Social Sciences, Osijek, Croatia

Abstract

According to the 5 C Model of Positive Youth Development, contribution to self, family, and community is considered the outcome of positive youth development. The present study aimed to examine the cross-lagged relationships between the 5Cs of positive youth development and participation in after-school activities as an indicator of contribution. Two-wave panel data gathered more than 1700 Croatian high school students. Hypotheses were tested using a cross-lagged path model. The results suggest that there is a bidirectional association: While after-school activities promote 5Cs a year later, the level of 5Cs in first year of high school predicts participation in activities that contribute to the self but not in activities that contribute to the community in second year of high school. In the context of our findings, if we want to promote adolescents' contribution it is also necessary to advocate for youth engagement and ensure the availability of leisure activities.

1.22. FECAL MICROBIOTA TRANSPLANTATION IN REFRACTORY IMMUNE-MEDIATED COLITIS: CASE SERIES AND REVIEW OF THE LITERATURE

Pharmaceuticals 2025; 12; 18(11): 1719. DOI: 10.3390/ph18111719

Impact factor: 4.8; SJR: 1.019; Q1

Golčić M[1,2], Radoš L[1], Skočilić I[1,2], Badovinac I[1], Hauser G[3,4], Krznarić Zrnić I [3,4], Šantić M [5], Fučkar Čupić D[6,7], Francetić S[1], Lisica K[1], Juras L[1], Škrtić M[1], Bešvir Džubur A[1], Šeparović R[8], Tomašić V[9], Tečić Vuger A[8], Mikolašević I[1,3,4]

[1] Clinic for Tumors, Clinical Hospital Centre Rijeka, Rijeka, Croatia

[2] Department of Oncology and Radiotherapy, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[3] Department of Gastroenterology, Clinical Hospital Centre Rijeka, Rijeka, Croatia;

[4] Department of Internal Medicine, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[5] Institute of Microbiology and Parasitology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia;

[6] Clinical Department of Pathology and Cytology, Clinical Hospital Centre Rijeka, Rijeka, Croatia;

[7] Department of General Pathology and Pathological Anatomy, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[8] Division for Medical Oncology, University Hospital for Tumors, Sisters of Mercy University Hospital Center, Zagreb, Croatia

[9] Department of Gastroenterology and Hepatology, Clinical Hospital Center Sisters of Mercy,

Zagreb, Croatia

Abstract

Background/Objectives: Immune checkpoint inhibitors (ICI) represent a significant breakthrough in cancer management, but they can cause adverse effects such as immunemediated colitis (IMC). The standard first-line treatment is corticosteroids, and second-line treatment is infliximab or vedolizumab. However, a proportion of immune-mediated colitis (IMC) cases are refractory to immunosuppressive treatment, which has led to the exploration of novel approaches such as fecal microbiota

transplantation. Methods: We present two patients who both developed grade III IMC following application of durvalumab and pembrolizumab, respectively. Both patients were refractory to corticosteroid therapy, while the first one also showed no improvement to infliximab. We performed two separate applications of FMT on both patients, from different donors, as a rescue treatment. Results: After unsuccessful immunosuppressive treatment and following rescue FMT, both patients demonstrated a rapid and sustained improvement in inflammatory markers, clinical symptoms, quality-of-life scores, and colonoscopy findings, without additional immunosuppressive treatment. Conclusions: FMT appears to be safe and a potentially effective treatment option for patients with refractory IMC both as secondand third-line therapy options. Continued efforts toward rigorous donor screening, use of standardized biobanks, and standardizing FMT protocols will further enhance safety and reproducibility.

Keywords: immune-mediated colitis; immune checkpoint inhibitors; corticosteroids; infliximab; fecal microbiota transplantation

1.23. *LEGIONELLA SHELTONII* SP. NOV., A NOVEL SPECIES ISOLATED ON A CRUISE SHIP DURING ROUTINE MONITORING

Int J Syst Evol Microbiol 2025; 75(7). DOI: 10.1099/ijsem.0.006813

Impact factor: 2.0; SJR: 0.749; Q1

Sauerborn Klobučar R[1], Kovačević M[1], Svetličić E[2], Kasalo N[3], Vasari K[1], Šantic M[4,5], Antonić M[4], Posta A[6], Ivančić Šantek M[7], Stopić K[1], Kazazić S[8], Malev O[9], Kapetanović D[10], Vucić M[11], Begić K[1], Franjević D[11], Klobučar G[11], Mijaković I[2,12]

[1]PathCon Laboratories EU, Zagreb, Croatia

[2]Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark, Kongens Lyngby, Denmark

[3]Laboratory of Evolutionary Genetics, Division of Molecular Biology, Ruđer Bošković Institute, Zagreb, Croatia

[4]Department Of Microbiology and Parasitology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[5]Teaching Institute of Public Health Primorje-Gorski Kotar County, Rijeka, Croatia;

[6]Laboratory for Biological Diversity, Division for Marine and Environmental Research, Institut Ruđer Bošković, Zagreb, Croatia

[7]Department of Biochemical Engineering, Laboratory of Biochemical Engineering, Industrial Microbiology, Malting and Brewing Technology, Faculty Of Food and Biotechnology, University of Zagreb, Zagreb, Croatia

[8]Division of Physical Chemistry, Laboratory for Mass Spectrometry and Functional Proteomics, Institut Ruđer Bošković, Zagreb, Croatia

9Department of Material Chemistry, Laboratory for Biotechnology in Aquaculture, Institut Ruđer Bošković, Zagreb, Croatia

[10]Division for Marine and Environmental Research, Laboratory for Aquaculture and Pathology of Aquatic Organisms, Institut Ruđer Bošković, Zagreb, Croatia

[11]Department of Biology, Faculty of Science, University of Zagreb, Zagreb, Croatia;

[12]Divison of Systems and Synthetic Biology, Department of Life Sciences, Chalmers University of Technology, Göteborg, Sweden.

Abstract

Legionella-like isolates, HB10 and PATHC038T, were isolated from a cold water distribution system on a cruise ship in 2017. The strains have been characterized by

employing discriminatory genome typing, matrix-assisted laser desorption/ionization time-of-flight MS technique, fatty acid profiling and biochemical tests, thus identifying a new species in the genus Legionella. Colonies displayed phenotypic characteristics typical of the family Legionellaceae, including a requirement for l-cysteine and testing catalase positive. Fatty acid methyl ester analysis showed that the predominant fatty acids detected in the studied strains are C16:0 iso, C16:1 ω7c, C16:0 and C15:0 anteiso. The obtained MIC values showed antimicrobial susceptibility to the antimicrobial drugs ciprofloxacin and erythromycin (0.8 and 2 µg ml−1, respectively). The bacteria were also Gram-negative, rod-shaped, grew aerobically on buffered charcoal yeast extract agar and weakly grew on glycine-vancomycin-polymyxin-cycloheximide media at 36 °C with the ability to autofluoresce a blue-white colour when placed under a long-wavelength UV light (365 nm). The whole-genome sequencing performed displayed a G+C content of 38.2 mol%. The digital DNA–DNA hybridization analysis demonstrated a separation from the phylogenetically most related *Legionella cherrii*, with 54.7% DNA–DNA relatedness. The identity percentage measured by average nucleotide identity between the PATHC038T strain and its respective closest species, L. cherrii, was 93.9%, also confirming the distinctiveness of the novel species. The 16S rRNA gene, mip and rpoB sequences showed a similarity of 98.7, 98.4 and 96.2%, respectively, with *L. cherrii* NCTC 11976T. Additionally, average amino acid identity and percentage of conserved proteins analyses further supported their classification as a novel species. The results obtained in this study confirm the status of an independent species. The name proposed for this species is Legionella sheltonii sp. nov. with PATHC038T (CCUG 76918T, ATCC TSD-370) as the type strain.

Keywords: average amino acid identity (AAI); *Legionella sheltonii* sp. nov.; matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF) MS; percentage of conserved proteins (POCP); phylogenomics; virulence factors

1.24. GLUTAMATE UTILIZATION FUELS RAPID PRODUCTION OF MITOCHONDRIAL ROS IN DENDRITIC CELLS AND DRIVES SYSTEMIC INFLAMMATION DURING TULAREMIA

Sci Adv 2025; 11(35): 6271. DOI: 10.1126/sciadv.adu6271

Impact factor: 12.5; SJR: 4.324; Q1

Fabrik I[1], Spidlova P[2], Prchal L[1], Fabrikova D[1], Viduka I[3], Marečić V[3], Filimonenko V[4,5], Sleha R[6], Vajrychova M[1], Kupcik R[1], Soukup O[1], Rousar T[7], Härtlova A[8,9], Šantić M[3,10], Stulik J[2]

[1]Biomedical Research Center, University Hospital Hradec Kralove, Hradec Kralove, Czechia.

[2]Department of Molecular Pathology and Biology, Military Faculty of Medicine, University of Defence, Hradec Kralove, Czechia.

[3]Department of Microbiology and Parasitology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia.

[4]Electron Microscopy Core Facility, Institute of Molecular Genetics, Czech Academy of Sciences, Prague, Czechia.

[5]Laboratory of Biology of the Cell Nucleus, Institute of Molecular Genetics, Czech Academy of Sciences, Prague, Czechia.

[6]Department of Epidemiology, Military Faculty of Medicine, University of Defence, Hradec Kralove, Czechia.

*7*Department of Biological and Biochemical Sciences, Faculty of Chemical Technology, University of Pardubice, Pardubice, Czechia.

*8*Wallenberg Centre for Molecular and Translational Medicine, Department of Microbiology and Immunology at Institute of Biomedicine, University of Gothenburg, Gothenburg, Sweden.

[9]Institute of Medical Microbiology and Hygiene, Medical Center-University of Freiburg, Faculty of Medicine, Freiburg, Germany.

[10]Department of Environmental Health, Teaching Institute of Public Health of Primorje-Gorski Kotar County, Rijeka, Croatia.

Abstract

Dendritic cells (DCs) hijacked by intracellular bacteria contribute to pathogen dissemination and immunopathology. How bacteria achieve DC subversion remains

largely unknown. Here, we describe the mechanism used by tularemia agent *Francisella tularensis* exploiting host mitochondrial anaplerosis. Shortly after internalization, *Francisella* associates with DC mitochondria, which leads to the rapid repurposing of their oxidative metabolism for production of mitochondrial reactive oxygen species (mtROS). Mitochondrial metabolic rewiring is orchestrated by the intramitochondrial signaling mediated by protein acetylation and involves switching to glutamate as the primary substrate for DC tricarboxylic acid cycle. Rather than killing the bacterium, glutamate-fueled mtROS production activates p38-dependent proinflammatory gene expression. Blocking of glutamate utilization prevents DC activation and bacterial dissemination and alleviates inflammation in vivo. Our findings underscore the importance of metabolic plasticity in antibacterial DC response and open up potential avenues for therapies targeting host metabolism.

1.25. RE-EMERGENCE OF USUTU VIRUS AND SPREADING OFWEST NILE VIRUS NEUROINVASIVE INFECTIONS DURING THE 2024 TRANSMISSION SEASON IN CROATIA

Viruses 2025; 17(6): 846. DOI: 10.3390/v17060846.

Impact factor: 3.5; SJR: 1.145; Q1

Vilibić-Čavlek T[1,2], Barbić LJ[3], Klobučar A[4], Vucelja M[5], Bogdanić M[1,2], Sabadi D[6,7], Kutleša M[8], Gjurašin B[8], Stevanović V[3], Curman Posavec M[4], Bjedov L[5], Boljfetić M[5], Jozić-Novinc T[9], Škara R[9], Tomljenović M[10,11], Hruškar Ž[1], Al-Mufleh M[12], Potočnik-Hunjadi T[13], Rončević I[14], Savić V[14]

[1] Department of Virology, Croatian Institute of Public Health, Zagreb, Croatia;

[2] School of Medicine, University of Zagreb, Zagreb, Croatia

[3] Department of Microbiology and Infectious Diseases with Clinic, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[4] Department of Epidemiology, Andrija Štampar Teaching Institute of Public Health, Zagreb, Croatia;

[5] Department of Forest Protection and Wildlife Management, Faculty of Forestry and Wood Technology, University of Zagreb, Zagreb, Croatia

[6] Department of Infectious Diseases, Clinical Hospital Center Osijek, Osijek, Croatia

[7] Faculty of Medicine, Josip Juraj Strossmayer University of Osijek, Osijek, Croatia

[8] Department of Intensive Care Medicine and Neuroinfectology, University Hospital for Infectious Diseases “Dr. Fran Mihaljevi´c”, Zagreb, Croatia

[9] Department of Infectious Diseases, General Hospital “Dr. Ivo Pediši´c”, Sisak, Croatia

[10] Department of Epidemiology, Teaching Institute of Public Health of the Primorje-Gorski Kotar County, Rijeka, Croatia

[11] Department of Social Medicine and Epidemiology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[12] Department of Infectious Diseases, County Hospital Čakovec, Čakovec, Croatia

[13] Department of Infectious Diseases, General Hospital Varaždin, Varaždin, Croatia

[14] Poultry Center, Croatian Veterinary Institute, 10000 Zagreb, Croatia

Abstract

Neuroinvasive arboviruses such as tick-borne encephalitis virus (TBEV), West Nile virus (WNV), Usutu virus (USUV), and Toscana virus (TOSV) have (re-)emerged with increasing incidence and geographic range. We analyzed the epidemiology of arboviral infections in Croatia during the 2024 transmission season. A total of 154 patients with neuroinvasive diseases (NID), 1596 horses, 69 dead birds, and 7726 mosquitoes were tested. Viral RNA was detected using RT-qPCR. IgM/IgG-specific antibodies were detected using commercial ELISA or IFA, with confirmation of cross-reactive samples by virus neutralization test. RT-qPCR-positive samples were Sanger sequenced. Arboviral etiology was confirmed in 33/21.42% of patients with NID. WNV was most frequently detected (17/11.03%), followed by TBEV (10/6.49%), USUV (5/3.24%), and TOSV (1/0.64%). WNV infections were reported in regions previously known as endemic, while in one continental county, WNV was recorded for the first time. USUV infections re-emerged after a six-year absence. In addition to human cases, acute WNV infections were recorded in 11/395 (2.78%) of horses and two dead crows. WNV IgG seropositivity was detected in 276/1168 (23.63%) and TBEV IgG seropositivity in 68/428 (15.88%) horses. None of the tested mosquito pools were positive for WNV and USUV RNA. Phylogenetic analysis showed the circulation of WNV lineage 2 and Usutu Europe 2 lineage. Climate conditions in 2024 in Croatia were classified as extremely warm, which could, at least in part, impact the quite intense arboviral season. The spreading of flaviviruses in Croatia highlights the need for continuous surveillance in humans, animals, and vectors (“One Health”).

Keywords: West Nile virus; Usutu virus; tick-borne encephalitis virus; neuroinvasive infections; Croatia

1.26. SEASONAL SHIFTS AND SMART STATS: IMPROVING BIODRYING IN WASTE MANAGEMENT

Appl Sci 2025. 15(3), 1432. DOI: 10.3390/app15031432
Impact factor: 2.8; SJR: 0.521; Q2

Traven L[1,2]

[1] Department of Environmental Medicine, Medical Faculty, University of Rijeka, Rijeka, Croatia

[2] Department for Scientific and Educational Activities, Teaching Institute of Public Health of the Primorsko-goranska County, Rijeka, Croatia

Abstract

The biodrying process is a well-established method in solid waste management for reducing the moisture content of municipal solid waste (MSW), facilitating its mechanical treatment, enhancing energy recovery efficiency, and simplifying disposal. However, challenges such as variability in drying efficiency, seasonal fluctuations, and operational inconsistencies limit its optimization and broader applicability. This study undertakes a detailed evaluation of biodrying operations using Statistical Process Control (SPC) techniques to improve process stability and identify key factors influencing efficiency. Data collected over a one-year period from a waste management facility employing Herhoff Rotteboxes® reveal an average drying efficiency of 28%, with notable seasonal trends showing reduced efficiency during summer and fall. A regression model analyzing waste load, operational parameters, and seasonal effects accounted for 25% of the variability in drying efficiency, suggesting additional factors like waste composition and microbial activity significantly impact the process. This study highlights the value of SPC tools in monitoring process stability and demonstrates how targeted optimization strategies—such as seasonal adjustments and refined loading practices—can enhance biodrying outcomes. By addressing gaps in current practices, these findings contribute to the advancement of

waste management technologies and support the development of more efficient and sustainable systems for handling municipal solid waste.

Keywords: biodrying performance; process stability analysis; municipal solidwaste treatment; Herhoff Rotteboxes® technology; seasonal effects on biodrying; waste moisture reduction

1.27. SILICON-MEDIATED MODULATION OF OLIVE LEAF PHYTOCHEMISTRY: GENOTYPE-SPECIFIC AND STRESS-DEPENDENT RESPONSES

Plants 2025; 14(9): 1282. DOI: 10.3390/plants14091282

Impact factor: 4.1; SJR: 0.888; Q1

Cukrov M[1], Ninković V[2], Maslov Bandić L[3], Marcelić Š[4], Palčić I[1], Franić M[1], Žurga P [5], Majetić Germek V[6], Lukić L [1], Lemić D[7], Pasković I[1]

[1] Department of Agriculture and Nutrition, Institute of Agriculture and Tourism, K. Poreč, Croatia

[2] Department of Ecology, Swedish University of Agricultural Sciences, SE-75007 Uppsala, Sweden

[3] Department of Chemistry, Faculty of Agriculture, University of Zagreb, Zagreb, Croatia

[4] Department for Ecology, Agronomy and Aquaculture, University of Zadar, Zadar, Croatia

[5] Teaching Institute of Public Health Primorsko-Goranska County, Rijeka, Croatia

[6] Department of Food Technology and Control, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[7] Department of Agricultural Zoology, Faculty of Agriculture, University of Zagreb, Zagreb, Croatia

Abstract

Secondary metabolites in olive (*Olea europaea* L.) leaves constitute a complex framework wherein phenylpropanoids, terpenoids, and secoiridoids in particular, serve as major contributors to olive plant resilience. Silicon (Si) stands as a mediator of defense mechanisms in plants, enhancing their protective responses and adaptability. A field trial on one-year-old plantlets of two metabolically distinct olive genotypes was conducted to investigate the effects of foliar-applied Si on the phytochemical profiles of locally treated leaves. Silicon's systemic effects in juvenile leaves were also appraised. We accounted for intervarietal differences in nutrient uptake and conducted in situ measurements of physiological indices. The peak of the summer season and the onset of autumn were chosen as the two sampling time points. Intense

summer conditions prompted metabolic adjustments that resulted in phytochemical profiles unique to each cultivar. These profiles were further significantly altered by Si while remaining genotype-specific, with substantial increases in prominent compounds like oleuropein (105% and 252%) and verbascoside (62% and 126%), depending on the genotype. As the pressure from environmental factors eased, the differences in Si-mediated phytochemical responses emerged. Silicon had a limited effect on the phytochemical profile of the resilient cultivar which acquired a metabolic steady-state, while it significantly altered the profile of its metabolically more versatile counterpart, resulting with a progressive increase in its oleuropein (37%) and verbascoside (26%) levels. These effects extended to untreated, juvenile leaves as well. While effective in altering and improving the phytochemical composition of olive leaves, Si acted in a manner that adhered to each genotype's metabolic foundation. The intensity of environmental constraints, along with each cultivar's inherent sensitivity to them, seems to be tied to silicon's capacity to mediate significant phytochemical alterations. The extent of silicon's prophylactic function may therefore be dependent on a genotype's metabolic foundation and overall sensitivity, and as such it seems inseparable from stress and its intensity.

Keywords: foliar-applied silicon; secondary metabolism; phenolic compounds; secoiridoids; oleuropein; physiological indices; silicon utilization; effect persistence

1.28. OPTIMISING OLIVE LEAF PHENOLIC COMPOUNDS: CULTIVAR AND TEMPORAL INTERACTIONS

Plants 2025; 14(17): 2789. DOI: 10.3390/plants14172789

Impact factor: 4.1; SJR: 0.888; Q1

Pasković I[1,2], Franić M[1], Chatzistathis T[3], Pongrac P[4,5], Žurga P[6], Majetić Germek V[7], Palčić I[1], Goreta Ban S[1], Zakraoui M[8], Marcelić Š[9], Mravlje J[4,5], Kaliterna J[10], Polić Pasković M[1]

[1] Department of Agriculture and Nutrition, Institute of Agriculture and Tourism, Karla Poreč, Croatia

[2] Faculty of Health Studies, University of Rijeka, Rijeka, Croatia

[3] Institute of Soil and Water Resources, Hellenic Agricultural Organisation (ELGO) 'DIMITRA', Thessaloniki (Thermi), Greece

[4] Jožef Stefan Institute, Ljubljana, Slovenia

[5] Department of Biology, Biotechnical Faculty, University of Ljubljana, Ljubljana, Slovenia

[6] Teaching Institute of Public Health of Primorsko-Goranska County, Rijeka, Croatia

[7] Department of Food Technology and Control, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[8] Faculty of Sciences of Tunis, University of El Manar, Tunis, Tunisia

[9] Department for Ecology, Agronomy and Aquaculture, University of Zadar, Zadar, Croatia

[10] Faculty of Agriculture, University of Zagreb, Zagreb, Croatia

Abstract

All olive (*Olea europaea* L.) plant tissues have a high phenolic content. However, the effects of the cultivar and sampling period on the tissue phenolic content remain almost unknown; in addition, the interactions between nutrient uptake and leaf phenol concentrations have not been clarified. This study sampled olive leaves to explore how the cultivar, sampling period, and their interaction affect leaf phenol and nutrient concentrations. Leaves were collected from six cultivars during three seasonal periods: harvest (October; SP1), dormancy (January; SP2), and pruning (March; SP3).

Five were Istrian cultivars ('Bova', 'Buža muška', 'Buža puntoža', 'Istarska bjelica', 'Rošinjola'), and one was the Italian cultivar 'Leccino'. Phenolic profiles in olive leaves were correlated with potassium (K), phosphorus (P), and copper (Cu) concentrations. However, significant correlations between these nutrients and oleuropein, verbascoside, and total phenolic content (TPC) were determined only for 'Rošinjola'. Oleuropein was the most abundant phenolic compound, while among genotypes, 'Buža muška' showed the highest oleuropein levels across all sampling periods, indicating its potential source of oleuropein in olive leaves. Seasonal variations in olive leaf phenolic compounds appear to be strongly influenced by phenological phase, nutrient dynamics, and weather conditions, as confirmed by multivariate analysis across sampling periods and cultivars. The findings emphasise the importance of selecting both an appropriate cultivar and sampling period to maximise the accumulation of olive leaf phenolic compounds. Nevertheless, long-term experimentation on cultivars with a high leaf phenolic potential, like 'Buža muška' and 'Rošinjola', is necessary in order to develop appropriate farming strategies for maximising phenolic compounds with human or plant health benefits.

Keywords: Buža muška; Rošinjola; biochemical farming strategy; oleuropein; verbascoside

1.29. THE INFLUENCE OF STANDARD AND FREEZE-DRIED TOFU ON THE PHENOLS AND QUALITY OF VIRGIN OLIVE OIL USED AS AN IMMERSION MEDIUM

Molecules 2025; 30(3): 672. DOI: 10.3390/molecules30030672
Impact factor: 4.6; SJR: 0.865; Q1

Koprivnjak O[1], Majetić Germek V[1], Žurga P[2], Brkić Bubola K[3]

[1] Department of Food Technology and Quality Control, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[2] Teaching Institute of Public Health of Primorsko-Goranska County, Rijeka, Croatia

[3] Institute of Agriculture and Tourism, Poreč, Croatia

Abstract

Various protein-rich foods are traditionally immersed in virgin olive oil (VOO), a medium rich in phenols, which are health-promoting and sensorially important compounds. Immersing tofu in VOO may modify the sensory properties and nutritional value of both due to the oil's hydrophilic phenol interactions with proteins and water. In this study, cubes of fresh tofu (T) (70% water) and freeze-dried tofu (FD-T) (5% water) were immersed in VOO for 7 days of cold storage. The changes in the phenolic compound content and standard quality parameters of the oil were noted after 1, 3, 5, and 7 days of contact with the tofu. The total phenols in the oil were determined using the Fast Blue BB assay, while single phenols were analyzed by HPLC-UV/VIS. During the 7 days, the total phenols in the oil decreased by up to 56% and 26% under the influence of fresh and freeze-dried tofu, respectively, including a significant decrease in hydroxytyrosol, oleacein, tyrosol, and oleocanthal. The water content and its release from fresh tofu significantly contributed to this decline. The degradation of the quality of the oil in contact with the fresh tofu was observed only in its sensory properties, with a marked reduction in the intensity of its fruitiness, bitterness and pungency.

Keywords: virgin olive oil; tofu; phenols; sensory properties

1.30. COMPARATIVE METABOLIC FINGERPRINTING OF OLIVE (*OLEA EUROPAEA* L.) CULTIVARS UNDER BORON FOLIAR FERTILISATION

Horticulturae 2025. 11(12): 1521. DOI: 10.3390/horticulturae11121521

Impact factor: 3.0; SJR: 0.647; Q1

Žurga P[1], Polić Pasković M[2], Major N[2], Goreta Ban S[2], Marcelić Š[3], Pongrac P[4,5], Bajoub A[6,7], Skendrović Babojelić M[8], Petek M[8], Pasković P[2]

[1] Teaching Institute of Public Health of Primorsko-Goranska County, Rijeka, Croatia

[2] Department of Agriculture and Nutrition, Institute of Agriculture and Tourism, Karla Poreč, Croatia

[3] Department for Ecology, Agronomy and Aquaculture, University of Zadar, Trg Kneza Zadar, Croatia

[4] Biotechnical Faculty, University of Ljubljana, Ljubljana, Slovenia

[5] Jožef Stefan Institute, Ljubljana, Slovenia

[6] Agro-Pôle Olivier, National School of Agriculture in Meknès, km 10, Haj Kaddour Road, B.P. S/40, Meknès, Morocco

[7] Department of Analytical Chemistry, Faculty of Science, University of Granada, Ave. Fuentenueva s/n, Granada, Spain

[8] Faculty of Agriculture, University of Zagreb, Zagreb, Croatia

Abstract

Olive (*Olea europaea* L.) cultivars often exhibit genotype-specific responses to micronutrient management. In this study, we investigated the metabolic leaf fingerprinting of three cultivars 'Rošinjola', 'Leccino', and 'Istarska bjelica' at two sampling periods (SP-I = 64 days after treatment (DAT) and SP-II = 118 DAT), following boron foliar fertilisation (+B = 41.62 mM B; −B = 0 mM B) applied 50 days after anthesis. To our knowledge, this is the first study to provide such a detailed evaluation of boron-induced shifts in phenolic metabolism in olive leaves. At harvest (SP-II), all three cultivars showed higher concentrations of total identified phenolic compounds in +B plants compared with the −B controls. Notably, the concentration of verbascoside at harvest was higher in +B plants of 'Istarska bjelica' and 'Leccino', but not in 'Rošinjola'. Oleuropein content increased in +B plants at harvest to a level higher than 4870

mg/100 g DW, irrespective of cultivar. Conversely, apigenin-7-glucoside declined from SP-I to SP-II in ‘Leccino’ regardless of treatment, whereas in ‘Istarska bjelica’, this decrease occurred only in control plants, with boron preventing the seasonal decline. These findings confirm the prolonged effect of boron foliar fertilisation on phenolic metabolism in olive leaves and highlight cultivar-specific differences in metabolic responses. Further research is needed to clarify how these metabolic shifts relate to primary plant metabolism and how they influence olive oil quality traits among cultivars grown under Croatian conditions.

Keywords: *Olea europaea* L.; plant metabolism; olive leaves; LC-MS/MS; phenolic compounds; oleuropein

2 Review

2.1. LIVING WITH BAD BUGS (*CIMEX LECTULARIUS*): BIOLOGICAL INSIGHTS, HEALTH RISKS, AND EFFECTIVE CONTROL METHODS

Med Flum 2025; 61; 3: 270-279. DOI: 10.21860/medflum2025_332188
Impact factor: /; SJR: 0.142; Q4

Tomić Linšak D[1, 2], Zekić L[1], Pavičić Žeželj S[1, 2], Glad M[2], Broznić D[2, 3], Linšak Ž[1, 2]

[1] University of Rijeka, faculty of medicine, Deaprtment for Health Ecology, Rijeka, Croatia

[2] Teaching Institute of Public Health of Primorje-Gorski Kotar County, Rijeka, Croatia

[3] University of Rijeka, Faculty of Medicine, Department of Medical Chemistry, Biochemistry and Clinical Chemistry, Rijeka, Croatia

Abstract

With increased mobility and improved connectivity to remote destinations around the world, the possibility of a resurgence in infestations by pests of economic importance, as well as various disease carriers of particular concern, has increased. In recent years, there has been a global increase in infestations by bedbugs, the re-emerging pest of the species *Cimex lectularius*, leading to clinical and control problems. Bed bugs have a long history of presence in human communities with extended geographic dispersion around the world. For many years, they represent a significant public health problem and are probably one of the most common ectoparasites on humans. The presence in the premises and ectoparasitism of bed bugs can cause several clinical and psychological disorders but also cause numerous economic problems that affect the cultural and tourist industry. By raising knowledge and awareness of their presence in the immediate vicinity of humans, recognition of infestation as well as possible effects on health are key to directing attention to the implementation of preventive measures and effective control of presence. This paper provides an overview of the known facts about the structure and biology of bed bugs, their direct and indirect impact on health, and describes effective methods of prevention and control.

Keywords: bedbugs; health; infestation; pest control; prevention and control; risk

2.2. FALLS IN THE THIRD AGE OF LIFE – PUBLIC HEALTH PERSPECTIVE AND CHALLENGES FOR THE FUTURE

Med Flum 2025; 61; 2: 157-162. DOI: medflum2025_330047
Impact factor: /; SJR: 0.142; Q4

Car Gunčić R[1], Vučković M[2], Budimir D[3], Budimir Medić R[4], Marijančić V[2], Sorta-Bilajac Turina I[5,6]

[1] Poliklinika Croatia, Rijeka, Croatia

[2] Faculty of Health Sciences, University of Rijeka, Rijeka, Croatia

[3] Health Center of Split-Dalmatia County, Split, Hrvatska

[4] Budimir servis d.o.o., Split, Croatia

[5] Teaching institute of Primorje-Gorsko kotar County, Rijeka, Croatia

[6] Department of Health Ecology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

Abstract

Falls and fall-related injuries in the elderly population represent a major public health challenge both in Croatia and in the world. They cause the greatest number of hospitalizations, long-term hospital treatment, disability and can lead to death. As many as 30% of people over 65 and 50% of people over 80 experiences at least one falls a year. In Croatia, in people over 65 years, 64.1% of hospitalizations are caused by injuries resulting from falls, which is also the leading cause of death. Physiotherapy prevention of falls and consequences is an unavoidable example of an integrated person-centred care process and requires a larger workforce and restructuring of services.

Keywords: accidental falls; aging; physical therapist; public health; quality of life

2.3. TICKS AS VECTORS OF ZOONOTIC PATHOGENS: PUBLIC HEALTH ASPECTS IN THE ISTRIA COUNTY

Šumar list 2025. 11-12: 563-572. DOI: 10.31298/sl.149.11-12.6
Impact factor: /; SJR: 0.173; Q4

Cvek D[1], Vucelja M[2], Puškadija D[1], Poljuha D[3], Broznić D[4], Pustijanac E[5], Šantić M[4], Tomić Linšak D[4]

[1] Teaching Institute of Public Health of Istra County, Pula, Croatia
[2] Faculty of Forestry and Wood Technology University of Zagreb, Zagreb, Croatia
[3] Institute of Agriculture and Tourism, Poreč, Croatia
[4] Faculty of Medicine, University of Rijeka, Rijeka, Croatia
[5] Faculty of Natural Sciences, Juraj Dobrila University of Pula, Pula, Croatia

Abstract

Monitoring the presence of vectors of infectious diseases is of critical importance for public health protection and it further emphasizes the necessity of an interdisciplinary approach within the “One Health” concept. This study is based on field research of ticks as vectors of zoonotic pathogens and the analysis of tick-borne disease incidence in Istria County, Croatia. According to data from the Croatian Institute of Public Health for the period 2016–2022, a total of 126 cases of zoonotic diseases were reported, of which 114 (93.4%) were cases of Lyme borreliosis, two were cases of Q fever, and one case each of rickettsiosis and haemorrhagic fever with renal syndrome. Eight reported cases of zoonoses were recorded in non-residents of Istria County. As part of this research, systematic sampling of hard ticks (Acari: Ixodidae) was conducted from 2020 to 2023 using the flagging method and collection from the host, yielding a total of 2349 specimens belonging to 12 different species from the genera *Ixodes*, *Dermacentor*, *Hyalomma*, *Haemaphysalis*, and *Rhipicephalus*, along with one soft tick from the genus *Argas*. The dominant species was the sheep tick (*Ixodes ricinus* L.), accounting for 70.84% of the total sample. This species is a known vector of

Borrelia burgdorferi sensu lato (the causative agent of Lyme borreliosis) and *Coxiella burnetii* (the causative agent of Q fever).

The results indicate a notable presence and wide distribution of vectors responsible for the transmission of Lyme borreliosis, confirmed as the most prevalent zoonosis in the region. The obtained data support the need for continuous entomological surveillance and epidemiological monitoring of vector-borne diseases to enable more accurate risk assessment and the development of appropriate public health measures.

Keywords: Istria County; public health; ticks; Lyme disease; zoonoses

2.4. ABSORPTION OF TOXICANTS FROM THE OCULAR SURFACE: POTENTIAL APPLICATIONS IN TOXICOLOGY

Biomedicines 2025; 13(3): 645. DOI: 10.3390/biomedicines13030645

Impact factor: 3.9; SJR: 0.114; Q1

Šoša I[1], Perković M[2], Baničekk Šoša I[3], Grubešić P[4], Tomić Linšak D[5 6], Strenja I[7]

[1] Department of Anatomy, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[2] Department of Pathology and Cytology, Pula General Hospital, Pula, Croatia

[3] Clinical Hospital Centre Rijeka, University Department of Physical and Rehabilitation Medicine, Rijeka, Croatia

[4] Department of Ophthalmology, Clinical Hospital Center Rijeka, Krešmirova 42, Rijeka, Croatia

[5] Department for Health Ecology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[6] Department for Scientific and Teaching Activity, Teaching Institute of Public Health County of Primorje-Gorski Kotar, Rijeka, Croatia

[7] Department of Neurology University Hospital Centre Rijeka, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

Abstract

In relation to the eye, the body can absorb substances from the ocular surface fluid (OSF) in a few ways: directly through the conjunctival sac, through the nasal mucosa as the fluid drains into the nose, or through ingestion. Regardless of the absorption method, fluid from the conjunctival sac should be used as a toxicological matrix, even though only small quantities are needed. Contemporary analytical techniques make it a suitable matrix for toxicological research. Analyzing small quantities of the matrix and nano-quantities of the analyte requires high-cost, sophisticated tools, which is particularly relevant in the highthroughput environment of new drug or cosmetics testing. Environmental toxicology also presents a challenge, as many pollutants can enter the system using the same ocular surface route. A review of the existing Literature was conducted to assess potential applications in clinical and forensic toxicology related to the absorption of toxicants from the ocular surface. The election

of the studies used in this review aimed to identify new, more efficient, and cost-effective analytical technology and diagnostic methods.

Keywords: drug; eye; matrix; modeled tissue; particle pollution; ocular surface fluid; toxicants; toxicology

3

Editorial

PHP

3.1. MIND, BODY, PLATE: INVESTIGATING DISORDERED EATING IN THE ACTIVE POPULATION

Front Nutr 2025; 12: 1592265. DOI: 10.3389/fnut.2025.1592265

Impact factor: 5.1; SJR: 1.115; Q1

Kenđel Jovanović G[1,2], Renata Barić R[3], Pokrajac-Bulian A[4], Greblo Jurakić Z[5]

[1] Department of Environment Protection and Health Ecology, Teaching Institute of Public Health of Primorsko-Goranska County, Rijeka, Croatia

[2] Department of Health Ecology, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

[3] Faculty of Kinesiology, University of Zagreb, Zagreb, Croatia

[4] Faculty of Humanities and Social Sciences, University of Rijeka, Rijeka, Croatia

[5] Faculty of Croatian Studies, University of Zagreb, Zagreb, Croatia

Athletes face unique challenges, particularly societal expectations, social comparisons, and the pressures of sports performance, which increase their susceptibility to disordered eating. If not recognized and untreated, these behaviors can severely affect athletes' physical and mental health, quality of life, and psychosocial functioning, underscoring the need for professional support (1, 2). Current data on the prevalence of eating disorders, combined with tailored assessment tools for eating behaviors, psychological symptoms, and risk factors in athletic populations, can provide a clearer picture of the prevalence of eating disorders in athletes and support more effective management strategies. Understanding the nutritional needs and body image concerns of athletes is crucial to promoting their physical and mental wellbeing. …

4 Index of authors

A

Ableitner O · 12
Alhambra-Borrás T · 2
Allerberger F · 12
Al-Mufleh M · 49
Antonic M · 45
Antonić M · 4
Antunović D · 8
Atsma A · 12

B

Badnjević M · 31
Badovinac I · 43
Bajoub A · 58
Bakarčić D · 17
Bally ELS · 2
Baniček Šoša I · 65
Barbarić A · 23, 25, 27, 33
Barbić LJ · 49
Begic K · 45
Bešvir Džubur A · 43
Bilajac L · 2, 4, 6
Bilobrk M · 6
Birkic N · 29
Bjedov L · 49
Bogdanić M · 49
Boljfetić M · 49
Brandão J · 12
Brčić Karačonji I · 23, 37
Brekalo H · 23
Briancesco R · 12
Brkić Bubola K · 57
Broznić D · 8, 61, 63
Budimir D · 62
Budimir Medić R · 62
Bulog A · 10

C

Car Gunčić R · 62
Cenov A · 12
Chatzistathis T · 55
Cíchová M · 12
Cicvarić O · 17
Coccia AM · 12
Cukrov M · 53
Curman Posavec M · 49
Cvek D · 63

Č

Čulina T · 15

D

Danijel Milinčić D · 37
De Maeyer K · 12
De Vries HJ · 12
Dejhalla E · 15
Della Liber SA · 12
Djukic J · 10
Dragaš Zubalj N · 17
Dramićanin A · 37
Dubrović I · 8, 19
Dujmić E · 35
Dukić J · 19
Dunkić V · 27

E

Elsiga G · 12

F

Fabrik I · 47
Fabrikova D · 47
Ferrando M · 2
Filimonenko V · 47
Francetić S · 43
Franić M · 53, 55
Franjevic D · 45
Fučkar Čupić D · 43

G

Gacal H · 39
Gačal H · 42
Gjurašin B · 49
Glad M · 21, 61
Glibotić Kresina H · 17
Gobin I · 23, 25, 27, 29, 31, 33

Golčić M · 43
Gómez L · 12
Goreta Ban S · 55, 58
Greblo Jurakić Z · 68
Grozić K · 21
Grubešić P · 65
Gržić R · 17

H

Hamer B · 21
Härtlova A · 47
Hauser G · 43
Heijnen L · 12
Hokajärvi AM · 12
Hrabar J · 12
Hruškar Ž · 49
Huse-Kutowska M · 12

I

Inić S · 27
Ivančić Jokić N · 17
Ivančić Šantek M · 45

J

Jakac M · 23, 37
Janković S · 17
Janská V · 12
Jelaković A · 6
Jelaković B · 6
Jelovica Badovinac I · 31
Jozić S · 12
Jozić-Novinc T · 49
Juraga D · 2, 4, 6
Juras L · 43
Jurec J · 19
Juretić L · 25, 27
Jurič A · 25, 37
Jurišić Grubešić R · 27

K

Kaliterna J · 55
Kapetanovic D · 45
Karleuša R · 8
Kasalo N · 45
Kazazic S · 45
Kenđel Jovanović G · 35, 68
Klatovsky S · 12
Klobučar A · 49
Klobučar G · 45
Kohls K · 12
Kopjar K · 37
Koprivnjak O · 57
Kornschober C · 12
Kovačević M · 45
Kremer D · 27
Kresina S · 17
Krešić G · 35
Krom A · 12
Krstulović N · 19
Krznarić Zrnić I · 43
Kupcik R · 47
Kutleša M · 49

L

Landeka N · 37
Lemić D · 53
Lettieri T · 12
Linšak Ž · 61
Lisica K · 43
Lučić Blagojević S · 31
Luden K · 12
Lukić L · 53
Lušić D · 37

M

Maglica T · 39, 42
Majetić Germek V · 53, 55, 57
Major N · 58
Malev O · 45
Marcelić Š · 53, 55, 58
Marecic V · 47
Maric N · 10
Marijančić V · 62
Marijanović Z · 23, 25
Marinić J · 8
Marinov D · 12
Marinović Glavić M · 2, 4, 6
Martines A · 12
Maslov Bandić L · 53
Merunka D · 19
Mežnarić S · 27
Mihić J · 39, 41, 42
Mijakovic I · 45
Mikolašević I · 43

Mikula-Pratschke C · 12
Milinčić DD · 23
Mišetić Ostojić D · 23, 29
Mohorić S · 17
Mrakovcic Sutic I · 10
Mravlje J · 55

N

Navarro A · 12
Nazlić M · 27
Ninkovic V · 53
Novak M · 39, 42
Nutrizio N · 19

P

Palčić I · 53, 55
Pasković I · 53, 55
Pasković P · 58
Pavičić Žeželj S · 35, 61
Pavičić-Hamer D · 21
Pavlešić T · 23, 29
Pedisić S · 29
Pelikan J · 21
Perčić M · 31
Perković M · 65
Pešić M · 37
Pešić MB · 23
Petek M · 58
Petković Didović M · 31
Petrović D · 17, 23, 25
Pikelj K · 21
Pitkänen T · 12
Planinić A · 29
Poje M · 12
Pokrajac-Bulian A · 68
Polić Pasković M · 55, 58
Pollak L · 27
Poljuha D · 63
Pongrac P · 55, 58
Popović B · 15
Porcel-Rodríguez E · 12
Posta A · 45
Potočnik-Hunjadi T · 49
Prchal L · 47
Predojevic Samardzic J · 10
Privileggio L · 21
Prokšová M · 12
Pustijanac E · 63
Puškadija D · 63

R

Raat H · 2, 4
Racz A · 2, 4
Radičić R · 19
Radoš L · 43
Renata Barić R · 68
Retelj M · 12
Režek Jambrak A · 19
Rončević I · 49
Rousar T · 47
Roviš D · 4, 39, 41, 42
Rozwadowska B · 12
Rukavina T · 2, 4, 6
Rytkönen A · 12

S

Sabadi D · 49
Saftić Martinović L · 23, 25, 29, 33
Sanseverino I · 12
Sarekoski A · 12
Sauerborn Klobucar R · 45
Savić V · 49
Schlager S · 12
Skendrović Babojelić M · 58
Skočilić I · 43
Sleha R · 47
Smodlaka Tanković M · 21
Sorta-Bilajac Turina I · 62
Soukup O · 47
Spidlova P · 47
Springer B · 12
Stevanović V · 49
Stojan I · 12
Stopić K · 45
Strenja I · 65
Stroobach E · 12
Stulik J · 47
Subotić A · 2
Sučić N · 12
Sutic Barbaric L · 39
Sutic I · 10
Svetlicic E · 45

Š

Šantic M · 45
Šantić M · 43, 47, 63
Šeparović R · 43

Šimunović-Erpušina M · 17
Škara R · 49
Škrtić M · 43
Šoljić V · 25
Šoša I · 65
Špalj S · 31
Šutić L · 41, 42

T

Tečić Vuger A · 43
Tomašić V · 43
Tomić Linšak D · 8, 61, 63, 65
Tomljenović M · 49
Traven L · 51

V

Vajrychova M · 47
Valério E · 12
Valić S · 19
Van Pelt G · 12
Vasari K · 45
Vasiljev V · 2, 4, 6
Viduka I · 47
Vilibić-Čavlek T · 49
Vlah N · 17
Vranken J · 12
Vrdoljak G · 39, 42
Vrdoljak Tomaš A · 12
Vucelja M · 49, 63
Vucić M · 45
Vučković M · 62
Vukić Lušić D · 12

W

Włos E · 12
Wubbels W · 12

Z

Zakraoui M · 55
Zanutto O · 2
Zavidić T · 15
Zekić L · 61
Zelenik K · 12
Ziombska M · 12
Ziuziakowski M · 12
Zulle K · 6

Ž

Žurga P · 53, 55, 57, 58