



The 12th Edition

EuroAliment
Food Sustainability Challenges and Solutions

International Symposium

Book of Abstracts

Food Sustainability Challenges and Solutions
23rd-24th October 2025, Galati, Romania



Galati University Press
2025



23rd-24th of October 2025, On- site and online

Book of Abstracts

EURO-ALIMENT 2025

THE 12TH INTERNATIONAL SYMPOSIUM

Food Sustainability

Challenges and Solutions

October 23rd-24th, Galați, Romania

Galati University Press

2025

Copyright © 2025 Galați University Press

All Rights Reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publishers.

The authors take responsibility for their contributions.

Galați University Press - Cod CNCSIS 281

Publishing house - GALAȚI UNIVERSITY PRESS

47 Domneasca St., 800008 – Galați, ROMANIA

Tel. 0040 0336 130 139, Fax. 00 40 236 46 13 53

gup@ugal.ro

Published by:

Faculty of Food Science and Engineering

111 Domneasca Street, 800201 Galați - Romania

Tel/Fax: +40 236 460 165

E-mail: euro.aliment@ugal.ro

Conference website: www.euroaliment.ugal.ro

October 2025

Printed in Romania by Galați University Press

ISSN 3008-4687 ISSN-L 1843-5114

EUROALIMENT 2025 IS ORGANIZED BY

Faculty of *Food Science and Engineering*, <http://www.sia.ugal.ro>

“Dunărea de Jos” University of Galati, Romania, <http://www.ugal.ro>

PARTNERS FOR EUROALIMENT CONFERENCE 2025

Association of Food Industry Professionals from Romania, in education, research and production, A.S.I.A.R, www.asiar.ro

Răzvan Angheluță Natural Sciences Museum Complex <https://cmsngl.ro>

ROMFISH, <https://www.romfish.ro>

Fundatia Dan Voiculescu, <https://fundatiadanvoiculescu.ro>

Fish Producers' Association, <https://patronatulpestelui.ro>

RO-ALIMENT, <https://www.roaliment.ro>

The General Association of Engineers of Romania, A.G.I.R., <https://www.agir.ro>

Student Club from Faculty of *Food Science and Engineering*, CSFSIA

Galati City Council, <https://cjgalati.ro>

ORGANISING COMMITTEE

Cristian DIMA

Ștefan PETREA

Iulia BLEOANĂ

Loredana DUMITRAȘCU

Leontina GRIGORE-GURGU

Vasilica BARBU

Daniela BORDA

Ira SIMIONOV

Doina ANDRONOIU

Oana NISTOR

INTERNATIONAL SCIENTIFIC COMMITTEE

Lidia FAVIER	<i>Department of Chemistry and Engineering of Processes, Chemical Engineering School of Rennes, Institute of Chemical Science of Rennes, France</i>
Katarzyna FELISIAK	<i>Faculty of Food Sciences and Fisheries, West Pomeranian University of Technology in Szczecin, Poland</i>
Ewa MACIEJCZYK	<i>Faculty of Biotechnology and Food Sciences, Lodz University of Technology, Poland</i>
Julia MARIN- NAVARRO	<i>Department of Biochemistry and Molecular Biology, University of Valencia, Spain</i>
Ekaterini MOSCHOPOULOU	<i>Department of Food Science & Technology, Laboratory of Dairy Research, Agricultural University of Athens, Greece</i>
Remigiusz PANICZ	<i>Faculty of Food Sciences and Fisheries, West Pomeranian University of Technology in Szczecin, Poland</i>
Jafari SEID MAHDI	<i>Department of Food Materials and Process Design Engineering, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran</i>
Stefania SILVI	<i>Scuola di Bioscienze e Medicina Veterinaria Università di Camerino, Camerino, Italy</i>
Rodica STURZA	<i>Technical University of Moldova, Chişinău, Republic of Moldova</i>
Anka TRAJKOVSKA	<i>Faculty of Technology and Technical Sciences-Veles, Republic of North Macedonia</i>
Jalil ZORRIEHZAHRA	<i>Iranian Fisheries Science Research Institute, University of Putra, Iran</i>
Zuzana CIESAROVÁ	<i>Food Research Institute, National Agricultural and Food Centre, Bratislava, Slovakia</i>
Verma DEEPAK KUMAR	<i>Agricultural and Food Engineering Department, Indian Institute of Technology Kharagpur, Kharagpur, India</i>
Adem GHARSALLAOUI	<i>Laboratoire d'Automatique, de Génie des Procédés et de Génie Pharmaceutique, University Claude Bernard Lyon I, France</i>
Costel DARIE	<i>Department of Chemistry and Biomolecular Science, Clarkson University, United States of America</i>
Katarzyna SAMBORSKA	<i>Department of Food Engineering and Process Management, Institute of Food Sciences, Poland</i>
Fahrettin GOGUS	<i>Gaziantep University, Gaziantep, Turkey</i>
Semih ÖTLEŞ	<i>EGE University, Izmir, Turkey</i>

Euro-Aliment Conference Vision

Globalization, economic recessions, climate change, ecological disasters, regional armed conflicts, and pandemics have led to an unequal distribution of food resources, infringing upon one of the most fundamental human rights: the "right to food." Consequently, over 700 million people are confronting acute hunger, which erodes human dignity.

In this context, to ensure equitable access to healthy food for all inhabitants of the Earth, academic and research communities in the fields of food science, food technology and biotechnology, nutrition, and health, alongside food producers and international organizations involved in the agri-food sector, have adopted shared strategies grounded in sustainability and sustainable development. The primary objectives include the development of innovative technologies that facilitate the intensive processing of natural resources and the rational exploitation of ecosystems, the design and development of innovative food products that enhance nutritional and health value, the reduction of water and energy consumption, the minimization of food waste, and the mitigation of environmental impact.

The integration of sustainable aquaculture practices with environmental conservation fosters innovative solutions that balance economic growth and ecological integrity. Strategies that encourage sustainable resource management, enhance biodiversity, and mitigate environmental impacts can be developed by promoting collaboration among aquaculture producers, environmental scientists, policymakers, and communities. This holistic approach not only supports the creation of resilient aquatic ecosystems but also opens new avenues for economic development through the responsible use of aquatic resources. Emphasizing sustainable practices in aquaculture ensures food security and contributes to the preservation of aquatic ecosystems, ultimately paving the way for a thriving blue economy that benefits both people and the planet.

The International Euro-Aliment Conference, held biennially by the Faculty of Food Science and Engineering at "Dunărea de Jos" University of Galați, Romania serves as an active platform that invites distinguished scientists, food producers, and policymakers to engage in a constructive exchange of ideas, promoting the sharing of research and production experiences, the presentation of scientific papers, and the discussion of contemporary issues related to food science and technology, food processing, and food safety and security.



23rd-24th of October 2025, On- site and online

This event represents a significant opportunity to engage with esteemed experts who will present the latest advancements in the fields of food nanotechnology, food functionalization, and the sustainable development of the blue economy considering the synergic approach within aquaculture and environmental science nexus.

Assoc Prof Cristian Vasile DIMA,
Dean of Faculty of Food Science and Engineering
Dunărea de Jos University of Galați, Romania

Contents

Euro-Aliment Conference Vision	5
DESIGN OF PROBIOTIC YOGHURT WITH THE ADDITION OF ROYAL JELLY	21
Ivelina G. Peykova-Shapkova ^{1*} , Mihaela G. Ivanova ¹ , Ivan G. Ivanov ² , Natalina K. Panova ³ , Krastena T. Nikolova ³ And Yulian D. Tumbarski ⁴	21
INVESTIGATION OF PHYSICAL AND CHEMICAL PROPERTIES USING SCANNING ELECTRON MICROSCOPY AND ENERGY DISPERSIVE X-RAY ANALYSIS OF EDIBLE FILMS ENHANCED WITH <i>SALVIA OFFICINALIS</i> SUPERCRITICAL FLUID EXTRACT	23
Iilir Mërtiri ^{1*} , Leontina Grigore-Gurgu ¹ , Liliana Mihalcea ¹ , Viorica Ghisman ² , Daniela Laura Buruiană ² , Gabriela Râpeanu ¹ , Nicoleta Stănciuc ¹	23
NEW STRATEGIES IN MICROBIOME-BASED THERAPIES BY EXPLORING THE SYNBIOTIC POTENTIAL OF SPORE-FORMING BACTERIA	24
Marilena Oprișanu, Leontina Grigore-Gurgu, Gabriela Elena Bahrim *	24
BIOACTIVE COMPOUNDS VARIATION IN PRESERVED BLACK CHOKEBERRY	26
Octavian Baston ^{1*} , Mihail Balaban ² , Octavian Barna ¹	26
INVESTIGATIONS ON THE ENRICHMENT OF FERMENTED DAIRY PRODUCTS WITH VEGETAL BIOACTIVE INGREDIENTS	27
Ina Vasilean ¹ , Livia Patrașcu ² , Maria Turtoi ² , Iuliana Aprodu ^{1*}	27
SUSTAINABLE ALTERNATIVE FOOD RESOURCES FOR FUTURE FOOD BY WIDENING INNOVATION INTO NEW COMPOSITES WITH IMPROVED HEALTH-PROMOTING PROPERTIES	29
Nicoleta Stănciuc, Adelina Ștefania Milea, Nicoleta Bălan, Silviu Măntăilă, Mihaela Cotârleş, Dănuț Gabriel Mocanu, Oana Viorela Nistor, Leontina Grigore-Gurgu, Doina Georgeta Andronoiu, Loredana Dumitrașcu, Gabriela Elena Bahrim, Gabriela Râpeanu	29
INVESTIGATION OF THE INHIBITORY POTENTIAL OF NADES EXTRACT FROM <i>FETEASCA ALBĂ</i> WHITE GRAPE POMACE ON POLYPHENOL OXIDASE FROM <i>IONATAN</i> APPLES	31
Silviu Măntăilă ^{1*} , Nicoleta Balan ¹ , Adelina Ștefania Milea ² , Gabriela Râpeanu ¹ , Nicoleta Stănciuc ¹	31
STUDIES OF THE INHIBITORY ACTIVITY OF A NADES EXTRACT FROM RED GRAPE POMACE ON ENZYMES INVOLVED IN POSTPRANDIAL BLOOD GLUCOSE REGULATION	32
Nicoleta Balan ^{1*} , Silviu Măntăilă ¹ , Adelina Ștefania Milea ² , Iuliana Aprodu ¹ , Gabriela Râpeanu ¹ , Nicoleta Stănciuc ¹	32

INFLUENCE OF THE EXTRACTION METHODS ON THE ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES OF THE SAGE EXTRACTS	34
Leontina Grigore-Gurgu ¹ , Daniela Borda ¹ , Liliana Mihalcea ¹ , Loredana Dumitraşcu ¹ , Iuliana Aprodu ^{1*}	34
PHENOLIC COMPOUND PROFILING, PREBIOTIC POTENTIAL, AND THERMAL DEGRADATION KINETICS OF PHYTIC ACID IN TEFF (<i>Eragrostis tef</i>)	35
Boyiza Samson Abebe*, Iuliana Aprodu, Daniela Ionela Istrati, Aida Mihaela Vasile, Mihaela Coterlet, Nicoleta Stănciuc, Camelia Vizireanu	35
COLOR STABILITY OF COOKED BEEF-PORK WIENERS WITH REDUCED NITRITE AND NATURAL ANTIOXIDANTS FROM SPENT ROSE PETAL EXTRACT	36
Nikolay, D. Kolev ^{1*} , Desislava, B. Vlahova-Vangelova ¹ , Alexandar, S. Balabanov ² , Lubomir, Ondruska ³ , Francesco, Vizzarri ³ , Mihaela G. Ivanova ²	36
PUMPKIN SEED FLOUR: A VEGETABLE ALTERNATIVE WITH HIGH NUTRITIONAL VALUE.....	38
Daniela Paladi ^{1*} , Nina Mija ²	38
ANCIENT VALUABLE CEREAL REVITALIZED THROUGH INNOVATION.....	39
Piea Guriţă ¹ , Amalia Busuioc ¹ , Elena Bulgar ² , Nicu A. Damaschin ¹ , Alexandru Gheorghiu ¹ , Oana V. Nistor ^{1*} , Gabriel D. Mocanu ¹ , Doina G. Andronoiu ¹	39
CARROT BY-PRODUCTS VALORIZATION: OPPORTUNITIES FOR INNOVATIVE AND VALUE-ADDED FOODS DEVELOPMENT	41
Florina-Genica Oncică ^{1*} , Nicoleta Stănciuc ¹ , Iuliana Aprodu ¹ , Oana Constantin ¹ , Constantin Croitoru ^{1,2} , Sergiu Erich Palcu ³ , Gabriela Râpeanu ¹ 41	
DEVELOPMENT OF SUSTAINABLE FUNCTIONAL PASTRY PRODUCTS USING GRAPE SKIN POWDER AS A NATURAL ENRICHMENT INGREDIENT	43
Eugenia Covaliov*, Tatiana Capcanari, Reşitca Vladislav,.....	43
Ruseva Olga	43
VALORIZATION OF BIOACTIVE COMPOUNDS FROM ALTERNATIVE PLANT SOURCES FOR THE DEVELOPMENT OF FUNCTIONAL FERMENTED SNACK BARS	44
Eugenia Covaliov*, Violina Popovici, Tatiana Capcanari, Oxana Radu.....	44
SUSTAINABLE TECHNOLOGIES FOR GLUTEN-FREE BREADMAKING USING HEMPSEED CAKE (<i>CANNABIS SATIVA</i>)	45
Tatiana Capcanari*, Eugenia Covaliov, Violina Popovici,.....	45
Cojocari Alexandrina, Cătălina Negoita	45

DEVELOPMENT AND CHARACTERIZATION OF A KOMBUCHA-TYPE FERMENTED BEVERAGE BASED ON APPLE AND QUINCE.....	46
Eugenia Covaliov*, Tatiana Capcanari, Violina Popovici, Oxana Radu, Natalia Suhodol, Deseatnicova Olga.....	
46	
BIOPOLYMERIC PACKAGING SOLUTIONS BASED ON THYME ESSENTIAL OIL FOR MUSHROOMS SHELF-LIFE EXTENSION.....	47
Mirela Crăciunescu ¹ , Iulia Bleoancă ¹ , Loredana Dumitrașcu ¹ ,.....	
47	
Corina Neagu ¹ , Felicia Stan ² , Catalin Fetecău ² , Daniela Borda ¹	
47	
RED CABBAGE POMACE AS A SUSTAINABLE SOURCE FOR BLUE COLORANTS USED AS NATURAL DYES IN TEXTILE	49
Mariana Dulman (Done) ¹ , Liliana Mihalcea ^{1*} , Angela Dănilă ²	
49	
EFFECT OF GRIT FROM RED GRAPE POMACE ON MINERAL, PHENOLIC, CHLOROPHYLL, AND CAROTENOID CONCENTRATION OF WHEATGRASS JUICE.....	51
Leontina Grigore-Gurgu ¹ , Bogdan Păcularu-Burada ² , George-Mădălin Dănilă ³ , Liliana Mihalcea ^{1*}	
51	
INNOVATIVE APPROACHES IN UTILIZATION OF PUMPKIN BY-PRODUCTS FOR VALUE-ADDED FOOD DEVELOPMENT.....	53
Roxana Nicoleta Gavril (Rațu) ^{1,2*} , Florina Stoica ³ , Nicoleta Stănciuc ¹ , Iuliana Aprodu ¹ , Oana Constantin ¹ , Claudia Mureșan ⁴ , Gabriela Râpeanu ¹	
53	
A SURVEY REVEALING ROMANIAN TEENS' KNOWLEDGE, ATTITUDES, AND PRACTICES ON FOOD PACKAGING	55
Iulia Bleoancă ¹ , Loredana Dumitrașcu ¹ , Daniela Borda ^{1*}	
55	
FORMULATION AND FUNCTIONAL CHARACTERIZATION OF A FERMENTED WHEY BEVERAGE ENRICHED WITH BITTER CHERRIES	56
Iulia Gluga ¹ , Corina Neagu ¹ , Loredana Dumitrașcu ¹ , Iulia Bleoanca ¹ , Daniela Borda ^{1*}	
56	
FUNCTIONAL CHARACTERIZATION OF ARONIA JUICE FERMENTED WITH PROBIOTIC LACTIC ACID BACTERIA.....	57
Corina Neagu ^{1*} , Anna Busuioc ²	
57	
HALOPHYTES AS ALTERNATIVE BIORESOURCES: POTENTIAL APPLICATIONS IN FOOD AND FEED	58
Nicoleta-Olimpia Andrei ^{1,2*} , Amalia Carmen Miteluț ¹	
58	
FT-IR CHARACTERIZATION OF HEMP ENRICHED MUFFINS.....	59

Cătălina, -B. Poteraş ^{1,2} , Andreea, -L. Mocanu ^{1,2*} , Corina, -A. Stroe ^{1,2} , Elena, - L. Ungureanu ¹ , Gabriel, Mustăţea ¹	59
FUNCTIONAL APPLICATION OF FAT-SOLUBLE SEA BUCKTHORN EXTRACT IN COOKED-SMOKED POULTRY FILLET	60
Natalia Netreba*, Irina Dianu, Iuliana Sandu	60
EXTRACTION STRATEGIES FOR PROTEIN CONCENTRATION FROM OILSEED CAKES	61
Oxana Radu ^{1*} , Tatiana Capcanari ¹ , Alina Boistean ¹ , Eugenia Covaliov ¹	61
EFFECTS OF PROPIONIC AND PROBIOTIC ADJUNCT CULTURES ON THE QUALITY CHARACTERISTICS OF OVINE GRAVIERA CHEESE MANUFACTURED ON INDUSTRIAL SCALE.....	62
Lambros Sakkas ¹ , Argiro Eleftheriou ² , Eleni Nastou ² , Evangelia Zoidou ¹ , Golfo Moatsou ¹ , Theofilos Massouras ¹ , Ekaterini Moschopoulou ^{1*}	62
EXPLORING THE FUNCTIONAL BIOPOTENTIAL OF SEA BUCKTHORN POMACE FOR INTEGRATION INTO ANIMAL-DERIVED FOOD PRODUCTS	64
Irina Dianu*, Tatiana Cusmenco, Artur Macari,.....	64
Iuliana Sandu, Natalia Netreba	64
SUSTAINABLE VALORIZATION OF <i>CORNUS MAS L.</i>	65
BY-PRODUCTS FROM LIQUEUR INDUSTRY.....	65
Alina Boistean ^{1*} , Aurica Chirsanova ¹ , Rodica Siminiuc ¹	65
PROTEIN SOURCES AND FOOD SYSTEM SUSTAINABILITY.....	66
Nastasia Belc ^{1*} , Denisa Duţă ¹ , Gabriel Mustăţea ¹ , Daniela Borda ² , Alina Magdas ³ , Florentina Roming Israel ⁴	66
THE EUROPEAN EXCELLENCE IN DAIRY LEARNING- ERASMUS+	68
Han Zuidema.....	68
SUSTAINABLE VALORIZATION OF SEA BUCKTHORN POMACE IN THE DEVELOPMENT OF A DAIRY PRODUCT WITH ENHANCED FUNCTIONALITY	69
Tatiana Cusmenco*, Irina Dianu, Iuliana Sandu,	69
Artur Macari, Olga Boestean, Natalia Netreba	69
PRUNUS FRUIT VALORIZATION FOR FUNCTIONAL BAKERY APPLICATIONS	70
Mariana Slavic, Adriana Dabija*, Amelia Buculei, Ancuţa Chetrariu	70
DEVELOPMENT AND PHYSICO-CHEMICAL EVALUATION OF AN ASSORTMENT OF NATURALLY SWEET, SUGAR-FREE ICE CREAM	71

Mariana Popescu, Mariana Slavic, Adriana Dabija*, Ancuța Chetrariu.....	71
ADVANCING BAKERY FERMENTATION: THE ROLE OF.....	72
NON-SACCHAROMYCES YEASTS IN PRODUCTS QUALITY.....	72
Cristian Mititiuc, Ramona Huber, Adriana Dabija*, Ionuț Avrămia	72
SUSTAINABLE BIOTRANSFORMATION OF SECONDARY CHEESE WHEY INTO FUNCTIONAL BEVERAGES: TECHNOLOGICAL AND ENVIRONMENTAL ASPECTS.....	73
Ramona Huber, Adriana Dabija*, Ancuța Chetrariu	73
FIFTEEN YEARS OF SUSTAINABLE DEVELOPMENT IN THE <i>GM COSTIN DAIRY PILOT PLANT</i>	74
Daniela Borda ^{1*} , Iulia Bleoanca ¹ , Corina Neagu ¹ , Loredana Dumitrascu ¹	74
NEW STRATEGIES FOR BUTTERMILK VALORIZATION	75
Loredana Dumitrascu ¹ , Iuliana Aprodu ¹ , Mirela Crăciunescu ¹ , Daniela Borda ^{*1}	75
VALORIZATION OF AGRI-FOOD BY-PRODUCTS FOR FOOD FUNCTIONALISATION BY MICRO- & NANOENCAPSULATION.....	76
Cristian Vasile Dima *	76
AGRICULTURAL COOPERATIVES IN ROMANIA: GOVERNANCE CHALLENGES AND OPPORTUNITIES FOR SUSTAINABLE RURAL DEVELOPMENT	77
Silvius Stanciu ^{1*} , Mihaela Pila ²	77
TECHNOLOGY TRANSFER IN ROMANIA'S AGRO-FOOD SECTOR: PATHWAYS FOR INNOVATION AND REGIONAL DEVELOPMENT	78
Silvius Stanciu ^{1*}	78
INNOVATIVE METHODS OF CONTROLLING RECRYSTALLIZATION PROCESS IN ICE CREAM	79
Anna Kamińska-Dwórznička ^{1*}	79
ANTIOXIDANT ACTIVITY OF CRAFT BEERS FROM ROMANIAN MARKET	81
Livia Patrascu ¹ , Maria Garnai ² , Evgheni Bruev ¹ , Ina Vasilean ^{2*}	81
EFFECTS OF MILK HEAT TREATMENT ON FUNCTIONALITY AND SHELF-LIFE QUALITY OF KAŞAR CHEESE	82
Melek Günay ¹ , Hasan Oral ¹ , Özlem Kaner ^{1*} , Ziya O. Derinsu ¹ , Metin Gültaş ²	82
DECREASING SUGAR LEVEL BY ENZYMATIC HYDROLYSIS OF LACTOSE IN LOW-FAT FRESH CHEESE	83

Damla Özçelik ¹ , Deniz Elitez ¹ , Özlem Kaner ^{1*} , Ziya O. Derinsu ¹ , Metin Gültaş ²	83
EU MULTI-STAKEHOLDER PLATFORM FOR COLLABORATION AND INNOVATION IN FOOD SAFETY: R&I PRIORITIES FOR SAFE TRANSITION TOWARDS SUSTAINABLE FOOD SYSTEMS	84
Veronica MT Lattanzio ^{1*} , Nunzia M Cito ¹ , Martina Loi ¹ , Antonio Moretti ¹ , Nastasia Belc ²	84
DEVELOPMENT OF AN INNOVATIVE ANCHOVY PRODUCT ENRICHED WITH MUSHROOMS: EVALUATION OF NUTRITIONAL AND SENSORY QUALITY.....	85
Fatma Delihasan Sonay ^{1*}	85
DEVELOPMENT, SENSORY CHARACTERIZATION, AND NUTRITIONAL PROFILING OF AN ANCHOVY-BASED CROQUETTE.....	86
Bariş Karşlı ^{1*}	86
PRODUCTION OF AGRICULTURAL FERTILIZER FROM FISH WASTE VIA ACIDIC AND ENZYMATIC METHODS.....	87
Bariş Karşlı ^{1*}	87
EGG DERIVED PEPTIDES AS FUNCTIONAL INGREDIENT FOR IMPROVING PUDDING PROPERTIES.....	91
Mihaela Brumă (Călin) ¹ , Ina Vasilean ¹ , Iuliana Banu ¹ , Gabriela Râpeanu ¹ , Nicoleta Stănciuc ¹ , Iuliana Aprodu ^{1*}	91
FUNCTIONAL PROPERTIES OF THE PROTEIN ENRICHED GLUTEN-FREE FLOURS	92
Anca Lupu ¹ , Iuliana Banu ¹ , Gabriela Râpeanu ¹ , Nicoleta Stănciuc ¹ , Ina Vasilean ¹ , Iuliana Aprodu ^{1*}	92
VARIATION OF BIOGENIC AMINES IN PRESERVED <i>ALBURNUS CHALCOIDES</i> MEAT	93
Octavian Baston ^{1*} , Octavian Barna ¹	93
FISH PRESERVATION WITH SELECTED LACTIC ACID BACTERIA	94
Vasilica Barbu ^{1*} , Chimène Agrippine Rodogune Yelouassi ^{2,3}	94
VITAMIN STABILITY UNDER COLD PLASMA TREATMENT: OPPORTUNITIES AND CHALLENGES	95
Omer Serif Aydin ^{1,2} , Gamze Duven ^{3*} , Yasemin Sahan ⁴	95
BIOACTIVE NATURAL COMPOUNDS IN NEUROPROTECTION: THERAPEUTIC VALUES OF RESVERATROL AND CANNABINODS IN NEURODEGENERATIVE DISEASES	96
Gabriela Vlăsceanu ^{1*} , Andrei Apetrei ²	96

RESVERATROL AND CANNABINODIES IN NEURODEGENERATE CONTEXT: FROM FUNCTIONAL NUTRITION TO SUPPLEMENT DEVELOPMENT AND NOTIFICATION .	97
Gabriela Vlăsceanu ^{1*} , Andrei Apetrei ²	97
CORNELIAN CHERRY (CORNUS MAS L.) AS A SOURCE OF FUNCTIONAL INGREDIENTS FOR FOOD PRODUCTS.....	98
Natalia Suhodol [*] , Eugenia Covaliov, Violina Popovici, Olga Deseatnicova, Vladislav Reșitca	98
INFLUENCE OF SOLVENT SYSTEM ON THE LIPOSOMAL ENCAPSULATION EFFICIENCY OF GRAPE POMACE POLYPHENOLS	99
Violina Popovici, Eugenia Covaliov, Tatiana Capcanari, Oxana Radu.....	99
VALIDATION OF THE COMPREHENSIVE FEEDING PRACTICES QUESTIONNAIRE IN CAREGIVERS OF 2 TO 7-YEAR-OLD CHILDREN IN ROMANIA.....	100
Cornelia Hodorogea (Huhulea) ¹ , Loredana Dumitrașcu ² , Iulia-Lidia Bleoancă ² , Dana-Iulia Moraru ² , Maria Turtoi ^{3*}	100
FOOD FRAUD VULNERABILITY ASSESSMENT IN A BAKERY COMPANY	101
Delia Onea (Popescu) ¹ , Daniela Borda ¹ , Loredana Dumitrascu ^{1*}	101
EMOTIONAL HUNGER AND SUSTAINABLE FOOD CHOICES: PERSPECTIVES ON THE ELDERLY.....	102
Ionica.Coșoreanu (Fanaca) ^{1,2} , Dana I., Moraru ^{1*} Costinela V. Georgescu ^{3,4}	102
AWARENESS OF THE IMPORTANCE OF DIET AND LIFESTYLE IN PREVENTING AND MANAGING OSTEOPOROSIS	104
Anișoara D. Doros-Girip ^{1,3} , Dana I., Moraru ^{1*} , Alexia A.Ș. Baltă ^{2,3} , Doina C. Voinescu ^{2,3}	104
EVALUATION OF NATURAL RADIOACTIVE CONTENT IN DRINKING WATER AND IMPACT ON HEALTH POPULATION	106
Violeta Pintilie-Nicolov ² , Dana. I. Moraru ^{1*} , Amalia Balcan ² , Adelina G. Pintilie ³	106
CHILD NUTRITION: THE IMPORTANCE OF DIETARY FIBER IN EARLY CHILDHOOD, FROM WEANING TO AGE 6	108
Elena Dogaru (Pogorevici) ¹ , Dana I. Moraru ^{1*} , A. Ramos-Villarroel ⁴ , Nicoleta M. Maței ^{2,3}	108
ORTHOREXIA: BETWEEN HEALTHY FOOD CHOICES AND PATHOLOGICAL BEHAVIOR IN THE ROMANIAN POPULATION – COMPARATIVE PRELIMINARY STUDY.....	109
Elena Dogaru (Pogorevici) ¹ , Cecilia Curis ^{2*} , Sebastian M. Curis ² , Nicoleta M. Maței ^{2,3} , Dana I. Moraru ¹	109

THE ACTIVITY OF THE FOOD BANK OF MOLDOVA DURING THE PERIOD 2020–2025	111
Laureana Odajiu, Nicolae Mocanu	111
QUALITY EVALUATION OF VARIOUS HOME MADE SYRUPS IN ROMANIA.....	112
Diana G. Gropoșilă-Constantinescu, Ioan N. Ranga*, Gabriela L. Mărgărit	112
PROBIOTIC CHARACTER ASSESSMENT OF <i>LACTIPLANTIBACILLUS PENTOSUS</i> STRAIN	115
Vasilica Barbu ^{1*} , Chimène Agrippine Rodogune Yelouassi ^{2,3}	115
IN SILICO INVESTIGATIONS ON THE PROPERTIES OF SOY ALLERGENS UPON ENZYME HYDROLYSIS	116
Daniela Țiuleanu (Bari) ¹ , Ina Vasilean ¹ , Iuliana Banu ¹ , Iuliana Aprodu ^{1*} ...	116
THE FUTURE OF FERMENTATION: TECH-DRIVEN STRATEGIES TO BOOST GABA IN CEREAL-BASED FERMENTED FOODS	117
Gamze Düven ^{1*} , Sine Özmen Toğay ²	117
EVALUATION OF THE BIOACTIVE POTENTIAL OF COMPOUNDS DERIVED FROM THE FERMENTATION OF HEMP SEEDS USING ARTISANAL STARTER CULTURES.....	118
Virginia (Apetroaei) Tănase*, Gabriela Elena Bahrim, Aida Mihaela Vasile, Daniela Ionela Istrati, Mihaela Cotârleț, Eugenia Mihaela Pricop, Camelia Vizireanu.....	118
STRUCTURAL ANALYSIS OF SURFACE-ASSOCIATED PROTEINS IN <i>LACTICASEIBACILLUS RHAMNOSUS</i> MIUG BL38 STRAIN AND THEIR BIOACTIVE IMPLICATIONS.....	119
Mihaela Cotârleț ¹ , Brîndușa Alina Petre ^{2,3} , Gabriela Elena Bahrim ¹ , Leontina Grigore-Gurgu ^{1*}	119
DYNAMICS OF SOME EMERGING CONTAMINANTS IN WATER AND SEDIMENT ALONG THE BLACK SEA COAST	121
Diana Moisa (Danilov) ^{1,2*} , Valentina Coatu ² , Carmen Chițescu ³ , Iulia Grecu ¹ , Angelica Docan ¹ , Andra Oros ² , Luminita Lazar ² , Nicoleta Damir ² , Lorena Dediu ^{1*}	121
TURMERIC-ENRICHED FUNCTIONAL FEED ENHANCES GROWTH, ANTIOXIDANT DEFENSE, AND THERMAL RESILIENCE IN KOI CARP UNDER CLIMATE-INDUCED TEMPERATURE STRESS.....	123
Chrysanthi Kalloniati ^{1,2} , Alina Antache ^{3,4} , Ira-Adeline Simionov ^{3,4} , Stefan M. Petrea ^{3,4} , Sofia Marka ¹ , Maria-Eleftheria Zografaki ¹ , Giorgos Tsirtsis ² , Catalina Iticescu ^{3,5} , Emmanouil Flemetakis ¹ , Rodica C. Efrose ^{1,5*}	123

DIETARY <i>ULVA LACTUCA</i> EXTRACT MODULATES THE RESPONSE OF FISH TO OXYTETRACYCLINE AND FLORFENICOL ADMINISTRATION.....	127
Alina Nicoleta Macoveiu ^{1,2} , Mirela Crețu ^{1,3} , Iulia Grecu ^{1,3} , Angelica Docan ^{1,3} , Ion Vasilean ¹ , Săndița Placintă ¹ , Maria Desimira Stroe ² , Lorena Dediu ^{1,3*}	127
EVALUATION OF THE FUNCTIONAL PROPERTIES OF SQUID INK BIOACTIVE COMPOUNDS FOR THE DEVELOPMENT OF BIO-BASED WOUND DRESSINGS.....	129
Mina Ahmadi ^{1*} , Haniye Rostamzad ²	129
EVALUATION OF THE PRIMARY PRODUCTION OF THE SAPLING VARA I FISH GROWING POND, WITHIN THE MĂLINA FISH FARM, GALAȚI COUNTY	130
Popescu Adina ¹ , Ibanescu C. Daniela ¹	130
BIODIVERSITY OF COMMERCIAL CATCHES FROM ROMANIA'S INLAND WATERS	132
Daniela Cristina Ibănescu ^{1*} , Adina Popescu ¹	132
THE CHALLENGES OF THE BLUE ECONOMY	134
Aurelia Nica ^{1,2*} , Isabelle Metaxa ¹ , Alina Antache ^{1,3} , Ira -Adeline Simionov ^{1,3} , Stefan-Mihai Petrea ^{1,3}	134
SYNTHESIS ON THE BLUE DIMENSIONS OF AQUACULTURE	135
Aurelia Nica ^{1,2*} , Ira-Adeline Simionov ^{1,3} , Alina Antache ^{1,3} , Isabelle Metaxa ¹ , Stefan-Mihai Petrea ^{1,3}	135
PRESENT STATUS AND APPLICATIONS IN THE CULTURE OF THE EUROPEAN CATFISH (<i>SILURUS GLANIS</i> L., 1858)	136
Iulia R. Grecu ^{1,2*} , Angelica Docan ^{1,2} , Lorena Dediu ^{1,2}	136
VARIATION IN THE BIOCHEMICAL COMPOSITION OF FISH MUSCLE AS INFLUENCED BY EXPOSURE TO ENVIRONMENTAL POLLUTANTS.....	137
Iulia R. Grecu ^{1,2*} , Mirela Crețu ^{2,3} , Angelica Docan ^{1,2} , Lorena Dediu ^{1,2}	137
ASSESSMENT OF BLOOD BIOCHEMICAL PARAMETERS IN <i>SCOPHTHALMUS MAEOTICUS</i> EXPOSED TO ENVIRONMENTAL POLLUTANTS	138
Angelica Docan ¹ , Diana Moisă (Danilov) ² , Iulia Grecu ¹ ,	138
Mirela Crețu ³ , Lorena Dediu ^{1*}	138
INNOVATIONS AND ADVANCES IN DELIVERY TECHNOLOGIES FOR BIOACTIVE COMPOUNDS AND PROBIOTICS IN AQUACULTURE FEEDS	139
Lorena Dediu [*] , Cristian Dima, Cristian Rimniceanu.....	139

MODULATION OF ANTIOXIDANT DEFENSES IN SIBERIAN STURGEON BY FEEDING WITH A KOMBUCHA FERMENTED PRODUCT IN A RECIRCULATING AQUACULTURE SYSTEM.....	140
Cristian Rimniceanu ¹ , Mirela Crețu ² , Angelica Docan ¹ , Marina Pihurov ¹ , Iulia Grecu ¹ , Gabriela Bahrim ¹ , Lorena Dediu ^{1*}	
	140
THE USE OF BLACK SOLDIER FLY (<i>HERMETIA ILLUCENS</i>) AS A NUTRITIONAL ALTERNATIVE IN FISH DIET.....	141
Liliana B. Athanasopoulos ^{2*} , Floricel M. Dima ² , Ira-Adeline Simionov ¹ , Isabelle Metaxa ¹ , Aurelia Nica ¹ , Alina Antache ¹ , Ștefan-Mihai Petrea ¹	
	141
WIDE SCREENING OF NEUROTOXIC COMPOUNDS BASED ON A BIENZYMATIC BIOSENSOR WITH CO-IMMOBILIZED ACETYLCHOLINESTERASE AND BUTYRYLCHOLINESTERASE.....	142
Madalina-Petruta Bucur ¹ , Maria-Cristina Radulescu ¹ , Bogdan Bucur ^{1*} , Adela Teban-Man ^{2,3} , Maria Daniela Nicoară ^{2,3} , Horia Leonard Banciu ³ and Gabriel Lucian Radu ¹	
	142
THE INFLUENCE OF VARIOUS SUBSTRATE TYPES ON COCOON DEPOSITION AND REPRODUCTIVE PERFORMANCE OF LEECHES (<i>HIRUDO VERBANA</i> CARENA, 1820)	144
Liliana B. Athanasopoulos, Floricel M. Dima, Magdalena Tenciu, Desimira M. Stroe, Gabriel Ion, Veta Nistor, Elena Sîrbu	
	144
SYNTHESIS, CHARACTERIZATION AND APPLICATIONS OF ARTEMISIA-BASED METAL NANOPARTICLES	145
Delia M. Luca ¹ , Roxana Strungaru-Jijie ² , Lăcrămioara Oprică ^{1*}	
	145
APPLICATIONS OF PLANT-BASED NANOPARTICLES IN ENVIRONMENTAL REMEDIATION	146
Delia M Luca ¹ , Gabriela Voichița ² , Lăcrămioara Oprică ^{1*}	
	146
LINKING MICROBIAL COMMUNITY DYNAMICS TO ENVIRONMENTAL DRIVERS IN LAKE RAZIM, ROMANIA	147
Denisa Igescu ^{1,2} , Elena -Alina Olaru ^{2,3} , Adrian Burada ⁵ , Ionela Avram ^{2,4} ...	
	147
MEASURES AND ACTIONS IN THE IMPLEMENTATION SITE IS4 – ROMANIA GRĂDIȘTEA/ BASCEALÎC AREA - ENISALA.....	149
Adrian Burada ¹ , Cristina Despina ^{*1} , Bogdan Petre Gheorghe ¹ , Daniela Seceleanu-Odor ¹ , Ștefan-Mihai Petrea ² , Ira Simionov ² , Catalina Iticescu ² , Tudor Constantin Racoviceanu ³ , Mihai Cristian Adamescu ³	
	149
ADVANCING THE GREEN NEXUS IN THE DANUBE DELTA THROUGH CLIMAPANNONIA'S ROADMAPS FOR A RESILIENT BLUE ECONOMY.....	150

Matei Simionov [*] , Adrian Burada, Iulian Nichersu, Iulian Fomici, Marian Tudor, Dragoş Balaican	150
BACTERIAL VALORIZATION OF AQUACULTURE SIDE STREAMS FOR A CIRCULAR BLUE ECONOMY	151
Samet Kalkan	151
TRANSFORMING FISHERY BYPRODUCTS INTO ACTIVE BIOPOLYMER PACKAGING FOR SEAFOOD QUALITY AND SHELF LIFE	152
Samet Kalkan [*]	152
EXPLORING INSECT MEAL RESEARCH IN AQUACULTURE: A LITERATURE ANALYSIS FROM DERGIPARK PUBLICATIONS	153
Tolga Şahin ^{1*}	153
DISTRIBUTION OF SPECIES BELONGING TO THE GENUS VIMBA (LEUCISCIDAE PISCES) IN TÜRKİYE	154
Esra Bayçelebi	154
COMPARISON OF <i>PHOXINUS COLCHICUS</i> AND <i>P. STRANDJAE</i> SPECIES AND THE STATUS OF <i>P. COLCHICUS</i> IN TÜRKİYE	155
Esra Bayçelebi	155
INTEGRATIVE PATHWAYS LINKING HEMATOLOGICAL, OXIDATIVE STRESS AND BEHAVIORAL RESPONSES OF FRESHWATER FISH EXPOSED TO HYDROPOWER TURBINE STRESSORS	156
Alina Antache ^{*,1,2,3} , Ira A. Simionov ^{1,2} , Stefan M. Petrea ^{1,2} , Catalina Iticescu ^{2,4} , Aurelia Nica ^{1,5}	156
AI-DRIVEN WATER RESILIENCE IN THE DANUBE DELTA.....	158
Mădălin Silion ¹ , Bogdan-Gabriel Pădeanu ^{1*} , Lucian Lumînăroiu ¹ , George Suci ¹ , Cristian Beceanu ¹	158
INNOVATIVE TRAINING FOR A SUSTAINABLE FUTURE: BEIA'S ROLE IN ADVANCING UNDERWATER TECHNOLOGIES AND BLUE ECONOMY SKILLS	160
Mădălin Silion ¹ , Lucian Lumînăroiu ^{1*} , George Suci ¹ , Bogdan-Gabriel Pădeanu ^{1*}	160
PRELIMINARY ASSESSMENT OF HEAVY METALS ACCUMULATION IN SEDIMENTS COLLECTED FROM SEVERAL LAKES FROM DANUBE DELTA	162
Carmen Roba ¹ , Nicoleta Brişan ^{*1}	162
TEMPORAL AND SPATIAL VARIATION OF <i>Scorpaena porcus</i> AS A DISCARD SPECIES IN BOTTOM TRAWL FISHERIES ALONG THE SOUTHEASTERN BLACK SEA COAST .	163

Hatice ONAY*	163
FISHERY SUSTAINABILITY AND RECOVERY: IS A TWO-YEAR CLOSURE SUFFICIENT FOR STRIPED VENUS CLAM POPULATIONS?	164
Yusuf CEYLAN	164
UNDERWATER WORKFORCE IN SUSTAINABLE AQUACULTURE: HUMAN EXPERTISE AND FUTURE PATHWAYS FOR THE BLUE ECONOMY	165
Tolga AKDEMIR	165
ANALYTICAL FRAMEWORK FOR PRIVATE HATCHERIES CRITICAL POINT ASSESSMENT IN SOUTHEAST ASIA	166
Stefan M. Petrea ^{1,2,3*} , Dragos S. Cristea ³ , Domenico Caruso ⁴ , Catalin Platon ⁵ , Ira-Adeline Simionov ^{1,2,6} , Alina Antache ^{1,2,7} , Catalina Iticescu ^{2,8} , Aurelia Nica ¹ , Isabelle Metaxa ¹	166
ASSESSMENT OF NEEDS FOR THE IMPLEMENTATION OF SOFT SKILLS IN THE EUROPEAN WATER INDUSTRY	168
Ira-Adeline Simionov ^{1,2*} , Nina-Nicoleta Lazăr ² , Tamara Radjenovic ³ , Milan Gocic ⁴ , Irene Laiz ⁵	168

FOOD SCIENCE - TRADITIONAL AND INNOVATIVE FOOD TECHNOLOGIES



23rd-24th of October 2025, On- site and online

DESIGN OF PROBIOTIC YOGHURT WITH THE ADDITION OF ROYAL JELLY

Ivelina G. Peykova-Shapkova^{1*}, Mihaela G. Ivanova¹, Ivan G. Ivanov²,
Natalina K. Panova³, Krastena T. Nikolova³, Yulian D. Tumbarski⁴

¹ Department of Milk and Dairy Products, University of Food Technologies, 26,
Maritsa Blvd., 4002, Plovdiv, Bulgaria.

² Department of Organic Chemistry and Inorganic Chemistry, University of Food
Technologies, 26, Maritsa Blvd., 4002, Plovdiv, Bulgaria

³ Department of Physics and biophysics "Prof. Dr. Paraskev Stoyanov", 55,
"Professor Marin Drinov" street, 9002 Medical University, Varna, Bulgaria

⁴ Department of Microbiology and Biotechnology, University of Food Technologies,
26, Maritsa Blvd., 4002, Plovdiv, Bulgaria

*Corresponding author: ivelina.shapkova@abv.bg

Abstract

This study aimed to develop a probiotic yoghurt enriched with royal jelly (RJ) to enhance its nutritional and functional qualities. The effects of incorporating *Lactocaseibacillus casei* RC-1 and RJ on the physicochemical, antioxidant, microbiological, and rheological properties of yoghurt were evaluated over 21 days of refrigerated storage. Three yoghurt formulations were tested: control with classic yoghurt starter culture (Yc), yoghurt starter culture with probiotic (Ypro), and yoghurt starter culture, probiotic with royal jelly (Ypro+RJ). Parameters such as pH, titratable acidity, water content, water holding capacity (WHC), fat content, color (L^* , a^* , b^*), total polyphenols, antioxidant activity (DPPH, FRAP), and microbial counts were analyzed. Ypro+RJ maintained the highest pH (4.82→4.48) and lowest acidity (0.73%→0.86%), indicating reduced acidification. WHC improved in all samples, with Ypro+RJ reaching the highest value (62.48%). Fat content remained at 3.6% across all groups. Color shifts were minimal ($\Delta E < 1.5$), suggesting little perceptible difference. Ypro+RJ had the highest polyphenol content (20.68→13.60 mg GAE/100g) and strongest antioxidant activity, reflecting a synergistic effect between the probiotic and RJ. Microbial analysis showed increased lactic acid bacteria (LAB) in Ypro and Ypro+RJ, while total plate and yeast/fungi counts remained within safe limits. Rheological testing revealed shear-thinning behavior in all samples. The control showed the highest initial complex viscosity ($|\eta^*| = 74.3$ Pa·s), which declined significantly by day 21 (19.5 Pa·s), indicating structural breakdown. The probiotic yoghurt showed more stability ($|\eta^*| = 19.9 \rightarrow 17.2$ Pa·s) and viscous behavior ($\tan(\delta)$: 6.72 → 3.45). The Ypro+RJ sample displayed the lowest viscosity (1.93 Pa·s on day 21) and highest $\tan(\delta)$ (>25), indicating reduced

elasticity. The Carreau–Yasuda model best fits all samples ($R^2 > 0.98$). Overall, the RJ addition enhanced the yoghurt's functional properties, boosting antioxidant activity, microbial viability, and storage stability. These results suggest that RJ-enriched probiotic yoghurt could serve as a next-generation functional food with potential health and consumer benefits.

Keywords: royal jelly, probiotic yoghurt

INVESTIGATION OF PHYSICAL AND CHEMICAL PROPERTIES
USING SCANNING ELECTRON MICROSCOPY AND ENERGY
DISPERSIVE X-RAY ANALYSIS OF EDIBLE FILMS ENHANCED
WITH *SALVIA OFFICINALIS* SUPERCRITICAL FLUID
EXTRACT

Ilir Mërtiri^{1*}, Leontina Grigore-Gurgu¹, Liliana Mihalcea¹, Viorica
Ghisman², Daniela Laura Buruiană², Gabriela Râpeanu¹, Nicoleta Stănciuc¹

¹Faculty of Food Science and Engineering, “Dunărea de Jos” University of Galați,
111 Domnească Street, 800201, Galați, Romania.

²Interdisciplinary Research Centre in the Field of Eco-Nano Technology and
Advance Materials CC-ITI, Faculty of Engineering, “Dunarea de Jos” University
of Galați, 47 Domneasca, 800008 Galați, Romania.

*Corresponding author: ilir_mertiri@yahoo.com

Abstract

In this study, edible films made from chitosan, gelatin, and sage (*Salvia officinalis*) supercritical fluid extract (So-SFE) were examined for their physical and chemical properties using Scanning Electron Microscopy (SEM) and Energy Dispersive X-Ray (EDX) analysis. The sage extracts were obtained through a pilot plant extractor (Natex, Prozesstechnologie GesmbH, Austria), utilizing CO₂ as a carrier in a supercritical fluid state, and equipped with two separators (S40 and S45) with independent control of temperature and pressure. The film solutions were formulated at different concentrations based on the Minimal Inhibitory Concentration (MIC) against two targeted pathogenic bacterial strains, *Listeria monocytogenes* Scott A, and *Staphylococcus aureus* ATCC 25923.

The MIC of the extract obtained from S40, for both bacterial strains, was determined between 0.1 and 0.2 mg/mL. In contrast, for extract S45, the MIC for both strains ranged from 0.39 to 0.78 mg/mL. The SEM investigation revealed significant variations in surface morphology between the control film and those supplemented with So-SFE. The control film exhibited a smooth and uniform surface, indicating a homogeneous matrix. In contrast, the films containing So-SFE showed an increasing presence of surface particles, irregularities, roughness, and agglomeration. EDX spectra indicated that all the film samples were primarily composed of carbon and oxygen, consistent with the biopolymers used in the film's formulation. The control film contained minimal elements, indicating a clean matrix. However, the films with So-SFE revealed trace elements such as Zn, Na, Ca, and Cu, depending on the concentration of the extract. The results obtained from the SEM analyses indicated that the addition of So-SFE influenced the overall profile of the film surfaces, which subsequently could affect the mechanical and barrier properties. Elemental mapping confirmed a relatively uniform distribution that aligns with the SEM observations. These findings support the fact that the physical and chemical changes of the film formulations are concentration-dependent.

Keywords: edible films, plant extract, antibacterial activity

NEW STRATEGIES IN MICROBIOME-BASED THERAPIES BY EXPLORING THE SYNBiotic POTENTIAL OF SPORE- FORMING BACTERIA

Marilena Oprișanu, Leontina Grigore-Gurgu, Gabriela Elena Bahrim*

Faculty of Food Science and Engineering, “Dunărea de Jos” University of Galați,
111 Domnească Street, 800201, Galați, Romania

*Corresponding author: Gabriela.Bahrim@ugal.ro

Abstract

In the last years, the spore-forming bacteria of the genus *Bacillus* spp. have attracted significant interest as novel potential probiotics in microbiome-targeted therapies due to their exceptional resistance to heat, pH variation, and gastrointestinal tract conditions, together with the multifunctional benefits. The capacity to form endospores and resist stress conditions, together with their ability to synthesize levan and levan-type fructooligosaccharides (FOS), makes them suitable for inclusion in synbiotic formulations to enhance beneficial microbiota proliferation and contribute to the overall health of the host. Moreover, a novel symbiotic formulation combining *B. subtilis* strain and L-alanyl-L-glutamine has demonstrated the ability to stimulate butyrate production, together with the growth of gut beneficial microorganisms involved in its synthesis, such as *Faecalibacterium prausnitzii*. As a consequence of microbiota changes, improvements were observed in lipid metabolism, including a reduction of LDL cholesterol level and a more favorable LDL/HDL ratio. Metabolomic analyses of rich or minimal media inoculated with different *Bacillus* species, such as *B. subtilis*, *B. licheniformis*, or *B. amyloliquefaciens* enabled the identification of important bioactive molecules. These include 1-kestose, as the smallest FOS with prebiotic activity, thioproline, an antioxidant compound with anticarcinogenic properties, vitamins B5 and B6, various peptides with antimicrobial properties, and poly- γ -glutamic acid, which has been shown to induce the proliferation of *Bifidobacterium* spp. in the gut. Thereby, it improves the symptoms of gastrointestinal disorders and mood. An important aspect regarding *B. subtilis* is the potential use of its secreted peptides as next-generation therapeutic compounds in cancer treatment, due to their capacity to induce apoptosis in cancer cells, particularly in those resistant to conventional therapies. In this regard, the peptides iturin, mycosubtilin, and bacillomycin D have gained attention for their ability to disrupt membrane integrity and trigger intracellular stress pathways, emphasizing selective cytotoxicity towards cancer cells while exhibiting low toxicity to normal cells. This study presents a case study on the synbiotics, the association between probiotics (spore-forming bacteria) and lactic acid bacteria, and their involvement in the synthesis of biotics aimed to alleviate the effects of leaky gut.

Keywords: probiotics, *Bacillus* spp., synbiosis, biotication, gut microbiome modulation

Acknowledgment: The Integrated Center for Research, Expertise and Technological Transfer in Food Industry (BioAliment-TehnIA), “Dunărea de Jos” University of Galati, Romania) is acknowledged for providing technical support. The support regarding the probiotic strains offers by MIUG Collection affiliated at the The Microbial Resource Research Infrastructure (MIRRI) is gratefully acknowledged.

BIOACTIVE COMPOUNDS VARIATION IN PRESERVED BLACK CHOKEBERRY

Octavian Baston^{1*}, Mihail Balaban², Octavian Barna¹

¹Faculty of Food Science and Engineering, “Dunărea de Jos” University of Galați,
47, Domnească street, Galați, România

²Miarbal Prod SRL, 92, Gheorghe C. Constantinescu Street, Brăila, România

*Corresponding author: octavian.baston@ugal.ro

Abstract

Black chokeberry (*Aronia melanocarpa*) is rich in bioactive compounds that benefit health. Only that fresh berry is tough to eat due to its astringent taste. Therefore, *Aronia* berries need to be processed. They can be processed using methods like thermal treatment, sweeteners, and extraction, and transformed into juices, nectars, syrups, various preserves, wines, tinctures, fruit desserts, teas, dietary supplements, etc. We preserved the berries by freezing them and making preserves with sugar and xylitol. The research was done to determine the amount of bioactive compounds from preserved *Aronia* berries and their evolution during 6 months of storage. We measured total phenols, flavonoids, anthocyanins, antioxidant activity, and ascorbic acid content. We found that the frozen berries had the highest amount of total polyphenols, total anthocyanins, and ascorbic acid compared to the preserves made with sugar (APS) and made with xylitol (APX). Using sugar (sucrose) with high-temperature thermal treatment boosted antioxidant activity significantly. In contrast, xylitol with high-temperature treatment helped maintain total phenols and ascorbic acid while increasing total flavonoids more than frozen berries. The anthocyanins in preserves (APS and APX) were affected more by thermal treatment than in fresh berries. Still, black chokeberry preserves contain many bioactive compounds that promote health and reduce free radicals. Heat treatment at temperatures under 90°C increases total phenols and flavonoids in chokeberry preserves. But it leads to a sharp decline in anthocyanins. Keeping preserved chokeberry products in cool places, under 18°C and out of natural light, helps preserve their antioxidant properties for the entire storage time.

Keywords: aronia, antioxidant, shelf life, sweeteners, preserves

INVESTIGATIONS ON THE ENRICHMENT OF FERMENTED DAIRY PRODUCTS WITH VEGETAL BIOACTIVE INGREDIENTS

Ina Vasilean¹, Livia Patraşcu², Maria Turtoi², Iuliana Aprodu^{1*}

¹Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati,
Domneasca Street 111, 800201, Galati, Romania

²Cross-border Faculty, Dunarea de Jos University of Galati, Domneasca Street
111, 800201, Galati, Romania

*Corresponding author: iuliana.aprodu@ugal.ro

Abstract

Various high amounts of by-products resulting from the processing of different raw materials in the food industry represent valuable sources of biologically active compounds that are not properly utilized. The main objective of this study was to obtain dairy products fermented with probiotic bacteria, supplemented with biologically active compounds from natural sources, such as grape seeds and pomace. A mixture of *Streptococcus thermophilus* and *Lactobacillus delbrueckii* subsp. *bulgaricus* was used for fermenting the milk supplemented with 1% grape seeds or pomace flour. Dairy products supplementation with vegetal ingredients prior to fermentation resulted in significantly higher antioxidant activity. When compared to the controls with no bioactive compounds of vegetal origin, the DPPH radical scavenging activity of the samples supplemented with 1% grape seeds and pomace flour was about 3.1 and 1.7 times higher, respectively. This trend was expected as the grape seeds presented a slightly higher DPPH radical scavenging activity compared to the flour made from grape skins. A slight reduction of the antioxidant activity was noticed after it was stored for 14 days at 4°C. Anyway, at the end of the storage period, the antioxidant activity of the samples enriched with vegetal bioactive ingredients remained superior to that of the controls. The samples supplemented with grape seeds and pomace flour exhibited improved water retention capacity, the syneresis decreasing by 3-4%. The pH of all samples decreased over storage, but a higher pH drop was observed in the case of the samples supplemented with vegetal bioactive ingredients. Rheological measurements indicated that all samples exhibited non-Newtonian behavior, the viscosity increasing with the level of supplementation with vegetal bioactive ingredients. In conclusion, the main by-products resulting from grape processing into wine might be successfully used for obtaining dairy products with improved functionality.

Keywords: antioxidant activity, grape seeds, grape pomace, yoghurt

Acknowledgment: This paper was co-financed by the European Regional Development Fund (ERDF) through the Smart Growth, Digitization and Financial Instruments Program



23rd-24th of October 2025, On- site and online

(PoCIDIF), call PCIDIF/144/PCIDIF_P1/OP1/RSO1.1/PCIDIF_A3, Project SMIS number 309287, acronym METROFOOD-RO Evolve.

**SUSTAINABLE ALTERNATIVE FOOD RESOURCES FOR
FUTURE FOOD BY WIDENING INNOVATION INTO NEW
COMPOSITES WITH IMPROVED HEALTH-PROMOTING
PROPERTIES**

**Nicoleta Stănciuc, Adelina Ștefania Milea, Nicoleta Bălan, Silviu Măntăilă,
Mihaela Cotârleş, Dănuț Gabriel Mocanu, Oana Viorela Nistor, Leontina
Grigore-Gurgu, Doina Georgeta Andronoiu, Loredana Dumitrașcu, Gabriela
Elena Bahrim, Gabriela Râpeanu**

*Faculty of Food Science and Engineering, “Dunărea de Jos” University of Galați,
111 Domnească Street, 800201, Galați, Romania.*

* Corresponding author: Nicoleta.Stanciuc@ugal.ro

Abstract

In 2009, FAO predicted an increase of around 34% of the world population by 2050, associated with an increase of 70% in food production demand. However, only in the last 10 years, we experienced an increase of around 12.5% in the world population. Therefore, providing food security to all people, while ensuring safety and nutritionally optimized foods, is a big challenge. Important goals should be considered for the Agenda 2030, such as providing good health and well-being, responsible consumption and production, climate action, local economy, and income generation, among others. Therefore, globalization, accelerated economic development, urbanization, and modernization of agricultural and food-processing techniques are emerging aspects that have led to profound changes in dietary patterns, raising important health and sustainability concerns. In order to overcome undernutrition and obesity, large-scale shifts towards healthier and more sustainable diets are necessary across socioeconomic, cultural, and geographical background. The main purpose of this paper is to present an overview of the national project, funded by The Executive Unit for Financing Higher Education, Research, Development and Innovation (UEFISCDI), project 9PCE/2025, entitled *Sustainable Alternative Food resources for future food by widening Innovation into new composites with improved health-promoting pRoperties* (SAFIR). SAFIR aims to provide enough scientific results and knowledge to support innovation in Romania, thus contributing to the development of sustainable food systems. At the scientific level, SAFIR exploits the synergy between plant secondary metabolites and postbiotics as a strategic combination designed to improve human health. SAFIR statement is to provide reliable answers for economy, environmental and societal problems, focusing on the development of food you can trust, by eco-functional uses of underutilized resources, in order to improve bioactive recycling. SAFIR is a

project engaged in designing easy to use and economically viable technologies, by using three key elements resulting from side streams (apple and grape pomace, whey and brewery spent grains) and the ability of probiotics to produce postbiotics. The project aims to produce different powders as alternative for synthetic additives, whereas two approaches will be used to reformulate food, by replacing meat and/or fat from meat products and wheat flour from bakery products.

Keywords: underutilized food resources, bioactive, postbiotics, microencapsulation, functional food

INVESTIGATION OF THE INHIBITORY POTENTIAL OF NADES
EXTRACT FROM *FETEASCĂ ALBĂ* WHITE GRAPE POMACE
ON POLYPHENOL OXIDASE FROM *IONATAN* APPLES

Silviu Măntăilă^{1*}, Nicoleta Balan¹, Adelina Ștefania Milea², Gabriela
Râpeanu¹, Nicoleta Stănciuc¹

¹Faculty of Food Science and Engineering, “Dunărea de Jos” University of Galati,
111 Domnească Street, RO-800201, Galati, Romania

²REXDAN Research Infrastructure, “Dunărea de Jos” University of Galati,
98 George Coșbuc Street, RO-800385, Galati, Romania

* Corresponding author: silviumantaila855@gmail.com

Abstract

Polyphenol oxidase (PPO) is a multifunctional copper-containing metalloenzyme, well known for its ability to oxidize phenols into quinones, a reaction that leads to melanin biosynthesis and enzymatic browning of fruits and vegetables.

This study aimed to evaluate the effectiveness of an extract obtained from white grape pomace (WGP) to inhibit the activity of apple PPO. The extract was obtained by applying green extraction practices, using a natural deep eutectic solvent (NaDES) composed of choline chloride, lactic acid (1:2 molar ratio), with the addition of 20% water, combined with ultrasound-assisted extraction (UAE). Based on the response surface methodology (RSM), using a central composite design (CCD), the optimal extraction conditions were established at 60°C for 30 minutes, with a solid-to-liquid ratio of 1:10 (g/v), resulting in a total polyphenol content (TPC) of 440.43 mg GAE/100 g DW and a total flavonoid content (TFC) of 13.72 mg QE/100 g DW.

The thermal inactivation kinetics of PPO, extracted from the *Ionatan* apple variety, was studied at temperatures ranging from 70 to 95°C and heat treatment times from 0 to 10 minutes. PPO exhibited high thermostability under these conditions. Thus, at 70°C for 10 minutes, the enzymatic activity (EA) was reduced to ~12.62%, while at 95°C, the reduction was only ~37.64%. In contrast, the addition of a concentration of 12.9 µg EQ/mL of WGP extract led to a 34.49% inhibition of EA, equivalent to a heat treatment at 95°C for 7.5 minutes. This inhibition can be explained by the interaction of the phenolic compounds in the extract with the copper atoms present in the active center of the PPO, an interaction that effectively inhibits melanin synthesis. The use of NaDES-based extract from WGP represents a sustainable and promising approach for developing natural inhibitors capable of preventing PPO-induced enzymatic browning while minimizing the processing of vegetable products.

Keywords: Polyphenol oxidase, NaDES, browning, polyphenol

Acknowledgment: This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P1-PCE-2023-0129, within PNCDI IV.

**STUDIES OF THE INHIBITORY ACTIVITY OF A NADES
EXTRACT FROM RED GRAPE POMACE ON ENZYMES
INVOLVED IN POSTPRANDIAL BLOOD GLUCOSE
REGULATION**

**Nicoleta Balan^{1*}, Silviu Măntăilă¹, Adelina Ștefania Milea², Iuliana Aprodu¹,
Gabriela Râpeanu¹, Nicoleta Stănciuc¹**

*¹Faculty of Food Science and Engineering, “Dunărea de Jos” University of Galati,
111 Domnească Street, RO-800201, Galati, Romania*

*²REXDAN Research Infrastructure, “Dunărea de Jos” University of Galati,
98 George Coșbuc Street, RO-800385, Galati, Romania*

* Corresponding author: Nicoleta.Balan@ugal.ro

Abstract

Diabetes mellitus is a chronic illness that is experiencing a significant increase in prevalence, primarily due to unhealthy dietary habits. This study aimed to evaluate the inhibitory potential of a natural deep eutectic solvent extract of red grape pomace (RGP-NaDES) on the activity of enzymes involved in postprandial blood glucose regulation: α -glucosidase and α -amylase.

Fluorescence quenching experiments were conducted to investigate the interaction between various concentrations of the extract ($0-1.32 \times 10^{-6}$ Mol/L) and the two enzymes, under different temperature conditions (20–55°C). The observed fluorescence spectra from the endogenous fluorophores present in the enzyme structures, tryptophan (Trp), tyrosine (Tyr), and phenylalanine (Phe), and their intensity were monitored in the presence of the extract.

Based on the Stern–Volmer equation, the number of binding sites (n) and the fluorescence quenching constant (K_q) were calculated for both enzymes. For α -glucosidase and α -amylase, the binding site number n was approximately equal to 1, suggesting a single binding site between the enzymes and the polyphenolic compounds in the RGP-NaDES extract.

The K_q value decreased as the temperature increased. For α -amylase, a value of 1.57×10^{12} Mol/L/s was recorded at 22°C, which decreased to 1.02×10^{12} Mol/L/s at 55°C. In the case of α -glucosidase, K_q was 1.32×10^{12} Mol/L/s at 22°C and dropped to 1.21×10^{12} Mol/L/s at 55°C, indicating that the quenching mechanism was static.

The RGP-NaDES extract induced fluorescence quenching in both enzymes, accompanied by a red shift of the emission maxima, reflecting changes in the tertiary and quaternary structure of the proteins. These structural alterations are likely due to

the binding of polyphenolic compounds to Trp and Tyr residues via hydrogen bonding and Van der Waals interactions.

The utilization of RGP-NaDES extract in the development of value-added functional food products targeting individuals with diabetes mellitus represents a promising approach, considering its ability to inhibit enzymatic activity.

Keywords: Polyphenols, NaDES, diabetes, fluorescence quenching

Acknowledgment: This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P1-PCE-2023-0129, within PNCDI IV.

INFLUENCE OF THE EXTRACTION METHODS ON THE ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES OF THE SAGE EXTRACTS

Leontina Grigore-Gurgu¹, Daniela Borda¹, Liliana Mihalcea¹, Loredana
Dumitraşcu¹, Iuliana Aprodu^{1*}

¹Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati,
Domneasca Street 111, 800201, Galati, Romania

*Corresponding author: iuliana.aprodu@ugal.ro

Abstract

Sage (*Salvia officinalis* L.) is an aromatic herb often used for preparing essential oils and various types of natural extracts with wide applications in food and pharmaceutical industries. Among the bioactive compounds from sage, polyphenolic compounds and terpenoids are particularly responsible for the antioxidant activity and antimicrobial properties. Therefore, it is highly desired to identify suitable extraction methods that allow concentrating most of these valuable compounds. The study aimed to compare the antioxidant activity, phytochemical profile, and antimicrobial properties of the sage extracts obtained through different methods. In this respect, different sage extracts were prepared through conventional extraction using 70% ethanol as solvent and supercritical CO₂ assisted extraction (S-CO₂-AE). Two fractionations were collected in the case of the S-CO₂-AE, with a total extraction yield lower than 1.6%. The samples prepared through conventional extraction presented a higher total phenolic content of 653 mg GAE/g d.w. compared to the S-CO₂-AE, out of which the total flavonoids represented up to 20%. The extracts prepared through conventional and S-CO₂-AE methods were particularly rich in epigallocatechin and respectively in borneol, α -campholenal, and longifolene. All sage extracts exerted no inhibition on *Escherichia coli*, but exhibited rather good growth inhibitory properties against *Listeria monocytogenes* Scott A and *Staphylococcus aureus*. The molecular docking investigations allowed partial elucidation of the inhibitory mechanisms of the major compounds from the sage on the activity of the enzymes essential for bacterial cell survival.

Keywords: sage, antioxidant activity, bioactive compounds, extraction methods

Acknowledgment: This work was supported by a grant from the Ministry of Research, Innovation and Digitization, CNCS/CCCDI-UEFISCDI, project number ERANET-M-3-SMARTGEL, within PNCDI IV.

**PHENOLIC COMPOUND PROFILING, PREBIOTIC POTENTIAL,
AND THERMAL DEGRADATION KINETICS OF PHYTIC ACID
IN TEFF (*Eragrostis tef*)**

Boyiza Samson Abebe*, Iuliana Aprodu, Daniela Ionela Istrati, Aida Mihaela Vasile, Mihaela Coterlet, Nicoleta Stănciuc, Camelia Vizireanu

*Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati,
47 Domnească Street, RO-800008, Galati, Romania*

*Corresponding author: samson.abebe@ugal.ro

Abstract

Teff (*Eragrostis tef*), a gluten-free cereal crop widely cultivated in Ethiopia, has significant potential as a functional food due to its rich profile of phenolic compounds and associated health benefits. This study aimed to: (i) characterize the phenolic composition of teff extracts using HPLC; (ii) evaluate their prebiotic activity through the viability of *Lactobacillus plantarum*; and (iii) assess the thermal degradation kinetics of phytic acid, an antinutritional factor.

HPLC profiling identified epigallocatechin (2960.30 µg/g) as the predominant flavonoid, followed by epicatechin (113.55 µg/g), hesperidin (163.64 µg/g), and ferulic acid (41.79 µg/g), among others. Prebiotic efficacy was demonstrated through sustained bacterial viability over 21 days of cold storage. The 5 mg/mL extract exhibited the strongest prebiotic effect, with *L. plantarum* counts decreasing from 4.72 ± 0.05 to 2.35 ± 0.05 log CFU/mL, compared to near-total loss in the control.

Thermal treatment of teff extracts at 50°C, 70°C, and 90°C revealed first-order degradation kinetics for phytic acid. The calculated activation energy (E_a) of 39.07 kJ/mol confirmed the process's temperature dependence and indicated effective phytic acid reduction through heat application.

In conclusion, teff demonstrates considerable promise as a functional ingredient, combining potent antioxidant and prebiotic properties with improved nutritional quality through controlled thermal processing. These findings support its application in health-promoting food systems and nutraceutical formulations.

Keywords: phenolic compound, prebiotic activity, *teff*, *plantarum*, phenolic

Acknowledgment: I would like to thank the technical support from the Integrated Center for Research, Expertise and Technological Transfer in Food Industry (https://www.bioaliment.ugal.ro/index_en.html).

OLOR STABILITY OF COOKED BEEF-PORK WIENERS WITH REDUCED NITRITE AND NATURAL ANTIOXIDANTS FROM SPENT ROSE PETAL EXTRACT

Nikolay, D. Kolev^{1*}, Desislava, B. Vlahova-Vangelova¹, Alexandar, S. Balabanov², Lubomir, Ondruska³, Francesco, Vizzarri³, Mihaela G. Ivanova²

¹*Department of Meat and Fish Technology, University of Food Technologies - Plovdiv, Maritza Blvd. 26, Plovdiv, Bulgaria*

²*Department of Milk Technology, University of Food Technologies - Plovdiv, Maritza Blvd. 26, Plovdiv, Bulgaria*

³*National Agricultural and Food Centre, Department of Nutrition and Small farm animals, Hlohovecká 2, Lužianky, Slovakia*

*Corresponding author: n_kolev@uft-plovdiv.bg

Abstract

Utilization of argo-wastes into value-added products as a part of the circular economy is a hot topic in recent years. The Balkans are famous for the rose oil from *Rosa damascena* Mill., but the industrial processing generates tons of by-products every year, threatening the ecosystem. The polyphenol-rich extract from the spent rose petals (FDRPE) was used as a natural antioxidant to maintain color stability in cooked beef-pork wieners with reduced nitrites. The pH, instrumental color (L^* , a^* , b^*), sensory profile, hydrolytic and oxidative changes in lipid fraction of four modifications of cooked beef-pork wieners were evaluated during 7-day cold storage, as follows – positive control (PC) no FDRPE and 100 mg NaNO₂/kg; negative control (NC) no FDRPE and 50 mg NaNO₂/kg; RE33 33 mg FDRPE/kg and 50 mg NaNO₂/kg; RE66 66 mg FDRPE/kg and 50 mg NaNO₂/kg. A significant ($P \leq 0.05$) modification $\times$ storage interaction was evaluated for pH, instrumental color (L^* , a^* , b^*), peroxide value (PV) and 2-thiobarbituric reactive substances (TBARS). The three samples with half reduced nitrite inclusion had significantly lower redness (a^*) compared to the PC. On the other hand, the weakest discoloration was observed in R66 during the 7-day cold storage. At the same time, wieners produced with 66 mg FDRPE/kg showed the smallest decrease in PV and an increase in TBARS. The incorporation of those tiny amounts of FDRPE doesn't compromise the sensory characteristics such as taste, smell, and texture. The lower scores for internal color were mainly due to the nitrite reduction more than to the FDRPE incorporation. The antimicrobial activity of the polyphenol contained in the FDRPE was not so prominent, yet at the end of cold storage, R33 and R66 exhibited a lower total plate count compared to both controls. Even though the reported strong antioxidant activity of FDRPE, the results confirm that the lower concentration –

RE33, wasn't able to inhibit the oxidative processes and discoloration, and compensated for the half reduction of nitrite as much as the higher dose – RE66.

Keywords: natural antioxidants; food safety; circular economy; polyphenols; meat processing

Acknowledgment: This research was funded by the Bulgarian National Science Fund for bilateral projects, grant number KP-06-Slovakia/7 from 13.08.2024 and APVV-SK-BG-23-0002 (grant 27A4-A-64039).

PUMPKIN SEED FLOUR: A VEGETABLE ALTERNATIVE WITH HIGH NUTRITIONAL VALUE

Daniela Paladi^{1*}, Nina Mija²

^{1,2} Faculty of Food Technology, Technical University of Moldova, 168 Stefan cel
Mare Blvd., Chisinau, Republic of Moldova

*Corresponding author: daniela.paladi@toap.utm.md

Abstract

This research has shown that pumpkin seeds are a valuable source of nutrients, with a high content of fat, protein, and fiber, especially in the shell. Due to their low moisture content (due to proper drying), they are sensitive to rehydration and oxidation, requiring strict storage conditions to prevent the development of microflora and lipid rancidity. In this context, the study aimed to demonstrate the possibility of obtaining a functional flour from pumpkin seeds by simple, accessible methods, using laboratory equipment. The chosen thermal treatment – drying at 130°C for 90 minutes – was essential for the evaporation of water without the degradation of heat-sensitive compounds, such as B-complex vitamins or natural antioxidants. Thus, a solid and crumbly paste was obtained, easy to grind, resulting in a flour with uniform granulation, microbiologically and nutritionally stable. The physicochemical analysis of the obtained product indicated a content of 7.5% moisture, 54% protein, 28% fat, 6.8% dietary fiber, and 5.2% ash, with a pH of 6.2. These parameters confirm the efficiency of the process and the preservation of the nutritional value of the seeds. The flour is rich in polyunsaturated fatty acids (linoleic and oleic) and essential amino acids such as lysine and tryptophan – compounds frequently absent in wheat flour. From a functional point of view, the flour has a good water absorption capacity (2.5–3 g/g) and fat retention capacity (over 1.8 g/g), which makes it suitable for use in bakery, biscuits, or baked goods. The texture is slightly compacted, with a specific adhesion of fatty flours, and the greenish-brown color and vegetal odor reflect the natural content of peel and aromatic compounds.

Keywords: functional flour, pumpkin seeds, thermal drying, nutritional value, physicochemical properties

Acknowledgment: The research was supported by the Institutional Project, subprogram 020405 “Optimizing food processing technologies in the context of the circular bioeconomy and climate change”, Bio-OpTehPAS, being implemented at the Technical University of Moldova.

ANCIENT VALUABLE CEREAL REVITALIZED THROUGH INNOVATION

Piea Guriță¹, Amalia Busuioc¹, Elena Bulgar², Nicu A. Damaschin¹, Alexandru Gheorghiu¹, Oana V. Nistor^{1*}, Gabriel D. Mocanu¹, Doina G. Andronoiu¹

¹Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati, Romania,

²Faculty of Economics and Business Administration, “Dunărea de Jos” University of Galati, Romania,

*Corresponding author: Oana.Nistor@ugal.ro

Abstract

Sorghum is the first cereal found on Earth, appearing as spontaneous flora back to 8000 B.C. and being domesticated by 4000 B.C. Known as a powerhouse of benefits: drought-tolerant and versatile whole-grain cereal, gluten-free, with an inexhaustible potential for manufacturing and significant carbohydrate-rich grain.

The purpose of the present study is to revitalize through innovation some of the opportunities of sorghum manufacturing and the obtaining of an innovative sweet product in three assortment ranges. By empowering the sustainable and eco-innovative character of the product, several by-products (molasses and powdered citrus peel) were used.

The obtaining process consists of 4 technological phases, namely: preliminary preparation, mixture preparation, product shaping, and glazing. As a major ingredient (42%), hulled sorghum was preliminary prepared (washed, soaked for 1 hour, and boiled (160°C/25 minutes)), the nuts (walnuts, almonds, or cashews) were roasted and grinded. The mixture composition contains: boiled sorghum, nuts, molasses, vanilla and rum extracts, and powdered orange and lemon peel. The samples were shaped into marbles of about 3.3 cm in diameter. Glazing involves the covering of marbles with dark chocolate and dressing the surface with pop-sorghum.

The sorghum marbles were characterized by the physico-chemical, phytochemical, textural, sensorial, and microbiological analysis.

As physico-chemical results and also nutrition facts reported to 100 g of product, the sorghum marbles contain: 28.51 g of fats, of which saturated 6.83 g, carbohydrates 41.35 g, of which sugars 14.62 g, 6.71g fibers, 9.52 g of proteins, and salts 0.01 g.

Shelf life, assured by microbiological analysis, revealed proper conditions for the sorghum marbles consumption of 7 days by respecting refrigeration temperatures (4-6°C).

In conclusion, this product aims to bridge the gap between tradition and today's health-conscious preferences.

Keywords: sorghum, gluten-free, sustainability, eco-innovation, by-products

Acknowledgment: The authors would like to extend their gratitude for the technical support to the Integrated Center for Research, Expertise and Technology Transfer in the Food Industry (BioAliment-TehnIA), Faculty of Food Science and Engineering, "Dunarea de Jos" University of Galati, Romania.

**CARROT BY-PRODUCTS VALORIZATION: OPPORTUNITIES
FOR INNOVATIVE AND VALUE-ADDED FOODS
DEVELOPMENT**

Florina-Genica Oncică^{1*}, Nicoleta Stănciuc¹, Iuliana Aprodu¹, Oana Constantin¹, Constantin Croitoru^{1,2}, Sergiu Erich Palcu³, Gabriela Râpeanu¹

¹*Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati, Domneasca Street, 111, RO-800201, Galati, Romania*

²*Academy of Agricultural and Forestry Sciences, 61 Marasti Blvd, Bucuresti, Romania*

³*Faculty of Food Engineering, Tourism and Environmental Protection, “Aurel Vlaicu” University of Arad, 2 Elena, Dragoi Street, RO-310330, Arad, Romania*

*Corresponding author: genicaoncica@gmail.com

Abstract

The growing emphasis on sustainable food production has underscored the necessity of more efficient utilization of agro-industrial by-products. Carrot by-products, such as peels and pomace, are abundant in dietary fibre, carotenoids, vitamins, and many bioactive components frequently discarded during juice extraction and processing. Carrot pomace is rich in dietary fibre, mostly insoluble fibre, which promotes digestive health and enhances satiety when added to food products. Besides fibre, pomace and peels are outstanding sources of carotenoids, including β -carotene, which functions as a provitamin A molecule with established antioxidant properties. They also comprise phenolic chemicals, vitamins (notably vitamins C and E), and important minerals such as potassium and calcium. These compounds impart antioxidant, anti-inflammatory, and possible chemoprotective characteristics, yielding health benefits such as enhancing immunological function, preserving cells from oxidative stress, and aiding in the prevention of chronic diseases.

This study investigates the possibilities of utilizing carrot by-products as functional ingredients in the creation of novel, value-added food products. Diverse processing methods, including drying, milling, and powdering, can convert these wastes into stable components appropriate for use in bakery items (muffins, macarons, fondant), roe salad, and dairy formulas (cheese). The nutritional profile of carrot by-products presents a substantial opportunity to improve fibre content, antioxidant properties, and natural colouration in food applications, catering to consumer preferences for clearer labels and healthier formulations. Sensory evaluations suggest that moderate inclusion levels can enhance product attractiveness while preserving favourable flavour and texture. Furthermore, the reintegration of carrot wastes into the food chain promotes waste reduction and adheres to circular economy principles. This

method enhances economic value to what is typically deemed waste while promoting resource efficiency and environmental sustainability. The valorisation of carrot by-products offers a pragmatic approach to creating functional foods with improved nutritional and sensory attributes, while also fostering sustainable food system practices.

Keywords: carrot by-products, dietary fiber, carotenoids, value-added foods, circular economy

Acknowledgment: Integrated Center for Research, Expertise and Technological Transfer In Food Industry: BioAliment – TehnIA (<http://www.bioaliment.ugal.ro>) is acknowledged for providing technical support.

DEVELOPMENT OF SUSTAINABLE FUNCTIONAL PASTRY PRODUCTS USING GRAPE SKIN POWDER AS A NATURAL ENRICHMENT INGREDIENT

**Eugenia Covaliov*, Tatiana Capcanari, Reșitca Vladislav,
Ruseva Olga**

*Faculty of Food Technology, Food and Nutrition Department,
Technical University of Moldova, 168 Stefan cel Mare blvd., Chisinau,
Republic of Moldova*

*Corresponding author: eugenia.covaliov@toap.utm.md

Abstract

The valorization of grape pomace, a significant by-product of winemaking, represents a key strategy in developing sustainable food systems aligned with circular economy principles. This study aimed to incorporate red grape skin powder (GSP), derived from the Moldovan varieties *Fetească Neagră* and *Rară Neagră*, into a classic sponge cake formulation, evaluating its impact on nutritional composition, physicochemical properties, antioxidant potential, and sensory acceptability. Four formulations were developed by substituting wheat flour with 2%, 4%, 6%, and 8% GSP. The enriched sponge cakes were analyzed for total polyphenol content (TPC), antioxidant activity (via DPPH assay), texture profile, color parameters, and hedonic sensory attributes. Results showed a dose-dependent increase in TPC, from 43.2 mg GAE/100g in the control to 178.6 mg GAE/100g in the 8% GSP sample, accompanied by a significant enhancement in antioxidant activity (from 15.8% to 62.4% radical inhibition). Color analysis revealed a progressive darkening and reddening of crumb color with increasing GSP levels, attributed to the presence of anthocyanins. Texture analysis indicated a moderate increase in hardness and a slight decrease in springiness in higher inclusion levels, without compromising the overall structure. Sensory evaluation (n=50 untrained panelists) highlighted that sponge cakes with 4% and 6% GSP reached the highest consumer acceptability scores, offering a good balance between taste, texture, and visual appeal. Formulations above 6% were less preferred due to a slightly earthy aftertaste and denser crumb structure.

Keywords: grape skin powder, sponge cake, circular economy, functional pastry, sustainable ingredients

Acknowledgment: We gratefully thank Agence Universitaire de la Francophonie that supports the International Project “Valorisation intelligente des résidus viti-vinicoles dans le contexte de l’économie circulaire”, running at Technical University of Moldova and to the World Federation of Scientists National Scholarship.

**VALORIZATION OF BIOACTIVE COMPOUNDS FROM
ALTERNATIVE PLANT SOURCES FOR THE DEVELOPMENT
OF FUNCTIONAL FERMENTED SNACK BARS**

Eugenia Covaliov*, Violina Popovici, Tatiana Capcanari, Oxana Radu

*Faculty of Food Technology, Food and Nutrition Department,
Technical University of Moldova, 168 Stefan cel Mare blvd., Chisinau,
Republic of Moldova*

*Corresponding author: eugenia.covaliov@toap.utm.md

Abstract

The global shortage of animal protein and the environmental pressures associated with its production have accelerated the demand for sustainable, plant-based alternatives. However, many legumes and pseudocereals contain antinutritional factors such as phytates and enzyme inhibitors that limit nutrient absorption. Fermentation has emerged as a powerful method to improve the nutritional quality of such ingredients by enhancing bioavailability and reducing antinutritional compounds.

This study investigates the use of *buckwheat* (*Fagopyrum esculentum*), *chickpeas* (*Cicer arietinum*), and *lentils* (*Lens culinaris*) as base materials for the formulation of fermented functional snack bars. Selected strains of *Lactobacillus spp.* and *Bacillus subtilis* were used to ferment the ingredients under optimized conditions (pH, temperature, time), aiming to increase antioxidant content, improve protein digestibility, and reduce undesirable compounds.

Comprehensive analyses were carried out before and after fermentation, including total polyphenols, antioxidant activity, protein and fiber content, as well as in vitro digestibility and bioaccessibility tests. The fermented ingredients were then incorporated into high-fiber, high-protein snack bar formulations. Sensory evaluation showed good consumer acceptability for prototypes with up to 30% fermented material. The results indicate that fermentation can significantly enhance the functional profile of plant-based snack ingredients, offering a viable route toward protein diversification and innovation in the health-oriented snack market. The developed bars are suitable for consumers seeking nutritious, clean-label, and sustainable food options.

Keywords: functional fermented snack bars, buckwheat, chickpeas, lentils, antinutritional factors

Acknowledgment: The research was supported by the Moldovan Government within the project of Young Researchers **BIO-FERM** - Valorization of bioactive compounds from alternative plant sources for the development of functional fermented foods, running at the Technical University of Moldova.

**SUSTAINABLE TECHNOLOGIES FOR GLUTEN-FREE
BREADMAKING USING HEMPSEED CAKE (*CANNABIS SATIVA*)**

**Tatiana Capcanari*, Eugenia Covaliov, Violina Popovici,
Cojocari Alexandrina, Cătălina Negoita**

*Faculty of Food Technology, Food and Nutrition Department,
Technical University of Moldova, 168 Stefan cel Mare blvd., Chisinau,
Republic of Moldova*

*Corresponding author: tatiana.capcanari@toap.utm.md

Abstract

Hempseed cake, a by-product of oil extraction from *Cannabis sativa L.* seeds, represents a valuable nutritional resource rich in complete proteins, dietary fiber, minerals, and bioactive compounds such as cannabins. Previously confined to animal feed, its conversion into defatted flour has opened new opportunities in the development of functional foods. This study explores the integration of hempseed cake into gluten-free bread formulations as a sustainable and nutritious alternative aligned with contemporary dietary trends.

The research addresses both the nutritional benefits and technological challenges of using hempseed cake in bakery products. While its inclusion enhances the protein content, antioxidant capacity, and fiber levels of gluten-free bread, it also impacts physical properties—particularly crumb structure, density, and firmness. Technological adjustments, including the use of sourdough fermentation, hydrocolloids, and starch blends, were applied to improve dough rheology and product acceptability. Experimental procedures included proximate composition analysis (moisture, dry matter, acidity, pH), textural profiling (hardness, chewiness, elasticity), colorimetric evaluation (L^* , a^* , b^* , ΔE), porosity and volume measurements, and sensory analysis (crust and crumb appearance, aroma, taste, and overall acceptance). Comparative tests revealed that breads containing hempseed cake, while denser and darker, were still rated favorably by sensory panelists. In addition, the study evaluated alternative gluten-free flours and starches (rice, oat, buckwheat, potato, tapioca) and emphasized the role of hydrocolloids (xanthan gum, guar) in improving moisture retention and crumb cohesion. The fermentation process was optimized using autolysis, folding techniques, and cold proofing, followed by baking at 227°C for 45 minutes.

Keywords: hempseed cake, gluten-free bread, sustainable bakery, functional ingredients, agro-industrial by-products

Acknowledgment: The research was supported by the Moldovan Government within the State project of Young Researchers no. 24.80012.5107.06TC “Waste sustainable utilization from the oil industry” running at the Technical University of Moldova.

**DEVELOPMENT AND CHARACTERIZATION OF A
KOMBUCHA-TYPE FERMENTED BEVERAGE BASED ON
APPLE AND QUINCE**

**Eugenia Covaliov*, Tatiana Capcanari, Violina Popovici, Oxana Radu,
Natalia Suhodol, Deseatnicova Olga**

*Faculty of Food Technology, Food and Nutrition Department,
Technical University of Moldova, 168 Stefan cel Mare blvd., Chisinau,
Republic of Moldova*

*Corresponding author: eugenia.covaliov@toap.utm.md

Abstract

In response to the growing consumer interest in functional fermented products made from natural ingredients, this study focused on the development of a kombucha-type beverage obtained by fermenting sweetened apple and quince extracts with a symbiotic culture of bacteria and yeasts (SCOBY). The fermentation was monitored over 14 days, and the resulting beverages were analyzed in terms of physicochemical composition, antioxidant activity, and organic acid content.

Throughout fermentation, pH values decreased from 3.56 (apple) and 3.42 (quince) to 3.16 and 3.10, respectively. Titratable acidity increased significantly, from 2.34 g/L to 5.28 g/L for the apple-based beverage and from 3.01 g/L to 5.94 g/L for the quince-based variant. Total polyphenol content increased from 58.3 to 112.6 mg GAE/100 mL (apple) and from 73.2 to 138.9 mg GAE/100 mL (quince). Antioxidant activity, assessed by the DPPH method, rose from 31.4% to 61.7% (apple) and from 39.1% to 68.2% (quince). HPLC analysis identified acetic, gluconic, and glucuronic acids, with higher final concentrations in the beverage fermented with quince: 1.28 g/L (acetic), 0.96 g/L (gluconic), and 0.65 g/L (glucuronic).

The data confirms that both apple and quince are suitable plant-based substrates for the development of naturally fermented beverages with enhanced antioxidant potential and functional properties. The formulation supports diversification of kombucha beyond traditional tea infusions, using locally available fruits.

Keywords: kombucha, apple, quince, fermentation, polyphenols, antioxidant activity

Acknowledgment: The research was supported by the Institutional Project, subprogram 020405 "Optimizing food processing technologies in the context of the circular bioeconomy and climate change", Bio-OpTehPAS, being implemented at the Technical University of Moldova.

**BIOPOLYMERIC PACKAGING SOLUTIONS BASED ON THYME
ESSENTIAL OIL FOR MUSHROOMS SHELF-LIFE EXTENSION****Mirela Crăciunescu¹, Iulia Bleoancă¹, Loredana Dumitrașcu¹,
Corina Neagu¹, Felicia Stan², Catalin Fetecău², Daniela Borda¹**

¹*Faculty of Food Science and Engineering, Bioaliment TehnIA Food Research
Center, “Dunarea de Jos” University of Galati, 111 Domnească Street, Galați,
Romania,*

²*Faculty of Engineering, Center of Excellence Polymer Processing, “Dunarea de
Jos” University of Galati, 111 Domnească Street, Galați, Romania,*

*Corresponding author: mirela.craciunescu@ugal.ro

Abstract

The complexity of modern food packaging solutions requires a balanced approach to food safety, food quality, and sustainability, considering the intricate food-package-environment interactions. The newly developed active composite packaging materials from biopolymers should be harmless to the environment and able to enhance the microbial and/or oxidative stability of perishable foods such as mushrooms.

The objective of this study is to develop a new biopolymer composite packaging material covered with coaxial electrospun polylactic acid (PLA) fiber mat loaded with thyme essential oil. Tests were performed to evaluate the shelf-life extension of mushrooms using the bioactive films placed inside the trays used for storage at 4-6°C.

Firstly, a film was developed from a 3.5% w/v whey protein isolate suspension thermally denatured and 1.5% w/v chitosan solubilized in 1% v/v acetic acid, under constant magnetic stirring (350-500 rpm) at 50-60°C/4 h. Furthermore, 2% glycerol and 2% Tween 80 were added and sonicated for 2 min at 30% amplitude and 40°C.

Polylactic acid (PLA) fibers resulting from coaxial electrospinning with thyme essential oil (TEO) were deposited onto the whey/chitosan film (WHY/CH) surface. A 2-syringe electrospinning system with a coaxial spinneret (19-gauge internal diameter needle and 14-gauge external diameter needle) was used. The operating conditions were set at 20 kV, with a shell flow rate of 1.6 mL/h (PLA solution), a core flow rate of 0.6 mL/h (TEO emulsion) and a collecting distance of 15 cm. Electrospinning was carried out on a rotating drum of 50 rpm for 1.5 h, resulting in a fiber mat covering the WHY/CH film.

The active bilayer composite films' potential had a significant ($p < 0.05$) antimicrobial effect against *Staphylococcus aureus*, total aerobic mesophilic bacteria, and coliforms at 4°C.

The preliminary results showed that weight loss, color changes, and microbial load of the mushrooms placed in trays with bilayer composite films are promising and suggest the possibility to extend the shelf-life of mushrooms, a highly perishable food.

Keywords: biopolymeric packaging, TEO, mushrooms, storage

Acknowledgment: The authors thank BioAliment TehnIA and the Center of Excellence in Polymer Processing (CE-PP) Research Centers for the infrastructure provided

RED CABBAGE POMACE AS A SUSTAINABLE SOURCE FOR BLUE COLORANTS USED AS NATURAL DYES IN TEXTILE

Mariana Dulman (Done)¹, Liliana Mihalcea^{1*}, Angela Dănilă²

¹*Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati,
47 Domnească Street, Galați, Romania*

²*Faculty of Industrial Design and Business Management, “Gheorghe Asachi”
Technical University of Iași, 29 Prof. Dr. Doc. Dimitrie Mangeron Street, Iași,
Romania*

*Corresponding author: lgitin@ugal.ro

Abstract

Natural dyes have applications in the food industry, where they are used in the development of natural and functional food ingredients. They are also employed in the textile industry for fabric coloring. In addition, the packaging industry capitalizes on their chromaticity as a way to promote products. Considering the low-cost price of red cabbage and the good pomace yield (43.08%), it can be stated that this natural source can be a viable source for obtaining dyes with applications in the textile industry. The dyes were obtained by conventional extraction with water at 60°C (E60) and 80°C (E80), respectively, extraction time of 60 minutes and a S:L ratio = 1:3. The blue dyes were obtained by changing the pH to 7.9. The obtained natural aqueous extracts showed negative values for the b^* parameter, and the a^* values were low, specific to the blue shade. The discontinuous dyeing process of three types of fabrics, cotton (C), linen (L) and wool (W), was carried out in water at 80°C for 90 minutes with $H_m = 40:1$. The dyed cotton presented the lowest values of the lightness parameter L^* indicating dark colors ($L^*=59.75\pm0.83$ for C_E60, respectively

$L^*=53.52\pm0.58$ for C_E80), and the negative values of the chromatic parameter b^* indicate fabrics with blue shades ($b^*=-10.38\pm0.22$ for C_E60 and $b^*=-13.15\pm0.05$ for C_E80). The highest values for the color difference ΔE were calculated for the samples dyed with the blue extract ($\Delta E=37.72\pm0.84$ for C_E60, respectively $\Delta E=39.33\pm0.53$ for C_E80), which indicates a good dyeing of the cotton fabric in blue colors. The linen fabric presented the lowest brightness values, negative b^* value and the highest color difference value ($\Delta E=39.90$). The color parameter b^* was negative, indicating the blue color of the wool with the highest intensity obtained with the extract E80. The analysis of the relative unevenness indices indicated the lowest values ($RUI=0.2$), so good color uniformity for samples C_60 and L_E60. All textiles showed good resistance to friction and light, and all the obtained scores were 4 or 5.

The dyed textiles were used to make the badges as visual identity elements to promote the name of the faculty.



L_E60

Keywords: red cabbage, pomace, blue colorants

Acknowledgment: Thanks for the collaboration with the members of the Integrated Center for Research, Expertise and Technology Transfer in the Food Industry (Bioaliment – TehnIA).

**EFFECT OF GRIT FROM RED GRAPE POMACE ON MINERAL,
PHENOLIC, CHLOROPHYLL, AND CAROTENOID
CONCENTRATION OF WHEATGRASS JUICE**

**Leontina Grigore-Gurgu¹, Bogdan Păcularu-Burada², George-Mădălin
Dănilă³, Liliana Mihalcea^{1*}**

¹*Faculty of Food Science and Engineering, “Dunarea de Jos” University of
Galati, 47 Domnească Street, Galati, Romania*

²*Food Research Institute ICA RD, Independence Splai 202, București 060021,
Romania*

³*Cromatec Plus SRL, Research Center for Instrumental Analysis SCIENT,
Petre Ispirescu Street 1, Tâncăbești, Ilfov, 077176, Romania*

*Corresponding author: lgitin@ugal.ro

Abstract

Wheat (*Triticum aestivum* L.) is the widely cultivated staple food crop for the majority of the world's population. Different growing conditions (type of soil, soil with nutrients, tap water with nutrients, or fertilizer) are factors of influence on wheatgrass growing and juice properties. The purpose of the present research was to investigate the effect of grit from red grape pomace on mineral, chlorophyll, phenolic, and carotenoid concentration of wheatgrass juice. The analyses of the grit from red grape pomace indicated 9.68 ± 0.33 mg/g linoleic acid and 1.67 ± 0.05 mg/g oleic acid, respectively. The concentration of heavy metals was undetectable or below the minimum detection limits. The main minerals identified in the grit from red grape pomace were Fe, Mn, Ca, K, and Mg. Germinated wheat grains (wheat seed buds with dimensions of 1.5 -2 mm) were planted in two soils (CE Chiscani and CE Polizești from the SE of Romania) enriched with grit from red grape pomace (2% and 5%, respectively). In the CE Polizești alluviosol samples, the addition of grit from red grape pomace determined the increase in the amount of juice compared to the control sample. In the CE Chiscani chernozem soil, the addition of 2% grit from red grape pomace improved the degree of wheat development by 1.38%, and the addition of 5% by only 0.97%. In the CE Polizești soil, the addition improved the phytochemical properties of the juice obtained from wheatgrass. Thus, the maximum chlorophyll concentration of 2.31 ± 0.07 mg/g was obtained for the juice obtained from the grass grown on the CE Chiscani soils with the addition of 2% grit from red grape pomace. However, the maximum flavonoid concentration of 2.29 ± 0.05 mg EC/g and total carotenoids of 185.80 ± 1.2 µg/g was obtained from the

plants grown on the CE Polizești soil. All juice samples showed high concentrations of Ca and K.

Keywords: red grape groats, wheatgrass juice, bioactive compounds

Acknowledgment: The authors are grateful for the financial support offered by the POC 2014–2020 program through the SINOVEG project, cod SMIS 119659, contract no. 326/390002/31.10.2020.

Thanks for the collaboration with the members of the Integrated Center for Research, Expertise and Technology Transfer in the Food Industry (Bioaliment – TehnIA).

INNOVATIVE APPROACHES IN UTILIZATION OF PUMPKIN BY-PRODUCTS FOR VALUE-ADDED FOOD DEVELOPMENT

Roxana Nicoleta Gavril (Rațu)^{1,2*}, Florina Stoica³, Nicoleta Stănciuc¹, Iuliana Aprodu¹, Oana Constantin¹, Claudia Mureșan⁴, Gabriela Râpeanu¹

¹*Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati, Domnească Street, 111, RO-800201, Galati, Romania*

²*Faculty of Agriculture, Department of Food Technologies, “Ion Ionescu de la Brad” Iasi University of Life Sciences, 3, Mihail Sadoveanu Alley, 700489 Iasi, Romania*

³*Faculty of Agriculture, Department of Pedotechnics, “Ion Ionescu de la Brad” Iasi University of Life Sciences, 3, Mihail Sadoveanu Alley, 700489 Iasi, Romania*

⁴*Faculty of Food Engineering, Tourism and Environmental Protection, “Aurel Vlaicu” University of Arad 2 Elena, Dragoi Street, RO-310330, Arad, Romania*

*Corresponding author: roxana.ratu@iuls.ro

Abstract

The increasing focus on sustainable food production has heightened interest in the valorization of agricultural by-products. Among these, pumpkin (*Cucurbita* spp.) by-products, including peels and pulp residues, are underutilized resources with considerable nutritional and functional potential. They are abundant in dietary fiber, high-quality plant proteins, vital fatty acids, vitamins (including vitamin E), carotenoids such as beta-carotene, and bioactive phenolic compounds with antioxidant and anti-inflammatory characteristics. Incorporating pumpkin by-products into food items can boost nutritional profiles, augment fiber consumption, and improve antioxidant capacity, while also promoting waste reduction and sustainable food production techniques.

This study investigates novel approaches for integrating pumpkin by-products into value-added food items, with the objective of improving nutritional and sensorial quality and supporting circular economy frameworks. Multiple processing techniques, such as drying, milling, and extraction, were utilized to produce pumpkin by-product powders, dietary fiber, and bioactive-rich powders. The resultant constituents were assessed for their proximate composition, antioxidant activity, and functional qualities, revealing elevated quantities of proteins, fibers, carotenoids, and phenolic substances. Trials in baking (muffins and cakes) and dairy matrices (yogurts and cheese) showed that supplementations with pumpkin by-products increased fiber content, augmented antioxidant capacity, and imparted favourable sensory characteristics without diminishing consumer appeal. Pumpkin by-product powders can enhance sensory attributes, imparting nuanced flavours, attractive

colour hues from carotenoid pigments, and better texture when adequately processed. Research suggests that moderate incorporation of pumpkin-derived components might sustain or improve consumer acceptability, providing a balance between health advantages and taste appeal. These findings underscore the potential of pumpkin by-products as valuable components for the production of functional foods and advocate for the sustainable use of horticulture waste streams.

Keywords: pumpkin by-products; functional ingredients; dietary fiber; antioxidants; value-added foods

Acknowledgment: Integrated Center for Research, Expertise and Technological Transfer In Food Industry: BioAliment – TehnIA (<http://www.bioaliment.ugal.ro>) is acknowledged for providing technical support.

**A SURVEY REVEALING ROMANIAN TEENS’
KNOWLEDGE, ATTITUDES, AND PRACTICES ON FOOD
PACKAGING**

Iulia Bleoancă¹, Loredana Dumitraşcu¹, Daniela Borda^{1*}

¹*Faculty of Food Science and Engineering, Bioaliment-TehnIA Research Platform,
“Dunarea de Jos” University of Galati, 800201 Galati, Romania*

* Corresponding author: Daniela.Borda@ugal.ro

Abstract

The rising awareness of environmental problems and interest in achieving Sustainable Development Goals reshaped the worldwide food packaging industry over the last decade. Sustainable food packaging solutions proposed in the last decades generally focused either on sourcing raw packaging materials (e.g., recycled, biopolymers) coupled with green technologies for the food packaging process (e.g., energy efficient, using renewable energy sources) or closed loops for waste management and recycling. Consumers’ opinion on sustainable packaging solutions, both those currently available on the market, and those in development for the near future, are essential for fostering responsible consumer behavior. This is particularly important among young people, as they will be the ones involved in shaping future consumption trends. In Eastern Europe, there are limited studies available on consumers’ awareness and behavior towards sustainable packaging practices. This study fills this gap by assessing Romanian teenagers’ knowledge, attitudes, and practices (KAP) on sustainable food packaging solutions. Using a 17-item survey, this research evaluates their understanding of sustainability concepts as the European Green Deal, attitudes on environmental protection through food packaging choices, and other factors influencing their choices on sustainable packaging. A pretest of the survey performed on 41 respondents indicated a very high internal consistency of the survey’s items, with Cronbach’s Alpha coefficient of 0.905. A sample of 514 teenagers aged 14-18 from three eastern counties of Romania, Galaţi, Brăila, and Focşani participated in the survey.

The findings of the current study correlate Romanian teenagers’ level of knowledge on sustainable food packaging with the extent of their attitudes translated into purchasing practices or disposal behaviors. Based on the conclusions of the study, tailored educational interventions will be formulated to promote sustainable packaging in Romania.

Keywords: sustainable packaging, teenagers, consumer study, KAP model

Acknowledgement: The authors acknowledge support of *European Excellence in Dairy Learning* (AEDIL-dairy-CoVE), 101055548 — ERASMUS-EDU-2021-PEX-CoVE. and the project *Sustainable strategies for developing functional dairy products based on new technologies, bioactive compounds, and active packaging*, grant no. – SDG4Dairy 7952/31.03.202

FORMULATION AND FUNCTIONAL CHARACTERIZATION OF A FERMENTED WHEY BEVERAGE ENRICHED WITH BITTER CHERRIES

Iulia Gluga¹, Corina Neagu¹, Loredana Dumitraşcu¹, Iulia Bleoanca¹,
Daniela Borda^{1*}

¹Faculty of Food Science and Engineering, Bioaliment-TehnIA Research Platform,
“Dunarea de Jos” University of Galati, 800201 Galati, Romania

*Corresponding Author: Daniela.Borda@ugal.ro

Abstract

In line with the Sustainable Development Goal 12, promoting food responsible consumption and production, this study explores the valorisation of sweet whey - a by-product from cheese production - by the development of a functional fermented beverage, contributing to circular economy practices.

The research focuses on the formulation and characterization of a fermented drink based on sweet whey and bitter cherries. Pre-tests were conducted using two microbial cultures: one containing *Lactiplantibacillus plantarum* (Bactoferm Vege-Start 60, Christian Hansen), and the other a kefir culture comprising *Kluyveromyces marxianus* ssp. *marxianus*, *Lactococcus lactis* ssp. *cremoris*, *Lactococcus lactis* ssp. *diacetylactis*, *Leuconostoc mesenteroides* ssp. *cremoris*, and *Lactobacillus acidophilus* La-5. Sensory evaluation by a panel of 10 trained members identified the kefir-based beverage as the most pleasant one. The selected kefir beverage was subsequently produced with three concentrations of sucrose (1%, 3%, and 5%) and three concentrations of cherries 10%, 15%, and 25%. Lactic acid fermentation kinetics were monitored alongside analyses including GC-MS volatile compound profiling, total polyphenol content, dry matter, refractive index, colorimetric properties, and microbiological assessments (*Enterobacteriaceae* and mold counts). The sample with 25% of cherries displayed the highest antiradical activity given by the polyphenols present in bitter cherries. The fingerprint resulting from gas-chromatography indicated the presence of alcohols, ketones, and aldehydes. This was also identified in the scientific literature that contributed to the overall flavor and acceptability of the product. The sensory analysis showed that 25% of cherries and 3% sucrose was not only very appreciated by panelists but also demonstrated good prospects to deliver to consumers healthy alternatives to current beverages.

Keywords: circular economy, whey valorization, bitter cherries, antioxidant, beverage

Acknowledgment: The authors acknowledge support of the project Sustainable strategies for developing functional dairy products based on new technologies, bioactive compounds, and active packaging, grant no. – SDG4Dairy 7952/31.03.2025

FUNCTIONAL CHARACTERIZATION OF ARONIA JUICE FERMENTED WITH PROBIOTIC LACTIC ACID BACTERIA

Corina Neagu^{1*}, Anna Busuioc²

¹*Faculty of Food Science and Engineering, Bioaliment-TehnIA Research Platform,
“Dunarea de Jos” University of Galati, 800201 Galati, Romania*

²*Faculty of Sciences and Environment, “Dunarea de Jos” University of Galati,
800201 Galati, Romania*

*Corresponding author: corina.neagu@ugal.ro

Abstract

Aronia juice is rich in polyphenols and anthocyanins, compounds known for their antioxidant and potential antidiabetic properties. In this study, the aronia juice was fermented with lactic acid bacteria (*Lactobacillus casei*), resulting in improved functional characteristics.

After fermentation, a significant increase in total polyphenols and flavonoid content was observed, along with enhanced antioxidant activity. Moreover, the fermented juice exhibited stronger inhibitory effects on α -amylase enzyme involved in carbohydrate digestion, suggesting a higher antidiabetic potential compared to non-fermented juice. These improvements are likely due to the breakdown of complex phenolic compounds into more bioavailable and bioactive forms during fermentation.

Overall, the fermentation process not only reduced the astringency and improved the sensory properties of aronia juice, but also enhanced its biological activity (*Table 1*).

Table 1 Comparison of bioactive compounds content and α -amylase inhibitory activity in fermented and non-fermented aronia Juice

Sample	Total polyphenols content ($\mu\text{g GAEq/mL}$)	Total flavonoid content ($\mu\text{g QEq/mL}$)	Condensed tannins, ($\mu\text{g CEq/g}$)	α -Amylase inhibition, (% Inhibition)
Non fermented aronia juice	64.99	35.58	1.03	28.37
Fermented aronia juice	90.01	91.82	0.07	72.36

These findings support the use of lactic fermentation as an effective strategy to develop functional beverages with potential benefits in glycemic control and metabolic health.

Keywords: aronia, fermentation, bio accessibility, antidiabetic properties

HALOPHYTES AS ALTERNATIVE BIORESOURCES: POTENTIAL APPLICATIONS IN FOOD AND FEED

Nicoleta-Olimpia Andrei^{1,2*}, Amalia Carmen Mitelut¹

¹ Faculty of Biotechnologies, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, 011464, Bucharest, Romania

² National Institute of Research and Development for Biological Sciences, 296 Splaiul Independentei, District 6, 060031, Bucharest, Romania

*Corresponding author: nicoleta.andrei@incdsb.ro

Abstract

Halophytes, plants adapted to saline environments, offer a promising sustainable alternative for food and feed production, particularly in arid and coastal regions where freshwater and arable land are scarce. These species are notably rich in bioactive compounds, including antioxidants, essential fatty acids, and amino acids. Historically, various halophytes have been utilized as herbs, vegetables, animal feed, and fodder. Consequently, halophytes are increasingly recognized as a viable alternative for addressing critical global challenges such as food security, freshwater scarcity, soil salinization, and the diversification of diets to promote improved nutritional health. The nutritional composition of halophytes can vary significantly between species and even within the same species, depending on environmental conditions.

Many halophytes, like *Atriplex* species, are rich in protein and can be used as a protein complement in animal feed. They have edible leaves and seeds that can be incorporated into salads, cooked dishes, or used as ingredients in various food products. Some halophytes, such as *Salsola* species, can be used as salt substitutes due to their naturally salty taste. Halophytes like *Salicornia* are increasingly recognized as gourmet vegetables and are used in salads or pickling. Halophytes can be processed into flour and used in various food applications, potentially enhancing the nutritional value of products like energy bars or crackers.

Although the potential of halophytes as sustainable sources of nutritional compounds is well supported by the literature, their successful integration into the food and feed sectors will depend on economic viability, land availability, and consumer acceptance.

Keywords: halophytes, bioresources, nutrition, food security, fodder

Acknowledgment: This work was carried out with the support of Ministry of Research, Innovation, and Digitization and financed from the Core Program (project 7N/23-02-0101/2023)

FT-IR CHARACTERIZATION OF HEMP ENRICHED MUFFINS

**Cătălina, -B. Poteraş^{1,2}, Andreea, -L. Mocanu^{1,2*}, Corina, -A. Stroe^{1,2}, Elena, -
L. Ungureanu¹, Gabriel, Mustăţea¹**

¹ *National Research and Development Institute for Food Bioresources, 5 Ancuţa
Băneasa Street, District 2, 020323, Bucharest, Romania,*

² *National University of Science and Technology Politehnica Bucharest, 313
Splaiul Independenţei, District 6, 060042, Bucharest, Romania*

*Corresponding author: andreea.mocanul@yahoo.com

Abstract

This study investigates the structural changes in muffins resulting from the incorporation of hemp flour (HF) as a functional ingredient, using Fourier Transform Infrared (FT-IR) spectroscopy as a rapid and non-destructive analytical method. Muffins were prepared using two types of base flour – refined wheat flour (WF) and whole wheat flour (WWF) – and enriched with HF at concentrations ranging from 5% to 20%. Each formulation was compared to a control sample to assess how the progressive substitution of traditional flour with HF affects the chemical structure of the final product.

FT-IR spectra revealed characteristic absorption bands associated with key molecular groups found in food matrices. Broad peaks around 3300 cm⁻¹ were attributed to O–H stretching vibrations, commonly linked to water and polysaccharides, while bands near 2920 cm⁻¹ corresponded to C–H stretching. A distinct peak around 1740 cm⁻¹ indicated C=O stretching, typically associated with lipids or esterified compounds. The fingerprint region (1200–1000 cm⁻¹), rich in information on polysaccharides and complex carbohydrates, showed increased intensity in both WF and WWF muffin samples with rising HF content – suggesting higher levels of fiber and complex carbohydrate structures contributed by the hemp flour. Notably, WWF-based muffins exhibited more pronounced spectral changes in the 1700–1600 cm⁻¹ region. These shifts and peak broadenings may indicate enhanced interactions between phenolic compounds and proteins, or structural alterations due to bioactive plant metabolites naturally present in whole grains and hemp.

Overall, the study confirms that FT-IR spectroscopy is an effective technique for monitoring molecular-level transformations in functional bakery products. The results highlight hemp flour's potential as a nutrient-rich, plant-based ingredient that supports the development of innovative, fiber-enriched baked goods.

Keywords: muffins, hemp flour, FT-IR functional bakery product

**FUNCTIONAL APPLICATION OF FAT-SOLUBLE SEA
BUCKTHORN EXTRACT IN COOKED-SMOKED POULTRY
FILLET**

Natalia Netreba*, Irina Dianu, Iuliana Sandu

*Faculty of Food Technology, Technical University of Moldova, 168, Stefan cel
Mare Bd., MD-2004, Chisinau, Republic of Moldova*

*Corresponding author: natalia.netreba@tpa.utm.md

Abstract

Sea buckthorn (*Hippophae rhamnoides* L.) pomace retains significant concentrations of lipophilic bioactives, including carotenoids, tocopherols, phytosterols, and unsaturated fatty acids. This study aimed to valorize this material through oil and ethanol-based extraction and incorporate the resulting fat-soluble extract into cooked-smoked poultry fillets to improve their functional and technological properties.

In treatment groups, the extract was blended with sunflower oil at concentrations of 15%, 30%, 45%, and 100% extract. These mixtures were injected into chicken breast fillets before vacuum tumbling and thermal processing. The resulting products were analyzed over 15 days of refrigerated storage. Physicochemical results showed a concentration-dependent reduction in lipid oxidation. Color parameters (L*, a*, b*) exhibited significant enhancement attributable to the presence of carotenoids in the extract. The pH values remained stable throughout storage, suggesting the absence of any pro-oxidant activity induced by the treatment. Microbiological analysis revealed a slight reduction in total viable counts and suppression of psychrotrophic spoilage bacteria. Sensory analysis indicated that the samples with 15-30% extract achieved the highest scores in appearance, flavor, and texture, with no off-flavors detected.

The incorporation of the fat-soluble sea buckthorn extract into cooked-smoked poultry fillets resulted in a significant enhancement of oxidative stability, improved color, and increased sensory appeal, without compromising microbiological safety. An inclusion level of 15-30% (relative to the oil phase) was identified as optimal for balancing technological functionality and sensory acceptability. These findings highlight the potential of upcycled sea buckthorn extract as a multifunctional, clean-label ingredient in meat product formulation, consistent with sustainable processing principles and aligned with current trends in the circular economy and functional food development.

Keywords: antioxidants, by-products, extraction, meat technology, shelf-life

Acknowledgments: The research was supported by the Institutional Project, subprogram 020405 “Optimizing food processing technologies in the context of the circular bioeconomy and climate change”, Bio-OpTehPAS, being implemented at the Technical University of Moldova.

EXTRACTION STRATEGIES FOR PROTEIN CONCENTRATION FROM OILSEED CAKES

Oxana Radu^{1*}, Tatiana Capcanari¹, Alina Boistean¹, Eugenia Covaliov¹

¹*Faculty of Food Technology, Technical University of Moldova,
168 Stefan cel Mare Street, Chisinau, Republic of Moldova*

*Corresponding author: oxana.radu@sa.utm.md

Abstract

The growing demand for high-quality alternative proteins constitutes a key challenge in the development of sustainable and resilient food systems. Oilseed cakes, by-products of the fat and oil industry, represent a promising but often overlooked source of plant protein. These materials, which are usually used as animal feed or thrown away, can contain up to 50% protein after mechanical pressing. Their further valorization, in terms of plant-based protein concentration, is complicated by the presence of residual fats (approximately 15–17%), complex carbohydrates, and various non-protein components.

To address these challenges, a comparative study was carried out to evaluate protein concentration methods adapted to the physicochemical properties of various oilseed cakes (pumpkin, almond, etc). Based on the analysis of sample composition, several extraction techniques were selected and tested in order to maximize protein recovery and improve its functional properties.

Specifically, the study evaluated three extraction strategies using salt solutions, alkaline treatment, and an enzyme complex based on papain. Enzymatic extraction is preferable when bioactivity, gentle processing, or allergen reduction is desired, and is particularly effective with non-defatted oilseed cakes due to the synergistic action of lipases and proteases. In contrast, alkaline extraction is suited for bulk protein isolate production with enhanced functional properties such as gelling and foaming. The salt-assisted enzymatic method proved most effective, balancing high yield and protein quality.

These findings confirm that oilseed cakes can serve as valuable raw materials for protein extraction and emphasize the importance of advanced extraction technologies for sustainable food innovation.

Keywords: plant-based proteins, press cake, enzymatic extraction, sustainable food systems

Acknowledgment: The research was supported by the Project 23.70105.5107.06T “Valorization of vegetable proteins from secondary products of the local fat and oil industry”, being implemented at the Technical University of Moldova.

**EFFECTS OF PROPIONIC AND PROBIOTIC ADJUNCT
CULTURES ON THE QUALITY CHARACTERISTICS OF OVINE
GRAVIERA CHEESE MANUFACTURED ON INDUSTRIAL
SCALE**

**Lambros Sakkas¹, Argiro Eleftheriou², Eleni Nastou², Evangelia Zoidou¹,
Golfo Moatsou¹, Theofilos Massouras¹, Ekaterini Moschopoulou^{1*}**

¹*Department of Food Science & Human Nutrition and* ²*Department of Animal
Science, Agricultural University of Athens, Iera Odos 75, 11855, Athens, Greece*

*Corresponding author: catmos@aua.gr

Abstract

Greek Graviera, a Gruyere type cheese, is traditionally made without propionic acid bacteria (PAB). The aim of this research was to manufacture a new type of Graviera cheese from ovine milk with the addition of PAB and probiotic bacteria.

Three different types of cheese were made in triplicate in a cooperative cheese plant in the Boio-Kozani region of northern Greece. Cheese A (control cheese) was made according to the cheesemaking protocol of the cheese plant using only lactic acid bacteria (LAB) culture, cheese B was made with LAB and PAB culture, and cheese C was made with LAB, PAB, and *Lb. acidophilus* - *B. lactis* cultures. During the curd scalding of cheese B and C, the whey was partially substituted by water, while all cheeses were salted in brine for one day. First stage of ripening took place at 18°C for 30 days, including surface dry salting. Then, all cheeses were vacuum packed and transferred at 4°C for 2 months to complete ripening. Analyses for chemical composition, microbial counts, texture, and sensory characteristics were performed until 100 days of ripening. Results showed that at 100 days, the pH of control cheese A was significantly ($P < 0.05$) lower than in cheeses B and C, but no significant ($P > 0.05$) differences were found regarding their fat, protein, salt, ash, and moisture content. Thermophilic lactobacilli and lactococci counts were similar in all matured cheeses, while PAB count was higher in cheese B than in cheese A. *Lb. acidophilus* counts in cheese C ranged from $5.77 \pm 0.01 \log_{10} \text{ cfu/g}$ to $6.65 \pm 0.45 \log_{10} \text{ cfu/g}$ at 20 and 100 days, respectively. Moreover, cheese C with PAB and probiotics showed significantly ($P < 0.05$) higher hardness and elasticity than control cheese A. Regarding the sensory traits, cheeses B and C exhibited more eyes in their mass than cheese A, and in general, they were equally accepted as cheese A.

Concluding, the addition of both the probiotic and the PAB culture in ovine Graviera cheese did not affect the general cheese quality, maintaining the probiotics' viability at about 10^6 cfu/g of cheese.

Keywords: Ovine Graviera, propionic acid bacteria, probiotics



23rd-24th of October 2025, On- site and online

Acknowledgment: This project has been co-funded by Greece and the European Union through the Rural Development, for Action 2 of Submeasure 16.1 – 16.2 of Measure 16, Operational group GRAVIERA PRO, Project code: M16ΣYN2-00178.

EXPLORING THE FUNCTIONAL BIOPOTENTIAL OF SEA BUCKTHORN POMACE FOR INTEGRATION INTO ANIMAL- DERIVED FOOD PRODUCTS

**Irina Dianu*, Tatiana Cusmenco, Artur Macari,
Iuliana Sandu, Natalia Netreba**

*Faculty of Food Technology, Technical University of Moldova, 168, Stefan cel
Mare Bd., MD-2004, Chisinau, Republic of Moldova*

*Corresponding author: irina.dianu@doctorat.utm.md

Abstract

The increasing demand for sustainable food systems fosters the valorization of fruit by-products, particularly pomace fractions rich in nutrients and bioactive compounds. Sea buckthorn (*Hippophae rhamnoides* L.) pomace, a residue from juice processing, exhibits significant potential as a functional ingredient for incorporation into food products of animal origin. Its composition is dominated by dietary fibers, which constitute 60–70% of the dry matter (DM), comprising both insoluble (cellulose, hemicellulose, lignin) and soluble (pectins) fractions. The pomace demonstrates notable hydration properties, retaining up to 7.25 g of water per gram of fiber, which supports its use as a moisture-binding and texture-enhancing agent in food matrices.

Phytochemical profiling reveals a diverse spectrum of polyphenolic compounds, including quercetin, isorhamnetin, kaempferol, phenolic acids (gallic, caffeic, chlorogenic), catechins, and proanthocyanidins, with a total phenolic content reaching 1417 mg GAE/100 g DM. Antioxidant activity has been confirmed through DPPH and ABTS assays. Sea buckthorn pomace also retains a fraction of the original vitamin C content (up to 2500 mg/100 g in fruit peel), along with tocopherols, β -sitosterol, and organic acids (citric, malic, tartaric), which contribute to its preservative and sensorial roles. The mineral profile, encompassing potassium, calcium, magnesium, phosphorus, and iron, further enhances its nutritional value.

The multifunctionality of sea buckthorn pomace – encompassing structural, nutritional, and antioxidative properties – supports its potential integration into meat, dairy, and other animal-derived products, enhancing texture, oxidative stability, and micronutrient density, in line with circular economy principles and clean label formulations.

Keywords: antioxidant capacity, dietary fiber, functional ingredient, plant-based by-product, processed animal products

Acknowledgments: The research was supported by the Institutional Project, subprogram 020405 “Optimizing food processing technologies in the context of the circular bioeconomy and climate change”, Bio-OpTehPAS, being implemented at the Technical University of Moldova.

SUSTAINABLE VALORIZATION OF *CORNUS MAS L.***BY-PRODUCTS FROM LIQUEUR INDUSTRY****Alina Boistean^{1*}, Aurica Chirsanova¹, Rodica Siminiuc¹**

¹ Faculty of Food Technology, Technical University of Moldova, 168, Stefan cel Mare Bd., MD-2045, Chisinau, Republic of Moldova

*Corresponding author: alina.boistean@toap.utm.md

Abstract

The liqueur industry, an important economic sector, generates large volumes of agri-food by-products annually, often treated as waste. These materials represent promising sources of valuable bioactive compounds (polyphenols, flavonoids, dietary fibers, etc.), with valorization potential in the food, pharmaceutical, cosmetic, and other industries. However, a problematic aspect is the presence of residual alcohol in the processed fruits, which limits the direct use of these by-products as animal feed due to possible toxic effects or altered nutritional value. In this context, the research proposal aims to extract the residual alcohol and use it as a substrate for the production of a natural vinegar. Secondary plant-based by-products derived from the production of liqueur using *Cornus mas L.* from a local manufacturer—including both freshly pressed residues and previously frozen fruits—were selected for this study. Their polyphenol content and antioxidant activity were evaluated, along with the investigation of their potential application in the development of a novel functional vinegar enriched with bioactive compounds. Aqueous extracts were prepared from the residual fruit material at three dilution ratios (1:1, 1:2, and 1:3), followed by acetic acid fermentation. The resulting vinegar samples were analyzed for total polyphenol content, antioxidant capacity, and colorimetric parameters. Based on the obtained data, it can be concluded that most of the evaluated parameters serve as reliable indicators of vinegar quality. Furthermore, the vinegar demonstrated promising health-promoting potential. Notably, the antioxidant activity of vinegar derived from *Cornus mas L.* by-products was found to be comparable to that of commercially available functional vinegars.

Keywords: waste management; bioactive compounds; residual alcohol; vinegar

Acknowledgment: The research was supported by Institutional Project, subprogram 020405 “Optimizing food processing technologies in the context of the circular bioeconomy and climate change”, Bio-OpTehPAS, being implemented at the Technical University of Moldova.

PROTEIN SOURCES AND FOOD SYSTEM SUSTAINABILITY

Nastasia Belc^{1*}, Denisa Duță¹, Gabriel Mustățea¹, Daniela Borda², Alina Magdas³, Florentina Roming Israel⁴

¹*National R&D Institute for Food Bioresources – IBA Bucharest, 5 Baneasa Ancuta Street, Bucharest 2, Romania,*

²*Faculty of Food Science and Engineering, University Dunarea de Jos, Galati, 111 Domnească Street, Galati*

³*National R&D Institute of Isotopic and Molecular Technologies, 67-103 Donat Street, Cluj-Napoca, Romania*

⁴*Faculty of Biotechnology, University of Agronomy and Veterinary Medicine, Bucharest, 159 Marasti, Bucharest 1*

*Corresponding author: nastasia.belc@bioresurse.ro

Abstract

This paper presents a general view of protein security, considering the source of protein and protein quality, in the context of sustainability. The food system is responsible for significant impacts on the environment such as water depletion and land use, as well as climate change. The main important Sustainable Development Goals (SDGs) related with the food system are: SDG2, Zero Hunger; SDG3, Good Health and Well-Being; SDG12, Responsible Production and Consumption; SDG13 - Climate Action. It is a major challenge to maintain a continuously increasing food production while assuring a healthy and regenerable environment, having a better access to healthy foods and diets, and an increasing of economic competitiveness to feed all people. Taking into consideration the sustainability context, the optimization and efficiency of the overall food chain should be improved to ensure Food and Nutritional Security. Components of Food Security are Availability: a consistent and enough food is produced and distributed; Access: Individuals have the economic means and physical access to obtain nutritious food; Utilization: Food must be utilized effectively by the body, ensuring proper nutrition and health; Stability: The food supply should be stable over time to prevent sudden disruptions. Nutritional Security focuses on the quality and adequacy of the nutrients in food supply chain to meet the dietary needs of individuals and communities. It emphasizes not just having enough food but having access to a variety of foods that provide essential nutrients, having as Components, Diversity: Access to a diverse range of foods to ensure a broad spectrum of nutrients; Micronutrient Adequacy: Ensuring sufficient intake of essential vitamins and minerals; Protein and Energy Adequacy: Meeting energy needs and ensuring an adequate intake of protein; Bioavailability: Considering the body's ability to absorb and utilize nutrients from the food consumed. The third

component, Protein and Energy Adequacy, is the basis of nutritional security and it is strongly related with the other 3 components. The diversity and balance of protein sources (animal and vegetal origin, mushrooms, algae, insect, 3D printed or from cellular agriculture, etc.) considering the specific, individual nutritional needs and sustainability context, should be considered.

Keywords: nutritional security, protein, sustainability, bioavailability

Acknowledgment: Horizon Europe Sustain-a-Bite project, Grant agreement no. 101180399, contract 112 PHE

**THE EUROPEAN EXCELLENCE IN DAIRY LEARNING-
ERASMUS+
Han Zuidema**

FMF - AEDIL Dairy CoVE

*Corresponding author: han@jpzmanagementpartner.nl

Abstract

The Erasmus+ project The European Excellence in Dairy Learning is dedicated to strengthening the learning culture within the European dairy sector. At its core, the project develops innovative and practice-oriented learning tools that foster craftsmanship, professionalization, and sustainability.

A key focus lies on enhancing digital skills and promoting a culture of life-long learning, ensuring that both current professionals and future generations remain equipped to respond to technological, societal, and environmental changes. Central to this ambition is the development of the Dairy Learning Hub: an international digital platform that integrates practical experience, research outcomes, and innovative teaching methods. The hub provides a sustainable foundation for knowledge sharing and cross-border collaboration. The main outcomes achieved so far and outline the project's anticipated impact and perspectives for the years ahead will be presented.

Keywords: dairy learning, sustainability, digital skills

**SUSTAINABLE VALORIZATION OF SEA BUCKTHORN
POMACE IN THE DEVELOPMENT OF A DAIRY PRODUCT
WITH ENHANCED FUNCTIONALITY**

**Tatiana Cusmenco*, Irina Dianu, Iuliana Sandu,
Artur Macari, Olga Boestean, Natalia Netreba**

*Faculty of Food Technology, Technical University of Moldova, 168, Stefan cel
Mare Bd., MD-2004, Chisinau, Republic of Moldova*

*Corresponding author: tatiana.cusmenco@sa.utm.md

Abstract

Sea buckthorn pomace represents a rich source of bioactive compounds, including phenolics, carotenoids, organic acids, and dietary fiber. This study investigates the incorporation of sea buckthorn pomace into dairy-based glazed curd products at concentrations of 1.25%, 2.5%, 3.75%, and 5%, aiming to enhance their nutritional profile, oxidative stability, and sensory appeal.

In the current landscape of functional food development and circular bioeconomy, the upcycling of plant-based processing residues offers a promising strategy for innovation in food formulation. Due to its favorable biochemical composition, sea buckthorn pomace holds significant potential for functional enrichment in conventional dairy matrices. Glazed curd, serves as an ideal vehicle for integrating bioactives, facilitating the diversification of the functional food sector. Results demonstrated an increase in dry matter content from 31.4% (control) to 33.7% with the highest pomace addition (5%). Titrable acidity slightly increased, reflecting the presence of natural organic acids. A linear increase in total polyphenol content was observed with increasing pomace levels, with the highest value of 46.8 mg GAE/100 g recorded at 5% addition, more than double that of the control (21.3 mg GAE/100 g). Antioxidant activity, measured via the DPPH method, improved by up to 70%, indicating a significant enhancement of the product's protective potential. Sensory evaluation revealed that the 2.5% sample was the most preferred, offering a well-balanced profile in terms of fruity taste, smooth texture, and visual attractiveness.

These findings support the feasibility of using sea buckthorn pomace as a functional ingredient in dairy product development. The optimal fortification level was identified at 2.5%, striking a balance between enhanced nutritional functionality and consumer acceptability. This study underlines the importance of sustainable exploitation of agro-industrial waste within the framework of food system innovation and eco-friendly formulation practices.

Keywords: antioxidants, bioactives, curd, polyphenols, sustainability

Acknowledgments: The research was supported by the Institutional Project, subprogram 020405 "Optimizing food processing technologies in the context of the circular bioeconomy and climate change", Bio-OpTehPAS, being implemented at the Technical University of Moldova.

PRUNUS FRUIT VALORIZATION FOR FUNCTIONAL BAKERY APPLICATIONS

Mariana Slavic, Adriana Dabija*, Amelia Buculei, Ancuța Chetrariu

*Faculty of Food Engineering, Stefan cel Mare University of Suceava, Universităţii,
13, Suceava Romania*

*Corresponding author: adriana.dabija@fia.usv.ro

Abstract

Fruits and vegetables are among the most wasted foods with 12 million tonnes of fruit and 21 million tonnes of vegetables lost each year. Fruits and vegetables account for over half of the food waste (21.1 kg/person/year) created by households, according to national surveys conducted in EU countries. Fruit-derived ingredients are increasingly used in bakery recipes due to their potential to improve the dietary fibre content, especially through a balanced ratio of soluble and insoluble fibres. These fibres contribute to improving the hydration capacity, fermentability and general functional qualities of bakery products. The aim of this paper was to identify the optimal forms of exploitation of *Prunus* fruits in the bakery industry. The research ranged from the study of the specialized literature on this type of fruit to their practical applicability in the bread-making process. *Prunus* fruits have attracted significant attention in recent years for their beneficial health properties. These fruits are rich in bioactive compounds, especially phenolic compounds such as anthocyanins, which exhibit strong antioxidant activity. The high phenolic content of *Prunus* fruits, especially in the peel, has led to a growing body of scientific research on their applicability in functional food products. Current literature identifies over 2,000 different natural compounds present in food products based on these fruits, reinforcing their importance as fruits rich in bioactive compounds. Studies have advocated the strategic incorporation of *Prunus* fruits in various processed forms - such as purees, powders or dried fragments - as functional ingredients to improve the nutritional and sensory profile of bakery products. This research highlights the nutritional composition, bioavailability of key bioactive compounds and the functional roles of phenolic and flavonoid constituents in *Prunus* fruits.

Keywords: bakery products, bioactive compounds, health properties, nutritional and sensory characteristics

DEVELOPMENT AND PHYSICO-CHEMICAL EVALUATION OF AN ASSORTMENT OF NATURALLY SWEET, SUGAR-FREE ICE CREAM

Mariana Popescu, Mariana Slavic, Adriana Dabija*, Ancuța Chetrariu

*Faculty of Food Engineering, Stefan cel Mare University of Suceava, Universităţii,
13, Suceava Romania*

*Corresponding author: adriana.dabija@fia.usv.ro

Abstract

Ice cream is one of the most widely consumed dairy products worldwide. The use of natural sweeteners in ice cream production could meet the demands of modern consumers focused on natural and nutritionally balanced foods. Interest in functional foods and new, innovative food experiences has expanded over the years and encouraged the development of new products that are beneficial for the body. The negative health effects associated with excessive sugar consumption have prompted a paradigm shift towards healthier options. Therefore, researchers are exploring various sugar substitutes, including natural sweeteners such as stevia and artificial sweeteners such as aspartame and sucralose. Each of these alternatives offers distinct advantages and challenges in terms of taste, texture and stability of ice cream formulas. Researchers are exploring sugar substitutes in ice cream to meet consumer demands for healthier options while maintaining taste and quality, using a multi-pronged approach. The aim of this paper was to obtain a new assortment of low-carb and low-calorie ice cream based on concentrated apple juice and cream substitutes. The ice cream samples obtained were analyzed from a physico-chemical and sensory point of view. The physico-chemical analyses demonstrated that the carbohydrate intake was reduced by replacing sugar with the natural sweetener used. From the point of view of the technological process, the properties of the ice cream were not influenced, which indicates that this natural sweetener can be successfully used in the manufacture of ice cream, but also in terms of the multiple benefits brought to consumers. The sensory analysis led to the conclusion that the low-carb ice cream was highly appreciated by the tasters, obtaining scores similar to the control sample. In conclusion, concentrated apple juice can be successfully used in the industrial manufacture of sugar-free ice cream, the new trend in consumer preferences, namely to consume healthier products.

Keywords: apple juice, cream substitutes, functional food, sugar substitutes

ADVANCING BAKERY FERMENTATION: THE ROLE OF NON-SACCHAROMYCES YEASTS IN PRODUCTS QUALITY

Cristian Mititiuc, Ramona Huber, Adriana Dabija*, Ionuț Avrămia

Faculty of Food Engineering, Stefan cel Mare University of Suceava, Universităţii,
13, Suceava Romania

*Corresponding author: adriana.dabija@fia.usv.ro

Abstract

The bakery products market is dynamic and contributes to increased competition, due to technical and scientific progress and consumer demands. Against the backdrop of new consumer trends, oriented towards healthy and artisanal products, the industry has begun to explore new directions of innovation, including the use of unconventional yeast. Yeast, an essential microorganism in the fermentation process, plays a major role in the texture, aroma and volume of bakery products. Although the *Saccharomyces cerevisiae* species remains the standard yeast, recent research is increasingly focusing on unconventional yeast, such as *Candida*, *Pichia*, *Torulaspora*, *Kazachstania*, etc. The aim of this paper was to identify in the specialized literature new starter cultures of unconventional yeast that can be used in bakery. These may present advantages such as unique aromatic profiles, fermentation capacity under difficult conditions, improvement of the nutritional value of the products and the potential to produce finished products with superior sensory properties. Species such as *Candida milleri*, *Torulaspora delbrueckii* or *Pichia anomala* have demonstrated the ability to generate volatile aromatic compounds and improve the rheological structure of dough. Some species, such as *Candida humilis* and *Candida krusei*, can contribute to extending shelf life by producing organic acids that inhibit the development of contaminating microorganisms. For example, *Yarrowia lipolytica* is known for its ability to produce lipids and natural antioxidants, contributing to the functional potential of bakery products. Comparative studies indicate that these yeasts can substitute or enhance traditional yeast, particularly in artisanal or regionally specific products. However, they may present limitations such as lower leavening capacity or lower tolerance to standardized industrial processes. In conclusion, unconventional yeast represents a promising resource for diversifying bakery products, improving sensory and nutritional qualities, as well as promoting sustainable practices. Their integration into production processes could redefine industry standards and satisfy the increasingly sophisticated preferences of modern consumers.

Keywords: bakery products, nutritional value, sensory properties, unconventional yeast

**SUSTAINABLE BIOTRANSFORMATION OF SECONDARY
CHEESE WHEY INTO FUNCTIONAL BEVERAGES:
TECHNOLOGICAL AND ENVIRONMENTAL ASPECTS**

Ramona Huber, Adriana Dabija*, Ancuța Chetrariu

*Faculty of Food Engineering, Stefan cel Mare University of Suceava, Universităţii,
13, Suceava Romania*

*Corresponding author: adriana.dabija@fia.usv.ro

Abstract

Dairy output worldwide is undergoing substantial rise, primarily propelled by heightened cheese production. During cheese production, approximately 90% of the processed milk is converted into whey, a nutrient-rich by-product. The management of whey streams has become a pressing economic and environmental challenge, particularly in regions with intensive dairy activity, such as Europe, which in 2024 produced nearly 148 million tonnes of milk—around 50% of which was utilized for cheese production. Despite whey's high nutritional value, characterized by a rich composition of proteins, lactose, minerals, bioactive peptides, and favourable techno-functional properties, only about 50% of sweet whey is currently valorised for human consumption. A substantial fraction of whey is discharged together with wash water into wastewater treatment facilities, leading to environmental pollution, including soil deterioration and ecological disruption of aquatic ecosystems due to biochemical oxygen demand (BOD)-induced oxygen depletion. One promising valorisation pathway for this underutilized by-product is the development of whey-based beverages—both fermented and non-fermented. Over the past decade, innovative processing technologies have enabled the incorporation of nutraceuticals, probiotics, prebiotics, fruit and vegetable juices, and plant extracts into whey beverages, enhancing their functional and health-promoting potential. This paper focuses on the valorisation of whey derived from urda or ricotta-type cheese manufacturing, commonly referred to as “secondary cheese whey” (SCW), recognizing it as a high-value resource for functional beverage production. Deproteinized whey, in particular, remains significantly underexploited, despite its considerable potential as a substrate for both alcoholic and non-alcoholic beverage formulations. The proposed approach seeks to transform this low-value by-product into a high-added-value raw material, thereby mitigating the ecological footprint associated with whey disposal and fostering advancements in the circular food bioeconomy. Moreover, hybrid whey-based beverage formulations are introduced, aligning with the rising consumer demand for health-oriented, organic, and ethically produced foods.

Keywords: by-product, circular bioeconomy, sweet whey, valorisation

Acknowledgment: work was supported by a grant of the CNFIS-FDI-2025-F-0603 /USV VIP 2025

**FIFTEEN YEARS OF SUSTAINABLE DEVELOPMENT
IN THE GM COSTIN DAIRY PILOT PLANT**

Daniela Borda^{1*}, Iulia Bleoanca¹, Corina Neagu¹, Loredana Dumitrascu¹

¹*Faculty of Food Science and Engineering, University Dunarea de Jos of Galati,
Romania,*

*Corresponding author: Daniela.Borda@ugal.ro

Abstract

The GM Costin Dairy Pilot Plant was rehabilitated in 2010 within the RESPIA project, *Up-scaling, upgrading and rehabilitation of the Educational Infrastructure for the development of Education and Scientific Research Pole in Food Science and Engineering*, code SMIS 11377 following the footsteps of the former Dairy Pilot plant functional between 1979- 1994 at the Faculty of Food Science and Engineering from Dunarea de Jos University of Galati, Romania. Built by GEA Engineering Company, the dairy line can process fermented dairy products, cheese, butter and cream, having a capacity of 600 L milk. From 2013 on, numerous eco-innovative projects were developed in GM Costin Dairy Pilot Plant, centered on designing of:

- ✓ **new dairy- based products** based on secondary flows valorization resulting from Dairy Pilot Plant: dairy ice-cream from concentrated whey that won European Ecotrophelia 2018 Gold prize, fermented beverages from concentrated delactosed sweet whey with read beetroot juice, coffee or cocoa powder, low fat buttermilk mayonnaise, freeze-dried candies with yogurt and elderberries by-product, FoodCell – a high protein snack and dip sauce (Ecotrophelia 2025).
- ✓ **new ingredients:** encapsulated metabiotics resulting from the researches performed during the Biotics+ project PN-III-P4-ID-PCE2020-1268.
- ✓ **new biopackaging intelligent materials** based on whey and essential oils, able to prolong the zucchini`s shelf-life.

Our quest for new products, ingredients and solutions continues given the opportunities provided by the project SDG4Dairy funded by the Dunarea de Jos University of Galati (2025-2027) and Erasmus+ AEDIL Dairy (2022-2026).

Keywords: dairy, sustainability, circular economy, whey valorization, metabiotics

Acknowledgement: The research presented was supported by the grant Sustainable strategies for developing functional dairy products based on new technologies, bioactive compounds and active packaging, SDG4Dairy, no 7952/31.03.2025. The authors also wish to thank RESPIA project, Up-scaling, upgrading and rehabilitation of the Educational Infrastructure for the development of Education and Scientific Research Pole in Food Science and Engineering, code SMIS 11377 for the infrastructure provided, and project New Emerging Concepts for Food Functionalization by Transition from Probiotics to Metabiotics- a strategy to promote health, Biotics+ PN-III-P4-ID-PCE 2020-1268, code 159 PCE.

NEW STRATEGIES FOR BUTTERMILK VALORIZATION**Loredana Dumitrascu¹, Iuliana Aprodu¹, Mirela Crăciunescu¹, Daniela Borda^{*1}**

¹*Faculty of Food Science and Engineering, Dunarea de Jos University, Domneasca, 111, Galati, Romania*

*Corresponding author: daniela.borda@ugal.ro

Abstract

Buttermilk is one of the main by-products of the dairy industry resulted during the production of butter, that contain valuable components with nutritional and functional properties. Buttermilk is an excellent source of proteins, lactose, minerals, vitamin B2 and B12 and milk fat globule membrane (MFGM). MFGM contains phospholipids, a component with health promoting properties and high functional potential for food formulations. On the other hand, buttermilk is very perishable and the use in concentrated form would contribute to improving its valorization in the food industry. In this context, the aim of the present study was to valorize buttermilk to develop versatile high protein ingredients with enhanced functionality. Buttermilk was concentrated up to 16% dry weight and mixed with whey protein isolate to reach a dry weight of 20% (S1), 25% (S2) and 30% (S3). The resulted mix was heated at 80°C for 15 minutes in a water bath, homogenized at 100 bar and characterized for water holding capacity, colour and rheological properties. The water holding capacity increased with increasing the dry matter content, and ranged between 51.75±2.55% (S1) to 89.91±3.44% (S3). The pH increased slightly with the increase in dry matter, while color coordinates (in terms of L*, a*, b*) and rheological properties were significantly affected by the matrix composition.

Keywords: buttermilk, whey proteins, functionality

Acknowledgement: This research was funded by the grant Sustainable strategies for developing functional dairy products based on new technologies, bioactive compounds and active packaging– grant no. SDG4Dairy 7952/31.03.2025

VALORIZATION OF AGRI-FOOD BY-PRODUCTS FOR FOOD FUNCTIONALISATION BY MICRO- & NANOENCAPSULATION

Cristian Vasile Dima*

*Faculty of Food Science and Engineering, "Dunarea de Jos" University of
Galati, Galati, Romania*

*Corresponding author: cristian.dima@ugal.ro

Abstract

In the context of the global development of a super-technological civilization, rebalancing the Nature (Environment)-Food-Health relationship represents one of the great challenges of the 21st century. Environmental degradation, climate change, changes in people's lifestyles, food losses and the inequity in the distribution of food resources are important causes that increase the risk of disease in the population. The agri-food sector generates large quantities of by-products that diminish the nutritional potential of the raw materials used in food processing and pollute the natural environment when they are discarded. Agri-food by-products, such as peels, seeds, rinds, pomace, and food waste, have a significant content of bioactive compounds with antioxidant, anti-inflammatory, antimicrobial, immunostimulatory etc. properties that can add value to foods, medicines, cosmetics, etc. This paper discusses two of the sustainable development objectives of the agri-food sector that can contribute to improving people's health and well-being, including: i) valorization of agri-food by-products and food waste by recovering the bioactive compounds, such as polyphenols, carotenoids, anthocyanins, essential oils, polyunsaturated fatty acids, polysaccharides, proteins and lipids, using emerging extraction methods, also called "green extraction methods" such as, microwave-assisted extraction, ultrasound-assisted extraction, supercritical fluid (CO₂) extraction, subcritical water extraction, pressurized liquid extraction, pulsed-electric field-assisted extraction, enzyme-assisted extraction, etc., because they use non-toxic solvents, apply non-aggressive parameters, have low energy consumption and high extraction efficiency ii) design and development of innovative foods with a particular focus on food functionalization by encapsulation techniques using recovered biocompounds as core material and carrier material. These foods make an important contribution to preventing and treating diseases, such as cardiovascular disease, type-2 diabetes, obesity, stroke, dyslipidemia, and cancer. Integrated into the principles of the circular economy, these objectives still remain challenging due to shortcomings regarding industrial-scale application, economic efficiency, legislation and, last but not least, consumer acceptability.

Keywords: agri-food by-product, bioactive compounds, micro/nanoencapsulation, functional foods

**AGRICULTURAL COOPERATIVES IN ROMANIA:
GOVERNANCE CHALLENGES AND OPPORTUNITIES FOR
SUSTAINABLE RURAL DEVELOPMENT**

Silviu Stanciu^{1*}, Mihaela Pila²

*¹Faculty of Food Science and Engineering, "Dunărea de Jos" University of Galați,
Domneasca 47, 800008, Romania,*

*²Faculty of Engineering and Agronomy in Brăila, "Dunărea de Jos" University of
Galați, Domneasca 47, 800008, Romania*

*Corresponding author: sstanciu@ugal.ro

Abstract

Agricultural cooperatives and producer groups represent essential instruments for strengthening farmers' collective capacity and supporting the sustainable development of rural areas. In Romania, the cooperative model has expanded significantly in recent years, driven by European funding opportunities and national policy measures. Despite this progress, governance challenges, unequal territorial distribution, and limited professionalization continue to hinder the full exploitation of their potential. The study examines the role of Romanian cooperatives within the broader European framework, focusing on governance aspects and their impact on rural development. Statistical analysis of national data highlights that cooperative structures are concentrated in regions with strong agricultural traditions and institutional support, while areas with weaker cooperative culture or administrative barriers remain underrepresented. The sectoral distribution reflects the specific profile of Romanian agriculture: cereals and oilseeds dominate, followed by fruits, vegetables, and dairy products. Governance difficulties, such as weak leadership, lack of trust among members, and limited access to professional training, reduce the efficiency of cooperative structures. Nevertheless, opportunities exist to strengthen their role through targeted policies, fiscal incentives, and investment in processing and marketing infrastructure. Strengthening the institutional framework and ensuring better coordination between public authorities, universities, and farmers' associations could further stimulate innovation and resilience in the cooperative sector. Moreover, digital tools and regional clusters can provide new frameworks for collaboration and integration into short supply chains.

The paper argues that well-managed cooperatives are not only vehicles for improving farmers' market access but also critical drivers of social cohesion, innovation, and resilience in rural Romania. Strengthening governance mechanisms is therefore key to ensuring that agricultural cooperatives contribute effectively to sustainable rural development.

Keywords: cooperatives, governance, rural development, agriculture, Romania

**TECHNOLOGY TRANSFER IN ROMANIA'S AGRO-FOOD
SECTOR: PATHWAYS FOR INNOVATION AND REGIONAL
DEVELOPMENT**

Silvius Stanciu^{1*}

*¹Faculty of Food Science and Engineering, "Dunărea de Jos" University of Galați,
Domneasca 47, 800008, Romania,*

*Corresponding author: sstanciu@ugal.ro

Abstract

Technology transfer is a strategic component for enhancing the competitiveness and sustainability of Romania's agro-food sector. The adoption of modern technologies in production, processing, and distribution contributes to resource optimization, cost reduction, and value chain efficiency. However, the current Romanian system faces structural challenges, including an underdeveloped processing infrastructure (sorting, packaging, freezing), weak collaboration among stakeholders, limited entrepreneurial culture within academia, and low financial support for innovation. The paper provides an overview of Romania's technology transfer ecosystem, focusing on the agro-food sector. Data from the National Register of Innovation and Technology Transfer Infrastructures (ReNITT) indicates the existence of 46 accredited entities, of which only 23 are linked to the agro-food sector and just 15 are affiliated with universities. These units are generally understaffed and underfunded, highlighting the limited academic involvement in leveraging research results. Recent public programs, such as the "Transfer Projects to the Economic Operator" scheme (2024), provided financial support for collaborative projects, but their impact remains concentrated in a few counties and insufficiently spread at national level. Best practice examples from universities and research institutes show that technology transfer can be achieved through patent exploitation, consultancy for SMEs, digital innovation hubs, and cross-border cooperation projects. Lessons from European initiatives emphasize the role of integrated Agricultural Knowledge and Innovation Systems (AKIS) and the importance of artificial intelligence and digital transformation in agro-food chains. The study concludes that systemic reform is required to strengthen partnerships between academia, industry, and government. Investments in infrastructure, training in entrepreneurial skills, and digital platforms for innovation dissemination are essential steps toward building a competitive and sustainable Romanian agro-food sector.

Keywords: technology transfer, agro-food sector, innovation, Romania, competitiveness

INNOVATIVE METHODS OF CONTROLLING RECRYSTALLIZATION PROCESS IN ICE CREAM

Anna Kamińska-Dwórznička^{1*}

¹ *Department of Food Engineering and Process Management, Institute of Food Sciences, Warsaw University of Life Sciences (WULS-SGGW), Nowoursynowska 159C, 02-776, Warsaw, Poland*

*Corresponding author: anna_kaminska1@sggw.edu.pl

Abstract

Ice cream is the type of the product that is made and also eaten in almost every country. Recrystallization is an issue that generates significant concern in the ice cream producers. It is an undesirable process that occurs when temperature fluctuates during storage. It consists in increasing the size of ice crystals, changing their shapes, number and arrangement in the product structure. Consequently, there is a current interest in the possible use of new stabilizers and also new techniques of ice cream production to control ice crystal growth during freezing and frozen storage [1, 4].

The study aimed to determine the influence of adding alternative stabilizers and using of US-assisted processes on ice cream structure. Different types of carrageenan (iota and kappa fractions) hydrolysis were conducted and the hydrolysates were used as stabilizer's in model systems and also in different type of ice cream. The effect of US-assisted homogenization and US-assisted freezing with a frequency of 21,5 and 40 kHz and a power of 2,4 kW in the chopped mode on the course of freezing and the crystal structure of ice cream was also examined.

It has been shown that new stabilizing substances obtained by acid and enzymatic hydrolysis of two different carrageenan fractions could beneficially limit the recrystallization process in model sucrose solutions and also in different type of ice cream [2]. Implementation of modern techniques such as ultrasonic homogenization or ultrasonic-assisted freezing to the production scheme of various types of ice cream can have a positive effect on the crystal structure of edible ice cream [1, 3, 4]. Studies also indicate that sonication could replace or limit the addition of stabilizing substances.

Keywords: ice cream, recrystallization, hydrolysis, US-assisted freezing

Literature:

- [1] Kot A., Kamińska-Dwórznička A., Jakubczyk E.: „Study on the influence of ultrasound homogenisation on the physical properties of vegan ice cream mixes”. *Applied Sciences* 2022, 12 : 8492.
- [2] Kot, A., Kamińska-Dwórznička, A., Antczak, A., Jakubczyk, E., Matwijczuk, A.: Effect of ι-carrageenan and its acidic and enzymatic hydrolysates on ice crystal structure changes in

model sucrose solution. Colloids and Surfaces A - Physicochemical and Engineering Aspects 2022, 643, 1-12.

[3] Kamińska-Dwórznička Anna, Kot Anna, Jakubczyk Ewa, Buniowska-Olejek M., Nowacka M.: Effect of Ultrasound-Assisted Freezing on the Crystal Structure of Mango Sorbet, 396 Crystals, 2023, vol. 13, nr 3, s.1-13.

[4] Kamińska-Dwórznička A., Kot A.: Physical properties and crystal structure changes of stabilized ice cream as affected by ultrasound-assisted freezing. Processes 2024, 12(9), 1957.

ANTIOXIDANT ACTIVITY OF CRAFT BEERS FROM ROMANIAN MARKET

Livia Patrascu¹, Maria Garnai², Evgheni Bruev¹, Ina Vasilean^{2*}

¹*Croos-Border Faculty, Dunărea de Jos University of Galați, Domnească 111 str.,
Galați Romania*

²*Faculty of Food Science and Engineering, Dunărea de Jos University of Galați,
Domnească 111 str., Galați Romania*

*Corresponding author: ina.vasilean@ugal.ro

Abstract

The study aimed to determine the in vitro antioxidant activity of different beer types, such as Lager, Australian Pale Ale, Indian Pale Ale, Amber, Double Amber Dark Lager, Black, Stout, and Porter totaling 21 samples. Wheat beers were also considered. Performed analyses in terms of antioxidant activity were Total Phenolic content, DPPH-RSA, and ABTS-RSA. Also some physical-chemical characteristics important for beer quality investigation were considered such as EBC color, pH, total titratable acidity, soluble proteins and viscosity. The lowest in vitro antioxidant activity was determined for wheat beers (for both DPPH and ABTS) while the highest value was registered for Black beer types. Results showed that antioxidant activity parameters were correlated with Original Extract stated on the label, which varied from 10.6 to 16.8°P. Beer color varied from 8.5 units (Holsten Pilsner) to 250 - 253 (dark types such as Amber, Black and Porter) with no correlation between antioxidant activity and color.

Keywords: original extract, antioxidants, special malts, EBC color

Acknowledgment: This paper was co-financed by the European Regional Development Fund (ERDF) through the Smart Growth, Digitization and Financial Instruments Program (PoCIDIF), call PCIDIF/144/PCIDIF_P1/OP1/RSO1.1/PCIDIF_A3, Project SMIS number 309287, acronym METROFOOD-RO Evolve.”

EFFECTS OF MILK HEAT TREATMENT ON FUNCTIONALITY AND SHELF-LIFE QUALITY OF KAŞAR CHEESE

Melek Günay¹, Hasan Oral¹, Özlem Kaner^{1*}, Ziya O. Derinsu¹, Metin Güldaş²

¹*Sütaş Dairy R&D Center, Karacabey, Bursa, Türkiye,*

²*Faculty of Health Science Nutrition and Dietetics Department, Bursa Uludağ
University, Gorukle Campus 16059 Nilufer, Bursa, Türkiye*

*Corresponding author: okaner@sutas.com.tr

Abstract

Kaşar cheese is a traditional Turkish semi-hard pasta filata-type cheese, well known for its characteristic melting and stretching properties, which are key indicators of its technological functionality. Heat treatment of milk is a critical step in cheese production, primarily to ensure microbial safety; however, it also significantly influences the structural, sensory, and functional characteristics of the final product.

This study was initiated due to the observation that, during the later stages of shelf life, the melting and stretching performance of Kaşar cheese tends to decrease, potentially reducing consumer acceptance. The aim was to investigate the impact of different pasteurization temperatures (70 °C/30 s and 72 °C/30 s) on the functional properties and shelf-life quality of Kaşar cheese, in order to identify an optimal heat treatment condition that maintains desirable technological performance throughout storage. All other processing parameters were kept constant to isolate the effect of pasteurization temperature.

Cheeses produced from milk pasteurized at the lower temperature (70 °C) exhibited slightly improved functional properties, such as slightly enhanced melting and stretching performance, which were sustained for a longer period during shelf life. On the other hand, cheeses made from milk pasteurized at 72 °C showed slightly rapid decline in these properties during shelf life. No significant differences were observed between treatments in terms of cheese yield or whey losses.

Throughout shelf life, chemical composition, sensory quality, and functional performance were monitored under controlled conditions. The results highlight that heat treatment temperature can influence cheese texture and melting behavior during shelf life.

Keywords: Kaşar cheese, pasteurization, heat treatment, functionality

DECREASING SUGAR LEVEL BY ENZYMATIC HYDROLYSIS OF LACTOSE IN LOW-FAT FRESH CHEESE

Damla Özçelik¹, Deniz Elitez¹, Özlem Kaner^{1*}, Ziya O. Derinsu¹, Metin
Güldaş²

¹Sütaş Dairy R&D Center, Karacabey, Bursa, Türkiye,

²Faculty of Health Science Nutrition and Dietetics Department, Bursa Uludağ
University, Gorukle Campus 16059 Nilufer, Bursa, Türkiye

*Corresponding author: okaner@sutas.com.tr

Abstract

β-Galactosidase from Kluyveromyces lactis was used to hydrolyze lactose in compound milk, which was subsequently used for the production of low-fat fresh cheese. Lactose hydrolysis was carried out simultaneously with fermentation at 38 °C until a pH of 4.65 was reached. The amount of sucrose added was reduced to balance the increase in sweetness resulting from lactose hydrolysis.

In the control recipe, the sugar concentrations were 4.8% lactose and 6% sucrose, while in the reduced-sugar recipe, they were 4.8% lactose and 3.8% sucrose. Sensory evaluations were conducted for each recipe, and no significant difference in sweetness was detected ($p \leq 0.05$). Lactose content analysis at the end of fermentation revealed high hydrolysis efficiencies of 97.8% for the control and 98% for the reduced-sugar sample. Based on these results, for every 1 g of lactose hydrolyzed, 0.4 g of sucrose could be eliminated from the recipe without affecting sweetness perception. This adjustment resulted in a 36% reduction in added sucrose, offering a promising strategy for sugar reduction in dairy products.

Furthermore, shelf-life studies were performed to determine whether lactose hydrolysis influenced post-acidification. No significant differences in pH values were observed between the control and reduced-sugar samples by the end of the shelf-life period, indicating that lactose hydrolysis did not negatively affect product stability.

Overall, the integration of enzymatic lactose hydrolysis into the production of low-fat fresh cheese allows for substantial sucrose reduction while maintaining sensory quality and shelf-life characteristics. This approach aligns with current consumer demand for healthier, lower-sugar dairy options without sacrificing taste or product integrity.

Keywords: lactose hydrolysis, fresh cheese, sweetness

**EU MULTI-STAKEHOLDER PLATFORM FOR
COLLABORATION AND INNOVATION IN FOOD SAFETY: R&I
PRIORITIES FOR SAFE TRANSITION TOWARDS
SUSTAINABLE FOOD SYSTEMS**

**Veronica MT Lattanzio^{1*}, Nunzia M Cito¹, Martina Loi¹, Antonio Moretti¹,
Nastasia Belc²**

*¹National Research Council of Italy, Institute of Sciences of Food Productions, via
Amendola 122/O, Bari, Italy*

*²National Research & Development Institute for Food Bioresources (IBA
Bucharest), 020323 Bucharest, Romania*

*Corresponding author: [*veronicamariateresa.lattanzio@cnr.it](mailto:veronicamariateresa.lattanzio@cnr.it)

Abstract

In response to the rapid transformation of global food systems driven by climate change, resource depletion, technological advances, and shifting consumer expectations, the European Union (EU) is strengthening integrated policy frameworks and science-policy-society collaboration to ensure resilient food systems' governance. Food safety shall remain a core priority to be tackled through systemic approaches, new technologies, and open data access to keep pace with innovation and evolving challenges. The EU Food Safety Platform, co-designed and launched under the FoodSafety4EU project (H2020), exemplifies this approach by bringing together regulators, scientists, industry, and citizens to co-create solutions and align research and innovation priorities. Its dynamic operational model includes geographical hubs, living labs, digital tools, and participatory methods that address changing food safety challenges and support evidence-based policymaking. A key output is the Strategic Research and Innovation Agenda (SRIA) for food safety, updated annually via multi-actor discussions such as the EU Food Safety Forum. The SRIA identifies emerging issues, consumer concerns, technological advances, and policy priorities relevant across the food safety system. With new EU policy priorities emphasizing competitive, sustainable food systems, upcoming research agendas will focus on closing innovation gaps, leveraging knowledge from Food 2030 and other initiatives, and increasing uptake across industry, regulators, and society. Future efforts will advance food safety through digital transformation, biotechnology, and data-driven methods to address complex environmental and systemic challenges. Living lab networks and multi-stakeholder platforms will continue to guide innovation ecosystems, enabling regulatory breakthroughs, scaling startups, and embedding sustainability and bioeconomy principles into food safety governance.

Keywords: Food Safety, Food Policy, Sustainability, Research Agenda, Food 2030

**DEVELOPMENT OF AN INNOVATIVE ANCHOVY PRODUCT
ENRICHED WITH MUSHROOMS: EVALUATION OF
NUTRITIONAL AND SENSORY QUALITY**

Fatma Delihasan Sonay^{1*}

¹*Faculty of Fisheries, Recep Tayyip Erdogan University, 53100, Rize, Türkiye*

*Corresponding author: fatma.delihasan@erdogan.edu.tr

Abstract

This study aimed to develop an innovative anchovy product by combining anchovy (*Engraulis encrasicolus*), commercially important and consumed source rich in high-quality protein, fatty acids, vitamins A and D, and minerals, with mushroom, and to evaluate its nutritional composition and sensory properties. Within the scope of this study, the nutritional compositions (crude protein, crude fat, crude ash, moisture, carbohydrate, energy) and sensory attributes (odor, hardness, juiciness, saltiness, oiliness, bitterness, aroma, appearance, overall acceptance, and purchase intention) of the developed product were determined. Sensory analyses were conducted by a panel of 15 panelists ranging in age from 27 to 51 years, with a gender distribution of 60% male and 40% female. According to the analysis results, the nutritional composition was determined as: crude protein 10.25±0.66%, crude fat 8.16±0.22%, crude ash 1.51±0.01%, moisture 71.08±1.22%, and carbohydrate 9.00%. The results of the sensory analysis showed that the panelists 100% accepted the product in terms of appearance and purchase intention. In terms of overall acceptance, nearly all participants evaluated the product positively, with 80% responding "I liked it a lot" and 13.3% responding "I liked". Additionally, for juiciness, 53.3% rated it as "a little watery"; for saltiness, 66.7% as "normal"; for oiliness, 53.3% as "medium oiliness"; for bitterness, 33.3% as "neither bitter nor not bitter" and 26.7% as "It's not bitter"; and for aroma, 33.3% as "slightly aromatic" and while 20% described it as "medium aroma" 20% as "very aromatic," and 20% as having an "in a perfect aroma". The findings determined that this innovative product, developed using anchovy and mushroom, is both rich in nutritional value and sensorially acceptable. This innovative food, created with the most heavily fished seafood species and mushrooms, presents an innovative approach that not only enhances nutritional value and sensory properties but also supports sustainable food production.

Keywords: Anchovy, healthy nutrition, innovative approach, mushroom, sensory analysis.

Acknowledgment: This research was funded by the Coordinator of Scientific Research Projects of Recep Tayyip Erdogan University (Grant number: FBA-2020-1167). I would like to thank the scientific and administrative staff of Recep Tayyip Erdoğan University, Faculty of Fisheries, Department of Seafood Processing Technology, Rize/Türkiye.

DEVELOPMENT, SENSORY CHARACTERIZATION, AND NUTRITIONAL PROFILING OF AN ANCHOVY-BASED CROQUETTE

Bariş Karşlı^{1*}

¹*Faculty of Fisheries, Recep Tayyip Erdogan University, Rize, Türkiye*

*Corresponding author: baris.karsli@erdogan.edu.tr

Abstract

Fish-based products represent an important source of high-quality protein, essential fatty acids, and micronutrients, contributing significantly to a healthy diet. However, despite its nutritional richness, anchovy remains underutilized in many regions due to its strong flavor, limited consumer familiarity, and lack of convenient product forms. The development of innovative, ready-to-eat formulations may therefore enhance consumer acceptance and promote anchovy consumption. This study aimed to develop and evaluate an anchovy-based croquette in terms of its sensory and nutritional properties. The product was formulated by combining filleted anchovies with mashed potatoes, onions, cheese, and spices, shaped into small balls, coated with flour, egg, and breadcrumbs, and deep-fried until golden brown. Sensory evaluation was conducted by a panel of individuals aged 28–52 years (72.22% male, 27.78% female) to assess appearance, aroma, texture, flavor, and overall acceptability. The sensory results indicated that the croquette exhibited a mildly roasted fish aroma, moderate texture, and a pleasant overall appearance. Panelists reported high satisfaction levels, and notably, purchase intention reached 100%, reflecting complete consumer approval and strong market potential. Nutritional analysis showed that the croquette contained 11.54% protein, 18.76% fat, 2.23% ash, 49.58% moisture, and 17.90% carbohydrates, corresponding to an energy value of 286.55 kcal per 100 g. In conclusion, the anchovy-based croquette demonstrated a balanced nutritional profile and excellent sensory quality. These findings highlight its potential as a value-added fish-based convenience food, supporting the diversification of seafood products and the broader utilization of anchovy in the human diet.

Keywords: Anchovy; Croquette, Sensory evaluation, Nutritional composition, Fish-based product

PRODUCTION OF AGRICULTURAL FERTILIZER FROM FISH WASTE VIA ACIDIC AND ENZYMATIC METHODS

Bariş Karşlı*

¹*Faculty of Fisheries, Recep Tayyip Erdogan University, Rize, Türkiye*

*Corresponding author: baris.karsli@erdogan.edu.tr

Abstract

This study aimed to evaluate the potential of using fish processing by-products as a raw material for agricultural fertilizer production. During fish filleting, a significant amount of organic waste is generated, which can be transformed into value-added products through sustainable processing. In this research, two different approaches—acidic and enzymatic—were applied to trout waste for the production of liquid fertilizers. In the acidic method, formic acid was used as the hydrolyzing agent, whereas the enzymatic method employed Alcalase and Protease enzymes individually and in combination. The fish residues were ground, homogenized, hydrolyzed, centrifuged, and separated into liquid, oil, and solid fractions. The physicochemical and microbiological characteristics of the fertilizers were analyzed. The pH values of the liquid fertilizers ranged from 3.58 to 6.97, and no microbial growth was observed in any of the samples. Yield and cost evaluations showed that the acidic method achieved the highest fertilizer yield (73.25%) at the lowest cost, while enzymatic methods provided yields between 58–67% but required higher costs due to enzyme usage. In addition, 9–13.3% of valuable fish oil was obtained as a by-product. Amino acid analyses revealed the presence of 20 amino acids, with alanine, lysine, serine, valine, and isoleucine being the most abundant. Enzymatic fertilizers contained higher amino acid concentrations compared to those obtained through the acidic process.

In conclusion, both methods demonstrated promising potential for converting fish waste into biofertilizers. The enzymatic process offered advantages in terms of nutrient composition, while the acidic method was more economical. These results indicate that fish waste can be effectively utilized as an organic fertilizer source, supporting sustainable production and waste reduction in the aquaculture industry.

Keywords: fish waste, biofertilizer, enzymatic hydrolysis, acidic hydrolysis, sustainable production



23rd-24th of October 2025, On- site and online



23rd-24th of October 2025, On- site and online

FOOD SAFETY AND NUTRITION



23rd-24th of October 2025, On- site and online

EGG DERIVED PEPTIDES AS FUNCTIONAL INGREDIENT FOR IMPROVING PUDDING PROPERTIES

Mihaela Brumă (Călin)¹, Ina Vasilean¹, Iuliana Banu¹, Gabriela Râpeanu¹,
Nicoleta Stănciuc¹, Iuliana Aprodu^{1*}

¹*Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati,
Domneasca Street 111, 800201, Galati, Romania*

*Corresponding author: iuliana.aprodu@ugal.ro

Abstract

The incorporation of powdered egg ingredients in various food formulations is desired, not only for increasing the nutritional value of the products, but also because of their functional properties, such as emulsification, thickening, and structure stabilization. The present study aimed to obtain and characterize the egg protein hydrolysates, to be further used for formulating puddings with improved nutritional and texture properties and reduced allergenicity. Egg protein hydrolysis was done with proteinase K, which is a broad-specificity microbial protease. The enzyme exhibited strong proteolytic activity on both the egg yolk and egg white proteins, with degrees of hydrolysis of 20.1 and 15.1%, respectively. The effect on egg white proteins was significantly limited, likely due to the presence of protease inhibitors such as ovomucoid and ovom inhibitor. Hydrolysis with proteinase K significantly improved the antioxidant activity of the egg-derived proteins. This enhancement is likely due to the release of short peptides rich in amino acids with strong radical-scavenging properties, such as tyrosine and tryptophan. In terms of antigenicity, proteinase K hydrolysis led to a marked reduction of IgE-binding capacity, demonstrating its effectiveness in breaking down allergenic epitopes. The observed decrease suggests good potential for generating hypoallergenic egg-based ingredients. Further tests were carried out to study the use of these egg-derived peptides for developing puddings with higher protein content, better antioxidant activity, and low allergenic potential. The supplementation of the starch-based pudding with egg protein hydrolysate, to ensure a final protein content higher than 16%, resulted in final products with improved stability and water holding capacity, higher viscosity, and better texture. In this study, pudding was used as a model system for testing the suitability of incorporating in starch-based food products the functional egg-derived ingredients, resulting from extensive enzymatic processing.

Keywords: hydrolysis, egg proteins, pudding, proteinase K, antigenicity

Acknowledgment: The Integrated Center for Research, Expertise and Technological Transfer in Food Industry is acknowledged for providing technical support.

FUNCTIONAL PROPERTIES OF THE PROTEIN ENRICHED GLUTEN-FREE FLOURS

Anca Lupu¹, Iuliana Banu¹, Gabriela Râpeanu¹, Nicoleta Stănciuc¹, Ina Vasilean¹, Iuliana Aprodu^{1*}

¹*Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati, Domneasca Street 111, 800201, Galati, Romania*

*Corresponding author: iuliana.aprodu@ugal.ro

Abstract

Nowadays, considering the high incidence of celiac disease and the gluten-related disorders, the gluten-free diet has become a lifestyle for many consumers. It is well-known that gluten-free products have a low nutritional profile and poor physical characteristics. Therefore, identifying gluten-free flour blends with good technological functionality and breadmaking properties is highly desired. The aim of the study was to obtain gluten-free products with high nutritional value, respectively high-quality protein content, and good functional properties. For that purpose, the gluten-free blends consisting of quinoa and sorghum flours used in the study were enriched with proteins from pumpkin and hemp. The solubility profiles of the sorghum and quinoa flours as well as the blends enriched with proteins were obtained by running solvent retention capacity (SRC) tests. In order to determine the performance of the main chemical compounds of the flours, such as proteins, starch, and fibers, six types of solvents were used in the study. A better protein performance was noticed in the case of the gluten-free flour blends with respect to the controls. Regardless of the protein source, a significant improvement in the lactic acid-SRC was noticed in the case of the protein-rich flour blends. The swelling power and solubility index tests performed in the temperature range of 55-95°C indicated no important changes in the water-related properties of protein enriched composite flours when heated at temperatures over 75°C. On the other hand, protein addition resulted in significant improvement of the viscosity of the composite flour-based dough, as indicated by the rheological measurements. In conclusion, pumpkin and hemp proteins can be used to modulate the functionality and breadmaking properties of the quinoa and sorghum flour blends.

Keywords: vegetal proteins, gluten-free flours, functional properties

Acknowledgment: The Integrated Center for Research, Expertise and Technological Transfer in Food Industry is acknowledged for providing technical support.

VARIATION OF BIOGENIC AMINES IN PRESERVED *ALBURNUS CHALCOIDES* MEAT

Octavian Baston^{1*}, Octavian Barna¹

¹Food Science and Engineering, “Dunărea de Jos” University of Galați, 47,
Domnească street, Galați, România

*Corresponding author: octavian.baston@ugal.ro

Abstract

Alburnus chalcoides known as the Danube bleak, is a very tasty fish found in all freshwater sources and is not processed industrially as a food source. Fish meat is a perishable food because it spoils faster than other meats. Biogenic amines are bioactive substances that can occur naturally or be produced due to microbial activity in fresh fish meat. European law states that histamine is the key biogenic amine for human health. The maximum level allowed in fresh and processed fish high in histidine is 100 mg/kg. We analyzed seven biogenic amines in *Alburnus chalcoides* meat. These include cadaverine, histamine, putrescine, tryptamine, tyramine, spermine, and spermidine. The meat was preserved using the following methods: refrigeration, freezing, salting, and marinating. The study aimed to find the initial levels of biogenic amines in fresh fish fillets. It also looked at how these levels change in preserved and long-term stored fish meat. Refrigerated fish meat started with a low level of biogenic amines. Over time, these levels rose, with many surpassing 10 mg/kg by day 8. Yet, histamine levels did not exceed this value. Freezing is a very good method for preserving fish due to its low biogenic amines content. The fish meat starts with low biogenic amines. Also, their levels change little during storage. The histamine content remains very low. Salting and marinating are effective ways to preserve fish. They keep biogenic amines low during storage. Histamine levels also remain small, even after 8 months. The initial level of biogenic amines in fresh and preserved fish is low. Freezing is the best method for preserving fish. This method shows the lowest levels of biogenic amines. In contrast, marinating and salting increase the content of these amines due to how the fish fillets were initially processed.

Keywords: fish, histamine, biogenic amine index, marinating, salting

FISH PRESERVATION WITH SELECTED LACTIC ACID BACTERIA

Vasilica Barbu^{1*}, Chimène Agrippine Rodogune Yelouassi^{2,3}

¹ Faculty of Food Science and Engineering, Integrated Center for Research, Expertise and Technological Transfer in Food Industry (Bioaliment-TehnIA), “Dunarea de Jos” University of Galati, Romania, 111, Domneasca Street, 800201 Galati, Romania

² Research Laboratory in Fishery Products Treatment and Conservation, Faculty of Sciences and Technology, Université d’Abomey-Calavi-Bénin B P. 1270 Abomey-Calavi, Benin

³ Food Health Safety Research Unit of Laboratory of Microbiology, Food Technology and Phytopathology, Department of Plant Biology, Faculty of Sciences and Technology, University of Abomey-Calavi, Benin, P.O Box: 04 BP 888, Cotonou, Benin

*Corresponding author: vbarbu@ugal.ro

Abstract

The permanent need to ensure safe, sustainable food with high nutritional and biological value is a major current concern in food biotechnologies. Sustainability and functional foods are two key concepts that are increasingly relevant in today's food industry, as consumers become more aware of the environmental impact of food production and the potential health benefits of the foods they consume. A method previously proposed by Yelouassi et al., in 2018 and Dossou-Yovo et al in 2010 was adapted and improved with the aim of obtaining a functional product that meets the microbiological standards established by the Codex Alimentarius Commission, the Food and Drug Administration (FDA), the EU Food Safety Authority (EFSA) and the Regulation (EC) No 2073/2005. The microbiological parameters analyzed were the total number of aerobic mesophilic bacteria, the number of yeasts and molds, the probable number of coliforms, and the number of lactic acid bacteria. The results obtained through the proposed original preservation method showed superior microbiological innocuousness (absence of both coliforms and yeasts and molds) but also excellent viability of lactic acid bacteria (10^7 - 10^8 CFU/g), which gives the product a functional character.

Keywords: fish, fermentation, lactic acid bacteria, microbiological safety, sustainable and functional food

Acknowledgment: Integrated Center for Research, Expertise and Technological Transfer in Food Industry (BioAliment-TehnIA), “Dunărea de Jos” University of Galati, Romania) is acknowledged for providing technical support. The support regarding the probiotic strains offers by MIUG Collection affiliated at the The Microbial Resource Research Infrastructure (MIRRI) is gratefully acknowledged.

VITAMIN STABILITY UNDER COLD PLASMA TREATMENT: OPPORTUNITIES AND CHALLENGES

Omer Serif Aydin^{1,2}, Gamze Duven^{3*}, Yasemin Sahan⁴

¹Central Research Institute of Food and Feed Control 16160-Osmangazi, Bursa, Türkiye

²Graduate School of Natural and Applied Sciences, Bursa Uludag University, 16059-Görükle, Bursa, Türkiye

³Karacabey Vocational School, Bursa Uludag University, 16700-Karacabey, Bursa, Türkiye,

⁴Faculty of Agricultural, Bursa Uludag University, 16059-Görükle, Bursa, Türkiye

*Corresponding author: gamzeduven@uludag.edu.tr

Abstract

Vitamins are essential in numerous physiological functions, including growth and development, immune system support, energy production, nervous system function, and maintaining bone, dental, skin, nail, hair, and eye health. They are also involved in blood formation, exhibit antioxidant activity, enhance productivity, and support reproductive health. However, these compounds are susceptible to processing conditions, particularly thermal treatments, which can significantly reduce their nutritional value in foods and animal feeds. In recent years, cold plasma has gained attention as a non-thermal alternative capable of reducing microbial load while potentially preserving sensitive bioactive compounds like vitamins. The impact of cold plasma on vitamin stability depends on several factors, such as treatment time and distance, gas type and flow rate, frequency, voltage, and physical and chemical properties (moisture content, shape, surface structure, nutrient composition, etc.) of the food/feed matrix. While plasma treatment can enhance the detectable content of specific vitamins (e.g., B-group vitamins and carotenoids) by releasing them from membrane-bound forms, it may also induce degradation, particularly of vitamin C and E, due to the interaction with reactive species. Limited data exist on the effect of cold plasma on a broad range of vitamins, underscoring the need for more targeted studies and optimized treatment parameters. This review aims to provide a comprehensive overview of the advantages and limitations of cold plasma technology in preserving vitamin content in food and feed products.

Keywords: non-thermal, vitamin stabilization, food and feed, plant-based, functional foods

Acknowledgment: We gratefully acknowledge the financial support of the Bursa Uludag University Scientific Research Coordination Office (Project No: FGA-2023-1307, Title: Effect of cold plasma treatment on zearalenone removal and bioaccessibility and vitamin A and E contents in maize).

**BIOACTIVE NATURAL COMPOUNDS IN NEUROPROTECTION:
THERAPEUTIC VALUES OF RESVERATROL AND
CANNABINODS IN NEURODEGENERATIVE DISEASES**

Gabriela Vlăsceanu^{1*}, Andrei Apetrei²

¹*Faculty of General Medical Assistance, Bioterra University of Bucharest, str.
Gârlei 81, sector 1, Bucharest. Romania*

²*Alcos Bioprod SRL, str. Traian Lalescu 249, Sămurcași, Dâmbovița, Romania*

*Corresponding author: ga.vlasceanu@yahoo.com

Abstract

In the context of the increasing incidence of neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, and amyotrophic lateral sclerosis, the identification of effective and safe therapeutic alternatives has become a major priority. As a *goal*, the present study aims to analyze the neuroprotective potential of some bioactive natural compounds — in particular, resveratrol and cannabinoids — by highlighting the molecular mechanisms involved and the therapeutic valences demonstrated in preclinical and clinical research. *The results* are encouraging: Resveratrol, a polyphenol present in grapes and red wine, has demonstrated antioxidant, anti-inflammatory, and antiapoptotic effects, contributing to the reduction of oxidative stress and the aggregation of neurotoxic proteins. Resveratrol also modulates the expression of sirtuins, in particular SIRT1, positively influencing mitochondrial function and neuronal longevity. Cannabinoids, especially Δ^9 -tetrahydrocannabinol (THC) and cannabidiol (CBD), act on the endocannabinoid system through CB1 and CB2 receptors, having neuroprotective effects by regulating excitotoxicity, inflammation, and oxidative processes. Recent studies highlight the role of cannabinoids in improving cognition, reducing spasticity, and slowing the progression of neurodegeneration. The combination of resveratrol and cannabinoids could lead to therapeutic synergies through complementary actions on cell signaling pathways involved in neurodegeneration. *In conclusion*, Resveratrol and cannabinoids show promising potential as natural neuroprotective agents, offering relevant therapeutic perspectives for the management of neurodegenerative diseases. However, their efficacy and safety need to be validated through large-scale clinical trials. Continuing multidisciplinary research is essential to translate these discoveries into personalized, minimally invasive therapies that improve the quality of life of patients affected by these complex pathologies.

Keywords: neuroprotection, resveratrol, cannabinoids, neurodegenerative diseases

**RESVERATROL AND CANNABINODIES IN
NEURODEGENERATE CONTEXT: FROM FUNCTIONAL
NUTRITION TO SUPPLEMENT DEVELOPMENT AND
NOTIFICATION**

Gabriela Vlăsceanu^{1*}, Andrei Apetrei²

¹*Faculty of General Medical Assistance, Bioterra University of Bucharest, str.
Gârlei 81, sector 1, Bucharest. Romania*

²*Alcos Bioprod SRL, str. Traian Lalescu 249, Sămurcași, Dâmbovița, Romania*

*Corresponding author: ga.vlasceanu@yahoo.com

Abstract

In the context of an aging population and the increasing prevalence of neurodegenerative diseases, there is a pressing need for innovative approaches for prevention and therapeutic support. *The aim* of this study is to explore the potential of resveratrol and cannabinoids in neuroprotection, from the perspective of functional nutrition and their integration into notified food supplements, with applicability in the prevention and management of neurodegenerative disorders. *Results:* Resveratrol, a polyphenolic compound of natural origin (grapes, berries), has been intensively studied for its antioxidant, anti-inflammatory, and activation properties of neuronal longevity pathways (such as SIRT1). Cannabinoids, especially CBD and THC, influence the endocannabinoid system, modulating neuroinflammatory responses and reducing oxidative stress and excitotoxicity. In functional nutritional combinations, these substances can act synergistically, contributing to maintaining neuronal homeostasis and slowing the progression of diseases such as Alzheimer's and Parkinson's. Preclinical studies and preliminary clinical observations support the use of these compounds in supplement formulations with a neuroprotective role. In addition, European legislation allows the notification of food supplements based on natural active ingredients, providing a regulated framework for their development. *Conclusions:* The integration of resveratrol and cannabinoids in food supplements with neuroprotective valences represents a promising direction in the prevention of neurodegenerative diseases. From functional nutrition to notified commercial formulations, these compounds can constitute a bridge between scientific research and practical applicability. Rigorous clinical research is needed to establish effective doses, bioavailability, and long-term safety profile, in order to develop accessible, scientifically validated, and regulatory compliant products.

Keywords: functional foods, resveratrol, cannabinoids, supplements

CORNELIAN CHERRY (*CORNUS MAS L.*) AS A SOURCE OF FUNCTIONAL INGREDIENTS FOR FOOD PRODUCTS

Natalia Suhodol*, Eugenia Covaliov, Violina Popovici, Olga Deseatnicova,
Vladislav Reșitca

¹Faculty of Food Technology, Technical University of Moldova, 168 Ștefan cel
Mare blvd., Chisinau, Republic of Moldova

*Corresponding author: natalia.suhodol@toap.utm.md

Abstract

Cornelian cherry (*Cornus mas L.*) berries, traditionally cultivated and consumed as part of the daily diet in the Republic of Moldova, have seen growing demand in recent years due to their notable nutritional value and functional properties. Cornelian cherry (*Cornus mas L.*) belongs to the category of berry crops, for which cultivation areas are continuously expanding and being supplemented with new varieties adapted to the current requirements of the local market.

The objective of this study was to evaluate, from both technological and nutritional perspectives, the chemical composition and functional properties of the Cornelian cherry variety *Cornus mas* 'Elegantnyj', as well as the impact of different storage methods on these parameters.

The chemical and physical characteristics, along with the functional properties, of fresh, frozen, and dehydrated fruits obtained through various preservation methods were investigated.

The results revealed that fresh Cornelian cherries (*Cornus mas L.*) are rich in vitamin C (69.00 ± 0.65 mg/100 g), contain high levels of polyphenols (10.49 ± 0.75 mg GAE/g), and exhibit significant antioxidant activity (62.93 ± 0.56 % DPPH).

The evaluation of preservation methods indicated that freezing is the most favorable technique, allowing the retention of vitamin C at 54.30 ± 0.54 mg/100 g. Among the dehydration techniques, the most effective was convective drying at 60 °C, which preserved the highest vitamin C content (169.20 ± 1.78 mg/100 g).

The findings demonstrate that *Cornus mas L.* fruits are a valuable source of nutrients and bioactive compounds with functional properties, suggesting their potential for use as a dietary ingredient or for the development of novel food products.

Keywords: bioactive compounds, berries, antioxidants, polyphenols

Acknowledgment: We gratefully thank TUM institutional project no. 020405, "Optimizing food processing technologies in the context of the circular bioeconomy and climate change", Bio-OpTehPAS for financial support.

INFLUENCE OF SOLVENT SYSTEM ON THE LIPOSOMAL ENCAPSULATION EFFICIENCY OF GRAPE POMACE POLYPHENOLS

Violina Popovici, Eugenia Covaliov, Tatiana Capcanari, Oxana Radu

*Faculty of Food Technology, Technical University of Moldova, 9/9 Studentilor
street, Chisinau, Republic of Moldova*

*Corresponding author: violina.popovici@toap.utm.md

Abstract

Ensuring food safety and extending product shelf life remain key priorities for the food industry, particularly in the context of oxidative degradation of bioactive compounds, which has been associated with chronic diseases such as cardiovascular conditions, diabetes, and cancer. Polyphenols derived from grape pomace are widely recognized for their strong antioxidant properties and their ability to protect food products from oxidative damage. However, their sensitivity to environmental conditions limits their stability and bioavailability. Liposomal encapsulation offers a promising strategy to overcome these limitations by enhancing the protection and controlled release of such compounds.

This study explores the effect of dissolution media on the encapsulation efficiency and stability of grape pomace polyphenols within liposomal formulations. Liposomes were prepared using a modified heating technique (Mozafari method), with polyphenolic extracts dissolved in either distilled water (PDW) or ethanol (PEt). The water-based liposomes exhibited higher encapsulation efficiency ($89.59 \pm 2.47\%$) compared to the ethanolic ones ($84.13 \pm 1.89\%$). After four weeks of storage, the retention of polyphenols remained higher in the PDW formulation ($84.79 \pm 1.59\%$) than in the PEt formulation ($79.18 \pm 0.93\%$). Additionally, the PDW samples contained greater quantities of encapsulated polyphenols overall.

These results confirm the enhanced performance of water-based liposomal systems in stabilizing polyphenols from grape pomace. This encapsulation approach shows high potential for food applications, enabling the development of functional products with improved antioxidant stability and health-promoting benefits.

Keywords: Polyphenols, encapsulation, antioxidants, bioactive compounds.

Acknowledgment: The research was supported by the State Project for Young Researchers “Stabilization of Plant-derived Bioactive Compounds by Liposomal Encapsulation”, running within the Technical University of Moldova.

**VALIDATION OF THE COMPREHENSIVE FEEDING
PRACTICES QUESTIONNAIRE IN CAREGIVERS OF 2 TO 7-
YEAR-OLD CHILDREN IN ROMANIA**

**Cornelia Hodorogea (Huhulea)¹, Loredana Dumitraşcu²,
Iulia-Lidia Bleoancă², Dana-Iulia Moraru², Maria Turtoi^{3*}**

¹Doctoral School of Fundamental and Engineering Sciences, in the field of Food Engineering, “Dunarea de Jos” University of Galati, Galati, Romania

²Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati, 111 Domneasca Street, Galati, Romania

³Cross-Border Faculty, “Dunarea de Jos” University of Galati, 111 Domneasca Street, Galati, Romania

*Corresponding author: maria.turtoi@ugal.ro

Abstract

Recent national and global data show that the prevalence of overweight and obesity in all age groups has risen in Romania, and the predictions for the future are not encouraging. General food habits are formed in preschool age, being largely influenced by the feeding practices of the children’s caregivers. The Comprehensive Feeding Practices Questionnaire (CFPQ) is an important self-report measure for evaluating a broad range of parental feeding practices, having been validated for various age groups and in multiple countries. However, it has not yet been validated in Romania. This study aimed to translate, adapt, and validate the CFPQ in Romanian among caregivers of 2- to 7-year-old children in Romania.

A sample of 443 caregivers (91.87% mothers) of 2 to 7-year-olds completed the Romanian version of the CFPQ. Reliability analysis, Exploratory factor analysis (EFA), and Confirmatory factor analysis (CFA) were performed.

The Cronbach’s alpha coefficient indicated a good internal consistency (0.796). The Kaiser-Meyer-Olkin and Bartlett’s Test of sphericity coefficient of 0.819 showed that the data is appropriate and significant ($p < 0.001$) for factor analysis. The EFA generated 13 factors for the scale that explained 62.24% of the data variation. The confirmatory factor analysis did not confirm the 12-factor structure of the original CFPQ model.

The results show that the CFPQ, with some modifications tailored to the Romanian population, is a valid tool for measuring parental feeding practices among caregivers of 2 to 7-year-old children.

Keywords: child nutrition, feeding practices, EFA, obesity, Romania

FOOD FRAUD VULNERABILITY ASSESSMENT IN A BAKERY COMPANY

Delia Onea (Popescu)¹, Daniela Borda¹, Loredana Dumitrascu^{1*}

¹*Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati,
Domneasca, 111, Galati, Romania*

*Corresponding author: loredana.dumitrascu@ugal.ro

Abstract

In the food industry, food fraud is considered not only an economic concern but also an emerging risk both for consumers and food regulators. Thus, food business operators are required to demonstrate within the food safety management systems that it can be mitigated by conducting a food fraud vulnerability assessment (FFVA). The most well-known instruments and resources for FFVA are developed by (2) United States Pharmacopeial Convention (USP), (2) Safe Supply of Affordable Food Everywhere (SSAFE) in collaboration with PwC and Wageningen University, (3) IFS Standards Product Fraud. Therefore, the aim of this study was to conduct a FFVA in a company producing bakery products by using the SSAFE tool known as Vulnerability Assessment Critical Control Points. For each ingredient and product category, the operator was able to identify the motivations, opportunities, and control measures of vulnerabilities by answering a set of 50 questions. The analysis highlighted a high level of risk to food fraud when using cheap raw materials or working with unreliable suppliers or with those having a weak traceability system. An organizational culture oriented towards food safety and ethics would significantly reduce the risk of internal food fraud among employees. Based on this analysis, the operator decided to increase the efforts to promote the food safety culture inside the company. On the other hand, the tool did not provide recommendations to mitigate vulnerability reduction.

Keywords: food fraud, vulnerability assessment, risk

EMOTIONAL HUNGER AND SUSTAINABLE FOOD CHOICES: PERSPECTIVES ON THE ELDERLY

Ionica Coșoreanu (Fanaca)^{1,2}, Dana I., Moraru^{1*} Costinela V. Georgescu^{3,4}

¹*Faculty of Food Science and Engineering, "Dunărea de Jos" University, 111 Domnească Street, 800201 Galați, România,*

²*"Saint Apostle Andrew" Emergency County Clinical Hospital, 177 Brailei Street 800578, Galati, Romania*

³*Faculty of Medicine and Pharmacy, "Dunărea de Jos" University, 47 Domnească Street, 800010 Galați, România*

⁴*"Buna Vestire" Hospital of Obstetrics and Gynecology, 99 N. Alexandrescu Street, 800151, Galati, Romania*

*Corresponding author: dana.moraru@ugal.ro

Abstract

Emotional hunger, defined as the tendency to consume food in response to negative emotions rather than physiological hunger, represents a significant challenge to people's health and well-being. Emotional eating is therefore not a simple appetite, but a reaction to deep, sometimes repressed emotions (sadness, loneliness, anxiety, boredom), with significant consequences for physical and mental health. Older adults, especially those who have suffered major personal losses (of life partners, friends or autonomy), are particularly vulnerable. Studies indicate that emotional hunger in the elderly is often amplified by limited access to fresh food and poor-quality diets. In this context, sustainable nutrition can have a dual role: improving emotional health through balanced diets and reducing the ecological footprint by promoting responsible consumption.

This study aimed to investigate the association between emotions and dietary behaviour, providing an updated analysis of trends related to emotional eating and identifying factors that may influence food choices among older adults. Additionally, it proposes sustainable nutrition-based dietary solutions tailored to the specific physiological needs of the elderly.

According to the answers received, two-thirds of the respondents distinguish between physical and emotional hunger. Also, over half of them acknowledge that they eat when they are experiencing boredom, stress, or feel sad or lonely, and some of them say that eating helps them feel better. "Love and communication with loved ones", "discussions and/or relationships with friends and family", "dancing, walking, and watching a movie", as well as "prayer", are some of the activities that some elderly individuals use as strategies to cope with negative emotional states.

These results highlight the potential of eco-conscious dietary practices to enhance the health and well-being of older adults while advancing environmental sustainability. By promoting nutrient-rich diets tailored to the physiological needs of older adults, the underlying causes of emotional hunger can be mitigated, fostering healthy ageing and supporting global sustainability objectives in nutrition, gerontology, and environmental sciences.

Keywords: elderly well-being, emotional hunger, sustainable nutrition, healthy ageing

AWARENESS OF THE IMPORTANCE OF DIET AND LIFESTYLE IN PREVENTING AND MANAGING OSTEOPOROSIS

Anișoara D. Doroș-Girip^{1,3}, Dana I. Moraru^{1*}, Alexia A.Ș. Baltă^{2,3},
Doina C. Voinescu^{2,3}

¹Faculty of Food Science and Engineering, “Dunărea de Jos” University, 111
Domnească Street, 800201 Galați, România,

²Faculty of Medicine and Pharmacy, “Dunărea de Jos” University, 47 Domnească
Street, 800010 Galați, România

³“Saint Apostle Andrew” Emergency County Clinical Hospital, 177 Brailei Street
800578, Galați, Romania

*Corresponding author: dana.moraru@ugal.ro

Abstract

Osteoporosis, an insidious disease often undetected until a fracture occurs, is defined by reduced bone mineral density and increased skeletal fragility. This chronic, progressive, and multifactorial condition is influenced by factors such as poor nutrition, smoking, excessive alcohol consumption, insufficient sleep, and physical inactivity, highlighting the need for prevention through healthy lifestyle measures.

In 2025, based on projections from the International Osteoporosis Foundation and the World Health Organization, osteoporosis affects approximately 240 million individuals worldwide (2.9–3.0% of the 8.2 billion global population, 12% among adults aged 50 and over). In the EU-27, it impacts 7.6% of the population (~33.9 million, 22.6% of those aged 50 and over). In Romania, the prevalence is approximately 2.4% (~464,000 individuals, 5.8% of adults aged 50 and over); however, these prevalence estimates may be significantly higher due to underdiagnosis and undertreatment, as a substantial proportion of osteoporotic fracture cases remain undetected or untreated.

This study analyzes the influence of lifestyle on the risk of osteoporosis, evaluating factors such as nutrition, physical activity, alcohol consumption, smoking and sun exposure as well as awareness of these factors and obstacles in adopting healthy practices for the prevention of bone diseases. Also, through a retrospective study (2015-2024), the hospitalization episodes and the temporal evolution of patients diagnosed with osteoporosis and other bone density disorders, their number and the costs recorded for hospitalization were analyzed at the level of Galați County.

The results of the questionnaire highlight significant gaps in osteoporosis prevention, despite moderate awareness (86.3% are aware of the condition). Only ca. 30% consume dairy products daily, ~34% are physically inactive, and smoking and/or alcohol consumption (35.6%) are prevalent, especially in certain groups. Family

history (34%) and interest in education (56%) offer opportunities for targeted interventions, but moderate risk perception (ca. 50%) does not translate into appropriate preventive behaviour.

Osteoporosis prevention involves an ongoing personal commitment, through strategies such as optimal nutrition, regular physical activity, quitting smoking and moderate alcohol consumption. These individual decisions, made consciously, support bone integrity, reduce the risk of fractures and promote a better quality of life, constituting an essential investment in long-term mobility and independence.

Keywords: diet, osteoporosis, health education, prevention

EVALUATION OF NATURAL RADIOACTIVE CONTENT IN DRINKING WATER AND IMPACT ON HEALTH POPULATION

Violeta Pintilie-Nicolov², Dana. I. Moraru^{1*}, Amalia Balcan²,
Adelina G. Pintilie³

¹*Faculty of Food Science and Engineering, “Dunărea de Jos” University, 111
Domnească Street, 800201 Galați, România,*

²*Department of Public Health, Ionizing Radiation Laboratory, 12B Rosiori St.,
800066 Galați, Romania*

³*Institutul Oncologic „Prof. Dr. Alexandru Trestioreanu”, 252, Fundeni Sos.,
022308, Bucharest, Romania*

*Corresponding author: dana.moraru@ugal.ro

Abstract

Drinking water is an important route of ingestion of natural radionuclides from the environment by the population. Radiological characterization of water is required by law or rules to be carried out by drinking water producers. Radioactivity parameters, along with chemical and bacteriological parameters, are regulated by national and international laws. The assessment of the dose received by the population from ingestion of radionuclides through the consumption of drinking water is quantified by the parameter called the Annual effective dose.

The World Health Organization (WHO) and the European Directive 2013/51 Euratom recommended a value of 0.1 mSv for the effective dose equivalent for one person per year, as a safe level. The World Health Organization (WHO) and the Council Directive 2013/51/Euratom recommend a value of 0.1 mSv for the effective dose equivalent for one person per year as a safe level. The European requirements for the protection of the health of the population concerning radioactive substances in water intended for human consumption have been transposed into Romanian national legislation by Law 301/2015.

In this study, the concentration of natural radionuclides was determined from a batch of samples taken from Galați County and the *annual effective dose* for the adult population was evaluated. The radionuclides with the highest conversion factor from activity to dose were determined: Ra-226, Po-210, Pb-210, U-nat. Ra-226 was determined using the microprecipitation concentration technique and global alpha measurement. Po-210 and Pb-210 were determined by concentration by precipitation with potassium permanganate and then sequential determination by separation on SR resin. Natural uranium was determined by spectrophotometric measurement after concentration and separation on Dowex resin.

The values of the *annual effective dose* evaluated based on the radionuclide concentrations revealed that the consumption of drinking water for adults is safe in terms of the content of natural radionuclides.

However, it is regulated that it is necessary to monitor natural and artificial radionuclides in drinking water through continuous audit programs, which leads to the reporting of any changes in the content of natural and artificial radionuclides.

Keywords: drinking water, natural radionuclides, annual effective dose, radiological safety

Acknowledgment: The authors would like to express their gratitude to the technical support of Ionizing Radiation Hygiene Laboratory, Department of Public Health Galati.

CHILD NUTRITION: THE IMPORTANCE OF DIETARY FIBER IN EARLY CHILDHOOD, FROM WEANING TO AGE 6

Elena Dogaru (Pogorevici)¹, Dana I. Moraru^{1*}, A. Ramos-Villarroel⁴,
Nicoleta M. Maftai^{2,3}

¹Faculty of Food Science and Engineering, “Dunărea de Jos” University, 111
Domnească Street, 800201 Galați, România,

²Faculty of Medicine and Pharmacy, “Dunărea de Jos” University, 47 Domnească
Street, 800010 Galați, România

³Clinical Hospital of Children Hospital “Sf. Ioan”, 800487 Galati, Romania

⁴Laboratory Assessment and Use of Marine Resources, Venezuelan Institute of
Scientific Research, Center of Oceanology and Antarctic Studies, Venezuela

*Corresponding author: dana.moraru@ugal.ro

Abstract

Early childhood nutrition plays a pivotal role in ensuring optimal health, cognitive and metabolic development. Dietary fibers help maintain healthy digestion, support gut bacteria and boost immunity. Soluble and insoluble fibers act synergistically, and their natural sources (fruits, vegetables, legumes, whole grains) are key. Despite well-documented health benefits, fiber intake in young children remains significantly below recommended levels, both in Romania and internationally.

This study aimed to assess parents' knowledge of the dietary importance of dietary fiber in pediatric nutrition and the influence of parental feeding behavior on fiber intake, as well as children's food preferences. A questionnaire adapted from validated instruments (FITS, WIC) was distributed to parents of children under 6 years of age, both in Romania and Italy. Relevant differences have been highlighted: Italian respondents reported higher consumption of vegetables, legumes, and whole grains, driven by the Mediterranean diet. In contrast, Romanian children consumed mostly refined products, processed meat, and sweets. Only 2% of Romanian parents reported meeting the five daily portions of fruits and vegetables, compared to 14% in Italy. The data obtained reveal a significant difference between Romania and Italy in terms of children's eating behavior and the level of awareness of the role of fiber in the diet. While Italian parents follow a model closer to international nutritional recommendations (with an increased consumption of vegetables, legumes and whole grains), in Romania choices based on the child's taste, marketing and economic accessibility still prevail, to the detriment of the real nutritional content. The majority of respondents in both countries expressed interest in receiving information about dietary fiber, indicating openness to accurate nutritional education and a desire to improve their children's diets. This finding highlights a significant opportunity for the development and implementation of targeted educational interventions.

Keywords: child health, dietary fiber intake, childhood nutrition

**ORTHOREXIA: BETWEEN HEALTHY FOOD CHOICES AND
PATHOLOGICAL BEHAVIOR IN THE ROMANIAN
POPULATION – COMPARATIVE PRELIMINARY STUDY**

Elena Dogaru (Pogorevici)¹, Cecilia Curis^{2*}, Sebastian M. Curis², Nicoleta M. Maftai^{2,3}, Dana I. Moraru¹

¹*Faculty of Food Science and Engineering, “Dunărea de Jos” University, 111 Domnească Street, 800201 Galați, România,*

²*Faculty of Medicine and Pharmacy, “Dunărea de Jos” University, 47 Domnească Street, 800010 Galați, România*

³*Clinical Hospital of Children Hospital “Sf. Ioan”, 800487 Galați, Romania*

*Corresponding author: cecilia.curis@ugal.ro

Abstract:

Concern for maintaining health by adopting a certain dietary behavior, along with other measures such as physical exercise, can represent a lifestyle. When concern for choosing organic and healthy foods becomes obsessive, it can be classified as pathological behavior and defined as orthorexia. Due to its complexity, the concept of orthorexia requires an interdisciplinary approach. Initially appearing in connection with healthism, a social construct referring to health, the notion of orthorexia has been reconceptualized over time. Despite not being recognized by the American Psychiatric Association for inclusion in the DSM-5, a series of criteria have been established for its identification in practice and for possible intervention.

This study can be classified as a mixed study with a retrospective component of systematic review without clinical intervention and a prospective component based on the use of a questionnaire adapted for the Romanian population. A primary objective of the study is theoretical-conceptual, namely to quantify interest in the concept of orthorexia indirectly, more precisely through the number of articles published and their distribution over periods: pre-pandemic, pandemic, and post-pandemic (2015-2024). A second aim of the study, practical, was to conduct an observational study identifying the characteristics and frequency of orthorexia in the general population by collecting responses from a sample of adult respondents. The first component of the study was developed by querying the PubMed Central database using the search terms orthorexia-addiction-behavior, while the second was conducted using the Test of Orthorexia Nervosa (TON 17) questionnaire, which was drafted and distributed to respondents via Google Forms. The data obtained was processed using Microsoft Excel. The results of the research show that this concept, which has been in scientific literature for over two decades, although relatively frequently addressed in specialized studies, is still little known and understood at the individual level and in practice.

The conclusions highlight the need to recognize this behavior using existing formal criteria, emphasizing the component of emotional distress. In practice, the questionnaire can be a useful tool for identifying people with orthorexia for specialized intervention (nutrition education and psychotherapy).

Keywords: orthorexia, addiction, eating behavior

THE ACTIVITY OF THE FOOD BANK OF MOLDOVA DURING THE PERIOD 2020–2025

Laureana Odajiu, Nicolae Mocanu

*Faculty of Food Science and Engineering, "Dunărea de Jos" University of Galati,
Romania, 47 Domnească Street, Galati, Romania*

*Corresponding author: laureana.odajiu@ugal.ro

Abstract

This paper explores the evolution, impact, and operational strategies of the Food Bank of Moldova during the period 2020–2025. Established as a response to increasing levels of food waste and social vulnerability, the Food Bank has played a crucial role in redistributing surplus food to disadvantaged communities across the country. Through partnerships with major retailers, NGOs, and public institutions, the organization has succeeded in recovering over 882,000 meal portions, with approximately 442,000 meals provided in 2024 alone. The study examines the logistics of food collection and distribution, the socio-economic profile of beneficiaries, and the educational campaigns aimed at reducing food waste. Despite limited national infrastructure for food recovery, the Food Bank has demonstrated measurable impact by supporting over 9,000 vulnerable individuals annually, including children, the elderly, and persons with disabilities. The findings highlight both the successes and challenges of food banking in Moldova, offering policy recommendations for improving food security, social inclusion, and sustainability in the context of Eastern Europe.

Keywords: Food Bank, Republic of Moldova, food recovery, organizations, educational campaigns

QUALITY EVALUATION OF VARIOUS HOME MADE SYRUPS IN ROMANIA

Diana G. Gropoșilă-Constantinescu, Ioan N. Ranga^{*}, Gabriela L. Mărgărit

*Faculty of Biotechnologies, University of Agronomic Sciences and Veterinary
Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania*

^{*}Corresponding author: ioan.ranga@bth.usamv.ro

Abstract

Fruit syrups have been appreciated for their alleged health advantages for quite some time, although the scientific evidence supporting these claims is often limited. Fruit syrups were consumed to alleviate symptoms of colds and flu, as well as stomach discomfort, because of their alleged antibiotic, antiviral properties and immune-boosting effects that support overall human health. Although these traditional applications do not replace modern medical treatments, they underscore the historical importance of fruit syrups beyond their culinary uses. In this research, we assessed the quality of homemade fruit syrups by performing various physical, chemical, and sensory analyses that gave us a comprehensive understanding of how these syrups were produced in accordance with the applicable standards. The results of the organoleptic analysis showed that the syrups were appreciated for their appealing and clear colors, enjoyable tastes, and pleasing aromas, but also for their textures that contained little to no solid particles. Both physical and chemical assessments confirmed the quality of the syrups, highlighting their composition, preservation, and stability. Since turbidity reduces over time due to the slow settling of solids, and given the measurements range from 12.9 to 22.7 NTU, we concluded that the syrups were freshly made. pH levels ranging from 2.95 to 4.19 and total acid concentrations of 0.3% to 3.8% in citric acid are beneficial for inhibiting the growth of bacteria and mold, thus ensuring the product's stability. These parameters also help preventing sugar crystallization and alterations in color, which help maintain sensory quality while balancing the sweet and sour flavors and preserving the fruit's aroma, ultimately improving the product's overall quality. Microbiological testing indicated that all the syrups were free from contamination by bacteria or molds.

Keywords: fir buds, quality control, sea buckthorn, strawberry, syrup

FOOD BIOTECHNOLOGIES: INNOVATIONS AND CHALLENGES



23rd-24th of October 2025, On- site and online

**PROBIOTIC CHARACTER ASSESSMENT OF
LACTIPLANTIBACILLUS PENTOSUS STRAIN**

Vasilica Barbu^{1*}, Chimène Agrippine Rodogune Yelouassi^{2,3}

¹ Faculty of Food Science and Engineering, Integrated Center for Research, Expertise and Technological Transfer in Food Industry (Bioaliment-TehnIA), “Dunarea de Jos” University of Galati, Romania, 111, Domneasca Street, 800201 Galati, Romania

² Research Laboratory in Fishery Products Treatment and Conservation, Faculty of Sciences and Technology, Université d’Abomey-Calavi-Bénin B P. 1270 Abomey-Calavi, Benin

³ Food Health Safety Research Unit of Laboratory of Microbiology, Food Technology and Phytopathology, Department of Plant Biology, Faculty of Sciences and Technology, University of Abomey-Calavi, Benin, P.O Box: 04 BP 888, Cotonou, Benin

*Corresponding author: vbarbu@ugal.ro

Abstract

Lactiplantibacillus pentosus (*Lbp. pentosus*) is a versatile lactic acid bacteria recognized for its probiotic potential and diverse applications in food fermentation. The genome of this species gives it a strong adaptive capacity and it can occupy different ecological niches such as the epiphytic microbiota of olives, cereals, intestinal microbiota of mammals and insects, but especially in a wide range of fermented foods of vegetable or animal origin. Numerous recent studies evaluate the probiotic potential of *Lbp. pentosus* and highlight, in addition to its role as a food biopreservative, its multiple health benefits, including immunomodulatory, blood pressure, and cholesterol-lowering effects. In this study, a strain of *Lbp. pentosus* was isolated from the epiphytic microbiota of corn caryopses and its growth kinetics and lactic acid production capacity were analyzed. The isolate demonstrated outstanding performance in terms of stress tolerance (salinity, pH, bile salts), adaptability in the simulated gastrointestinal system, antibiotic resistance/susceptibility, and antimicrobial activity. The *Lactiplantibacillus pentosus* strain exhibits unique probiotic properties, making it valuable across various industries, including agriculture, pharmaceuticals, cosmetics, and particularly the food sector.

Keywords: probiotic, *Lactiplantibacillus pentosus*, simulated gastrointestinal system, stress tolerance, antibiogram pattern

Acknowledgment: Integrated Center for Research, Expertise and Technological Transfer in Food Industry (BioAliment-TehnIA), Dunărea de Jos University of Galati, Romania) is acknowledged for providing technical support. The support regarding the probiotic strains offers by MIUG Collection affiliated at the The Microbial Resource Research Infrastructure (MIRRI) is gratefully acknowledged.

IN SILICO INVESTIGATIONS ON THE PROPERTIES OF SOY ALLERGENS UPON ENZYME HYDROLYSIS

Daniela Țiuleanu (Bari)¹, Ina Vasilean¹, Iuliana Banu¹, Iuliana Aprodu^{1*}

¹Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati,
Domneasca Street 111, 800201, Galati, Romania

*Corresponding author: iuliana.aprodu@ugal.ro

Abstract

Soybeans are known for their high content of good quality proteins, but nowadays many consumers choose a soy-free diet because of the presence of allergenic proteins and some natural anti-nutrients. The main soybean proteins responsible for the allergenic response in sensitive individuals are members of the cupin superfamily, namely glycinin (11S) and β -conglycinin (7S). The objective of this *in silico* investigation was to provide insights into the effect of enzyme-assisted hydrolysis on the integrity of the linear epitopes of glycinin and β -conglycinin. In order to simulate the gradual hydrolysis process, different degrees of hydrolysis were simulated, and the probability of epitope alteration was checked to estimate the potential impact on the allergenic properties. The enzymes tested for soybean protein hydrolysis were the digestive enzymes, namely pepsin, trypsin, and chymotrypsin, which act in sequence on the food proteins in the human gastrointestinal tract. Because of the differences in specificity for different peptide bonds, the tested enzymes exhibited different efficiencies in recognizing and cleaving the targets. When simulating the complete hydrolysis of allergenic proteins, with individual enzymes, it was observed that the most efficient was chymotrypsin, which was able to alter, to the highest extent, most of the epitopes of all allergens. Chymotrypsin was followed by pepsin in the case of using β -conglycinin as substrate, and by trypsin in the case of glycinin. On the other hand, when acting in sequence, the complete hydrolysis of the soy allergens by the digestive enzymes caused significant alteration of all epitopes. Anyway, it should be noted that the complete hydrolysis is an ideal scenario. The *in silico* tests indicated that the complete hydrolysis of the soy proteins resulted in a wide range of peptides with 3 to 20 amino acids, with potential antioxidant properties.

Keywords: hydrolysis, egg proteins, pudding, proteinase K, antigenicity.

Acknowledgment: The Integrated Center for Research, Expertise and Technological Transfer in Food Industry is acknowledged for providing technical support.

**THE FUTURE OF FERMENTATION: TECH-DRIVEN
STRATEGIES TO BOOST GABA IN CEREAL-BASED
FERMENTED FOODS**

Gamze Düven^{1*}, Sine Özmen Toğay²

*¹Karacabey Vocational School, Bursa Uludag University, 16700-Karacabey,
Bursa, Türkiye,*

²Faculty of Agricultural, Bursa Uludag University, 16059-Görükle, Bursa, Türkiye

*Corresponding author: gamzeduven@uludag.edu.tr

Abstract

Gamma-aminobutyric acid (GABA) is a non-protein amino acid with four carbon atoms and is a bioactive compound known for its positive effects on human health. Due to its calming effects on the nervous system, ability to lower blood pressure, and anti-stress properties, GABA has gained importance in the development of functional foods. Cereal-based fermented products are considered suitable matrices for GABA production, especially for individuals who cannot consume animal-based foods (e.g., vegans, vegetarians, individuals with milk protein allergies or lactose intolerance). Depending on the type of cereal used and its substrate content, a fermented cereal product can be transformed into a high-GABA food by appropriate microorganisms and optimized fermentation conditions. Technological interventions play a key role in enhancing GABA content during this transformation process. Novel fermentation technologies (such as precision fermentation and molecular biology techniques), selection of starter cultures, optimization of environmental conditions (pH, temperature, duration), and biotechnological applications (enzyme addition, co-culture usage) can significantly increase GABA synthesis. Furthermore, innovative approaches such as controlled fermentation systems and enrichment with probiotics can improve both product quality and GABA levels. As a result, with the opportunities offered by technology, traditional or newly developed cereal-based fermented foods can be transformed into functional products enriched in GABA content. This contributes significantly to both the food industry and public health. This study examines the factors and technological methods that influence the enhancement of GABA content in cereal-based fermented foods.

Keywords: GABA, cereal-based fermentation, precision fermentation, plant-based, functional foods

Acknowledgment: This study was supported by the TÜBİTAK 2515 EU COST Projects Program under the project numbered 124O180, titled “Investigation of Potential Psychobiotic Strains Producing GABA (Gamma-Aminobutyric Acid) in Boza Produced from Different Raw Materials.” We would like to express our gratitude to TÜBİTAK for their financial support.

**EVALUATION OF THE BIOACTIVE POTENTIAL OF
COMPOUNDS DERIVED FROM THE FERMENTATION OF
HEMP SEEDS USING ARTISANAL STARTER CULTURES**

**Virginia (Apetroaei) Tănase*, Gabriela Elena Bahrim, Aida Mihaela Vasile,
Daniela Ionela Istrati, Mihaela Cotârleț, Eugenia Mihaela Pricop, Camelia
Vizireanu**

*Faculty of Food Science and Engineering, "Dunarea de Jos" University of Galati,
47 Domnească Street, RO-800008, Galati, Romania*

*Corresponding author: virginia.ape7@gmail.com

Abstract

This study aimed to investigate the influence of composition and kefir grain type on antioxidant activity and the bioactive compound content in fermentation media. Hulled hemp seeds, with or without added coconut flour, were fermented using either milk kefir or water kefir grains.

The evaluation of antioxidant activity (using ABTS and DPPH assays) and the content of bioactive compounds (proteins, flavonoids, and polyphenols) revealed significant differences between samples, depending on the type of fermentation and the initial matrix composition. A positive effect of water kefir fermentation on antioxidant activity was observed, and the addition of coconut flour influenced the biochemical profile of the beverages.

For example, the extract obtained from the matrix without added coconut flour and fermented with water kefir grains (S3 – 2A IV) showed the highest antioxidant activity (RSA% - ABTS: 60.11%), protein content (18.91 mg/g d.w.), and polyphenol content (4.52 mg GAE/g d.w.). Furthermore, the two peptide fractions, 3 kDa and 10 kDa, from the same sample exhibited improved antioxidant capacities (RSA% - ABTS: 58.17%, DPPH: 37.10%) and (RSA% - ABTS: 77.54%, DPPH: 39.61%), respectively, highlighting the synergistic effect of the medium formulation and the fermentation type.

These results suggest that formulation and processing methods can significantly impact the nutritional and functional value of fermented plant-based products, potentially serving as sources of bioactive compounds with antioxidant properties.

Keywords: hulled hemp seeds, fermentation, antioxidant activity, bioactive compounds

Acknowledgment: I would like to thank the technical support from the Integrated Center for Research, Expertise, and Technological Transfer in Food Industry (https://www.bioaliment.ugal.ro/index_en.html).

**STRUCTURAL ANALYSIS OF SURFACE-ASSOCIATED
PROTEINS IN *LACTICASEIBACILLUS RHAMNOSUS* MIUG BL38
STRAIN AND THEIR BIOACTIVE IMPLICATIONS**

**Mihaela Cotârleț¹, Brîndușa Alina Petre^{2,3}, Gabriela Elena Bahrim¹, Leontina
Grigore-Gurgu^{1*}**

¹Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galați,
111 Domnească Street, 800201, Galați, Romania; ²Faculty of Chemistry, “Al. I.
Cuza” University of Iasi, 11, Carol I Boulevard, 700506 Iasi, Romania; ³Center
for Fundamental Research and Experimental Development in Translation
Medicine–TRANSCEND, Regional Institute of Oncology, 700483 Iasi, Romania

*Corresponding author: Leontina.Gurgu@ugal.ro

Abstract

Lactocaseibacillus rhamnosus is a well-documented probiotic species known for its ability to adhere to the intestinal mucosa, inhibit the pathogenic activity, modulate the proliferation of beneficial microbiota, and contribute to the overall host health. These functions and beneficial effects are closely correlated with cell surface-associated proteins, which are key components of the bacterial proteome. Subsequently, these proteins are translocated from the cytoplasm to the cell wall, where they play a crucial role in mediating the interactions between the probiotic cells and the intestinal mucosa, including adhesion, signaling, and host immune responses. In the present study, the wall-associated proteins of *Lcb. rhamnosus* MIUG BL38 probiotic strain were investigated, with a particular focus on the small molecular peptides extracted using 5M LiCl, which selectively release non-covalently bound cell-wall associated components. The matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOFF) analysis highlighted two distinctives groups of molecules, one having the molecular masses between 400 and 600 Da, and the other in the range of 5-20 kDa. The 400-600 Da molecules are likely short bioactive peptides, metabolic byproducts or quorum-sensing compounds that are potentially involved in intercellular signaling or host-microbiome communication. The second group of molecules, ranging from 5-20 kDa, includes peptides with antimicrobial activity against various pathogenic microorganisms within the host microbiome. It also comprises putative truncated surface adhesins that facilitate adhesion to the intestinal epithelium, thereby enhancing colonization of beneficial bacteria and competing with pathogens for binding sites and nutrients. The antibacterial activity was confirmed by an *in vitro* study. Future *in vivo* investigations in fish models will be performed to evaluate the impact of these surface-associated peptides on the gut microbiota and the potential cytotoxic effects on intestinal and hepatic tissue under aquaculture relevant conditions.

Keywords: Probiotics, *Lcb. rhamnosus MIUG BL38*, surfaces-associated proteins, bioactives

Acknowledgment: To internal grant, GI 7960/31.03.2025 from “Dunarea de Jos” University of Galati, Romania. The *Integrated Center for Research, Expertise, and Technological Transfer in Food Industry* -BioAliment-TehnIA and the *Microbial Resource Research Infrastructure-MIRRI* (www.mirri.org) is gratefully acknowledged for scientific support and infrastructures.

DYNAMICS OF SOME EMERGING CONTAMINANTS IN WATER AND SEDIMENT ALONG THE BLACK SEA COAST

**Diana Moisa (Danilov)^{1,2*}, Valentina Coatu², Carmen Chițescu³, Iulia Grecu¹,
Angelica Docan¹, Andra Oros², Luminita Lazar², Nicoleta Damir², Lorena
Dediu^{1*}**

¹*Faculty of Food Science and Environment, “Dunarea de Jos” University of
Galati, 47 Domnească Street, RO-800008, Galati, Romania,*

²*National Institute for Marine Research and Development “Grigore Antipa”,
Mamaia 300, Constanta, Romania, www.rmri.ro*

³*Faculty of Medicine and Pharmacy, “Dunarea de Jos” University of Galati, 35
A.I. Cuza Street, 800010 Galati, Romania;*

*Corresponding author: ddanilov@alpha.rmri.ro, lorena.dediu@ugal.ro

Abstract

The Black Sea is a semi-enclosed marine basin with limited water exchange, making it particularly sensitive to environmental stressors and pollutant accumulation. Over the past decades, it has been exposed to increasing anthropogenic pressure, including urbanization, agricultural runoff, untreated or poorly treated wastewater discharges, and intensive seasonal tourism.

Traditional pollutants such as nutrients, heavy metals, polycyclic aromatic hydrocarbons, organochlorine pesticides, and polychlorinated biphenyls have been widely studied and monitored.

In recent years, attention has shifted toward a new class of contaminants—emerging contaminants which have the potential to adversely affect aquatic ecosystems. Among these, pharmaceutical compounds are of particular concern due to their widespread use, continuous discharge into the environment, persistence, and ability to interfere with biological processes even at low concentrations.

Thus, water and sediment samples collected from the Romanian Black Sea coast were analyzed to determine the presence and concentration levels of some selected pharmaceutical compounds. Sample extraction was performed using the QuEChERS method, and analysis was carried out using high-performance liquid chromatography coupled with tandem mass spectrometry (HPLC-MS/MS).

This study evaluates the presence and distribution of selected pharmaceutical compounds along the Romanian Black Sea coast, focusing on their quantification in surface waters and detection in marine sediments.

The results show the widespread presence of pharmaceutical contaminants in coastal waters of the Black Sea and their absence in marine sediments. This highlights the

need for continued monitoring and better management of pollution sources in this sensitive marine ecosystem.

Keywords: Black Sea, emerging contaminants, pharmaceutical compounds, water, sediments

Acknowledgment: This research has been carried out with financial support from the NUCLEU Programme (SMART-BLUE) funded by the Ministry of Research, Innovation, and Digitization, project no. PN23230103, and from the National Monitoring Programme, founded by the Ministry of Environment, Water and Forests, Contract no 50/21.04.2023.)

**TURMERIC-ENRICHED FUNCTIONAL FEED ENHANCES
GROWTH, ANTIOXIDANT DEFENSE, AND THERMAL
RESILIENCE IN KOI CARP UNDER CLIMATE-INDUCED
TEMPERATURE STRESS**

Chrysanthi Kalloniati^{1,2}, Alina Antache^{3,4}, Ira-Adeline Simionov^{3,4}, Stefan M. Petrea^{3,4}, Sofia Marka¹, Maria-Eleftheria Zografaki¹, Giorgos Tsirtsis², Catalina Iticescu^{3,5}, Emmanouil Flemetakis¹, Rodica C. Efrose^{1,5*}

¹*School of Applied Biology and Biotechnology, Agricultural University of Athens, Athens, Greece*

²*School of Environment, University of the Aegean, Mytilene, Greece*

³*REXDAN Research Infrastructure, “Dunărea de Jos” University of Galați, Galați, Romania*

⁴*Faculty of Food Science and Engineering, “Dunărea de Jos” University of Galați, Galați, Romania*

⁵*Faculty of Sciences and Environment, “Dunărea de Jos” University of Galați, Galați, Romania*

*Corresponding author: rodiefros@aua.gr

Abstract

Rising climate variability poses a major challenge to aquaculture, as temperature extremes disrupt physiological balance and productivity in fish. Developing adaptive nutritional strategies is therefore crucial for sustainable farming. This study evaluated an innovative fish feed (IF) aimed at improving growth, welfare, and antioxidant defense in koi carp (*Cyprinus carpio* var. Koi, L., 1758) exposed to thermal stress. Four diets were tested: IF with turmeric (V1), IF with beetroot (V2), IF without additives (V3), and a commercial feed (V4). After eight weeks of feeding, fish were exposed to low (17 °C), normal (25 °C), and high (35 °C) temperatures for six hours. Growth performance analyses showed that V1-fed fish achieved the highest specific growth rate ($\text{SGR} = 1.21 \pm 0.03 \text{ \% day}^{-1}$) and protein efficiency ratio ($\text{PER} = 2.1 \pm 0.1$), alongside the lowest feed conversion ratio ($\text{FCR} = 0.92 \pm 0.05$). In contrast, V4-fed fish exhibited lower growth efficiency, particularly under high temperature. Hematological assessments revealed that V1 fish maintained stable red blood cell counts ($6.7 \times 10^6 \text{ cells/}\mu\text{L}$), hemoglobin (12.5 g/dL), and hematocrit (35%) across temperature regimes, suggesting improved oxygen transport and metabolic resilience. V4 fish showed pronounced declines in these parameters at 35 °C, indicating stress-induced haematological suppression. PCA analysis of biochemical and molecular data confirmed clear clustering by feed type. V1 and V2 groups formed distinct, compact clusters across temperatures, indicating physiological

stability and antioxidant activation. Antioxidant enzyme activities (SOD, CAT, GPx) were 1.6–2.3 times higher in V1-fed fish than in V4-fed controls, while lipid peroxidation (MDA) was lowest in V1. Gene expression results showed strong upregulation especially of *SOD* and *GPx*, and *Hsp70*, in V1-fed fish, confirming enhanced antioxidant and stress-response capacity. Overall, turmeric-supplemented IF (V1) most effectively supported growth, hematological stability, and oxidative stress resilience under thermal extremes. These results demonstrate the potential of bioactive-enriched feeds to promote fish welfare and thermotolerance, offering valuable tools for climate-resilient aquaculture.

Keywords: climate-resilient aquaculture, thermal stress, turmeric supplementation, antioxidant defense, koi carp (*Cyprinus carpio* var. Koi)

Acknowledgment: This work was supported by the project ResPonSE, (contract no. 760010/30.12.2022), developed with the support of the Romanian Ministry of Research

**ADVANCING THE GREEN NEXUS OF
AQUACULTURE AND
ENVIRONMENTAL SCIENCE:
PERSPECTIVES ON FUTURE BLUE
ECONOMY DEVELOPMENT**



23rd-24th of October 2025, On- site and online

**DIETARY *ULVA LACTUCA* EXTRACT MODULATES THE
RESPONSE OF FISH TO OXYTETRACYCLINE AND
FLORFENICOL ADMINISTRATION**

**Alina Nicoleta Macoveiu^{1,2}, Mirela Crețu^{1,3}, Iulia Grecu^{1,3}, Angelica Docan^{1,3},
Ion Vasilean¹, Săndița Placintă¹, Maria Desimira Stroe², Lorena Dediu^{1,3*}**

¹ Faculty of Science and Environment, “Dunărea de Jos” University of Galați, , 47
Domnească Street, RO-800008, Galați, Romania,

² Research-Development Institute for Aquatic Ecology, Fisheries and Aquaculture,
Galați, Romania.

³ Romanian Center for Modelling of Recirculating Aquaculture System, “Dunărea
de Jos” University of Galați, Dr. Alexandru Carnabel No. 61, 800201 Galați,
Romania

*Corresponding author: lorena.dediu@ugal.ro

Abstract

The intensive and often inappropriate use of antibiotics in aquaculture significantly contributes to the emergence of bacterial resistance and the reduced effectiveness of antimicrobial treatments. In fish farming, oxytetracycline (OTC) — a broad-spectrum, bacteriostatic tetracycline antibiotic derived from *Streptomyces* spp. — and florfenicol (FLO) — a structural analog of chloramphenicol with enhanced activity against certain bacterial strains — are among the most commonly administered agents. Considering growing concerns about the ecotoxic effects on aquatic organisms and the antimicrobial resistance associated with frequent use of antibiotics such as OTC and FLO, the identification of natural agents with adjuvant potential has emerged as a promising research direction. Green macroalgae, particularly *Ulva lactuca*, have attracted attention due to their rich content of bioactive compounds, including sulfated polysaccharides, pigments, polyphenols, and essential fatty acids.

This study investigated the potential of *Ulva lactuca* as a natural neoadjuvant that can enhance the efficacy of antibiotics, specifically oxytetracycline (OTC) and florfenicol (FLO), while reducing their associated adverse effects. Over an 11-week feeding period, *Cyprinus carpio* specimens received either a standard diet or a diet enriched with *Ulva lactuca*. Following this period, fish were randomly assigned to six experimental groups (three replicates per group, n = 30 fish/replicate): (1) FC – control group fed a conventional diet; (2) FC + FLO – conventional diet with florfenicol treatment; (3) FC + OTC – conventional diet with oxytetracycline treatment; (4) FCU – diet supplemented with *Ulva lactuca*; (5) FCU + FLO – *Ulva lactuca* diet with florfenicol; and (6) FCU + OTC – *Ulva lactuca* diet with

oxytetracycline. Antibiotic treatments were administered via food for 10 days. This experimental design enabled a comparative assessment of antibiotic effects and the modulatory role of *Ulva lactuca* on physiological and biochemical parameters. Hematological indices (hemoglobin, hematocrit, MCHC, MCV, HEM) and biomarkers of oxidative stress and immune function (TAC, MDA, lysozyme) were analyzed. Results showed that both antibiotics exerted detrimental effects on fish health, while *supplementation with Ulva lactuca* exhibited a mitigating effect, suggesting its potential as an effective immunostimulant and natural adjuvant. These findings contribute to a deeper understanding of antibiotic impacts in aquaculture and support the integration of *Ulva lactuca* in fish diets as a sustainable strategy to enhance resilience and reduce antibiotic-related stress.

Keywords: antibiotics, antimicrobial resistance, *Ulva lactuca*, natural neoadjuvant, sustainable aquaculture

EVALUATION OF THE FUNCTIONAL PROPERTIES OF SQUID INK BIOACTIVE COMPOUNDS FOR THE DEVELOPMENT OF BIO-BASED WOUND DRESSINGS

Mina Ahmadi^{1*}, Haniye Rostamzad²

¹ *Aquatics Fish Processing Research Center, Iranian Fisheries Science Research Institute (IFSRI), Agricultural Research, Education & Extension Organization (AREEO), Bandar Anzali, Iran,*

² *Department of Fisheries, Faculty of Natural Resources, University of Guilan, Someasera, Guilan, Iran*

*Corresponding author: ahmadimina64@yahoo.com

Abstract

In recent years, increasing attention has been directed toward the use of natural resources with multifunctional bioactivities and environmental sustainability in the field of wound healing. One of the emerging candidates in this regard is squid ink, which, due to its rich content of melanin, sulfated polysaccharides, peptides, enzymes, and biogenic nanoparticles, exhibits significant potential for the development of bio-based wound dressings.

This marine-derived secretion possesses a unique biochemical profile that provides a broad spectrum of therapeutic properties, including antibacterial, anti-inflammatory, antioxidant, hemostatic, and tissue-regenerative effects. Several studies have highlighted the synergistic effects of melanin and sulfated polysaccharides in inhibiting the growth of antibiotic-resistant bacteria and reducing oxidative stress at the wound site. Furthermore, the hemostatic activity of squid ink, attributed to its protein and polysaccharide content, plays a key role in rapid blood clotting and promoting the initial hemostatic phase of wound repair. Recent investigations have demonstrated that a combination of squid ink polysaccharides with chitosan (SIP-CS), formulated as a sponge-type wound dressing, was able to enhance hemocyte recruitment, achieve faster bleeding control, and accelerate the healing process of burn wounds in *in vivo* rabbit models. Moreover, melanin nanoparticles derived from squid ink have shown promising results in modulating immune responses, promoting angiogenesis, and stimulating collagen synthesis, offering a novel approach for next-generation wound care systems.

Given that squid ink is a by-product of the seafood processing industry, its utilization in biomedical applications not only offers an innovative and efficient solution for treating acute and chronic wounds but also contributes to the development of green and sustainable technologies. However, to advance its clinical applications, further research-including well-designed *in vivo* and clinical trials is essential to evaluate its safety, mechanisms of action, and scalability for industrial production.

Keywords: squid ink, bioactive wound dressing, green technologies, wound healing

**EVALUATION OF THE PRIMARY PRODUCTION OF THE
SAPLING VARA I FISH GROWING POND, WITHIN THE
MĂLINA FISH FARM, GALAȚI COUNTY**

Popescu Adina¹, Ibanescu C. Daniela¹

¹ *Faculty of Food Science and Engineering, “Dunarea de Jos” University of
Galati, Domneasca Street, no. 47, Galati, Romania*

*Corresponding author: Adina.popescu@ugal.ro

Abstract

Monitoring chlorophyll in phytoplankton provides researchers and water managers with essential data on water quality, as these organisms are very responsive to changes in nutrient levels. Therefore, chlorophyll measurement is also an effective and indirect indicator of nutrient pollution, but also an indicator of the primary production of the basins. Phytoplankton is the main primary producer of organic matter for many aquatic ecosystems.

The qualitative assessment of water, by determining the physico-chemical parameters, was carried out according to order 161/2006. The determination of phytoplankton primary production was done by the Gaarder-Gran method, by determining chlorophyll pigments. The ecological status was established based on the degree of eutrophication, by determining the amount of chlorophyll *a*, a quality indicator according to order 161/2006. The assessments were made within the Mălina Fish Farm, Galați County.

During the monitoring of physico-chemical parameters, the water quality in the summer I fry rearing basin at the Mălina fish farm remained within the permitted and recommended limits for waters used in fish farming. Overall, it was classified as belonging to the second quality category.

Phytoplankton primary production was determined based on oxygen consumption, estimated by calculating gross and net production, as well as oxygen consumption through plankton respiration. The results indicate a good level of primary production and are presented in Figure 1.

The quantitative analysis of assimilatory pigments showed that the highest photosynthetic potential occurred during the vegetative season. During this period, the combined concentration of chlorophyll *a* and pheophytin ranged from 22.37 to 36.68 mg/l. In contrast, the lowest values were recorded in spring, when the concentration of chlorophyll *a* and pheophytin ranged from 6.31 to 10.79 mg/l.

The highest amount of chlorophyll was recorded in the vegetative season, and according to order 161/2006, the pond is eutrophic, characterized by high trophicity,

lower water transparency (well-developed phytoplankton), and good biological production.

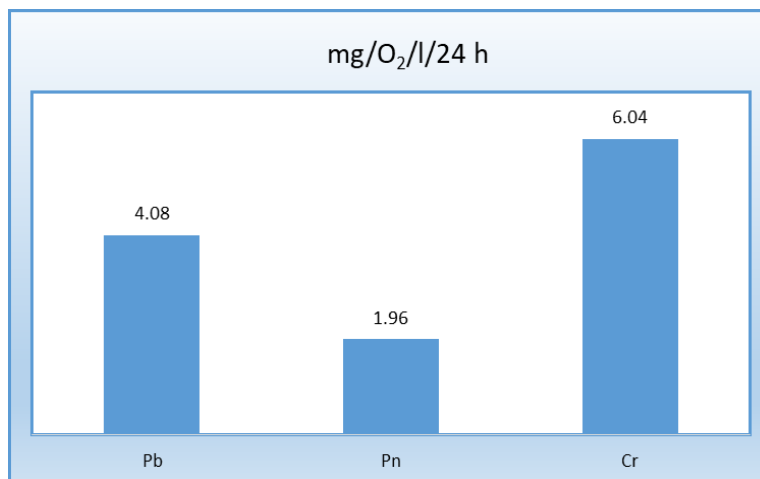


Figure 1. Determination of primary production based on oxygen consumption

The primary production, determined by the two methods of the summer I juvenile rearing pond within the Malina Fish Farm, Galati County, is good. The pond provides a sufficient amount of phytoplankton necessary for the nutrition of carp and phytophagous fish in the first stage of development.

Keywords: phytoplankton, chlorophyll, primary production, trophic potential, water

Acknowledgment: This paper was supported by the UDJG Research Center MoRAS

BIODIVERSITY OF COMMERCIAL CATCHES FROM ROMANIA'S INLAND WATERS

Daniela Cristina Ibănescu^{1*}, Adina Popescu¹

¹ Faculty of Food Science and Engineering, "Dunarea de Jos" University of Galati, 111 Domneasca Street, 800201 Galati, Romania

*Corresponding author: dgheorghe@ugal.ro

Abstract

Commercial fishing involves the capture of fish and other aquatic organisms by authorized personnel, using gear and methods permitted by law.

Romania's fishery-related patrimony consists of all areas permanently or temporarily covered with water that hold strategic ecological, economic, and social value. The natural aquatic basins that are part of the national public domain and where legal fishing activities are conducted include: the Danube River, the Danube Delta, the Razim – Sinoie lake complex, reservoir lakes, the Prut and Siret rivers, and the coastal zone of the Black Sea.

This study aims to assess the diversity of inland commercial catches, as the diversity of ichthyofauna reflects both the natural richness of the country's aquatic ecosystems and the anthropogenic pressures exerted upon them.

The processed data consists of statistical reports on the total commercial fishing catches recorded by economic agents authorized to engage in commercial fishing within waters under Romanian jurisdiction between 2008 and 2022, as published on the official website of the National Agency for Fisheries and Aquaculture.

Reported catches by fishermen (excluding the Danube Delta Biosphere Reserve) between 2008 and 2022 remained relatively stable, ranging from 2,457 tons (in 2010) to 3,868.51 tons (in 2016). The dominant species captured during this period belong to the family *Cyprinidae*. Biodiversity was assessed using several established diversity indices, including Simpson, Shannon, Menhinick, Margalef, and Berger–Parker. In addition, measures of evenness (Shannon and Simpson evenness indices) were calculated. These evenness indices account for the distribution pattern of individuals among species. The indices were computed based on catch biomass.

The values of the applied diversity indices suggest that, in 2022, the species composition of the commercial catches was the most balanced.

Although both species and allowable catch quantities are annually regulated through official ordinances. The optimal values recorded for the diversity indices in 2022 indicate that the relative abundance of each species in the catches was at its most favorable.

This balance contributes to the maintenance of functional ecosystem stability, as well as to the enhancement of overall productivity through the increased representation of each species' functional traits within the fish community.

Keywords: catch, biodiversity, commercial fishing

Acknowledgment: This paper was supported by the UDJG Research Center MoRAS

THE CHALLENGES OF THE BLUE ECONOMY

Aurelia Nica^{1,2*}, Isabelle Metaxa¹, Alina Antache^{1,3}, Ira -Adeline Simionov^{1,3},
Stefan-Mihai Petrea^{1,3}

¹Food Science, Food Engineering, Biotechnology and Aquaculture Department,
Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati,
Domnească Street, no. 47, Galați – 800008, Romania

² “Dunarea de Jos” University of Galati, Multidisciplinary Research Platform
(ReForm) – MoRAS, Galați, Romania

³ “REXDAN Center, “Dunarea de Jos” University of Galati, Domnească Street,
no. 47, Galați – 800008, Romania

*Corresponding author: anica@ugal.ro

Abstract

The concept of a sustainable blue economy, as presented in this article, provides a lens through which the existing policy landscape can be examined. Through this perspective, the main drivers and pressure points can be better understood, new mechanisms for cooperation and integration can be established, and identified resource gaps can be addressed.

The Blue Economy encompasses a range of economic sectors tied to oceans, seas, and coastal regions—including Blue Food, Blue Energy, Blue Transportation, Blue Carbon, and Blue Life. Together, these industries currently contribute approximately \$1.5 trillion annually to the global economy, a figure the World Bank projects will grow to between \$4 trillion and \$6 trillion by 2030. The Blue Economy offers enormous opportunities for growth. However, significant challenges can occur along the way, such as labor shortage, gender inequality, and issues about the attractiveness of the Blue Economy jobs for new generations.

However, the accelerating degradation of ocean ecosystems is making it increasingly difficult for these industries to operate sustainably and profitably. Addressing this crisis requires urgent and coordinated action to safeguard the long-term health of marine environments and the communities that depend on them. No single organization or government can solve this alone; collaboration across public and private sectors is essential to ensure the responsible and sustainable use of the world's aquatic resources.

Keywords: crisis, challenges, blue economy, sustainable

Acknowledgment: The present research was supported by the project An Integrated System for the Complex Environmental Research and Monitoring in the Danube River Area, REXDAN, SMIS code 127065, co-financed by the European Regional Development Fund through the Competitiveness Operational Programme 2014–2020, contract no. 309/10.07.2021.

SYNTHESIS ON THE BLUE DIMENSIONS OF AQUACULTURE

**Aurelia Nica^{1,2*}, Ira-Adeline Simionov^{1,3}, Alina Antache^{1,3}, Isabelle Metaxa¹,
Stefan-Mihai Petrea^{1,3}**

¹*Food Science, Food Engineering, Biotechnology and Aquaculture Department,
Faculty of Food Science and Engineering , “Dunarea de Jos” University of Galati,
Domnească Street, no. 47, Galați – 800008, Romania*

²*“Dunarea de Jos” University of Galati, Multidisciplinary Research Platform
(ReForm) – MoRAS, Galați, Romania*

³*REXDAN Center, “Dunarea de Jos” University of Galati, Domnească Street, no.
47, Galați – 800008, Romania*

*Corresponding author: anica@ugal.ro

Abstract

The rapid development of aquaculture has been considered the blue revolution, an approach to increasing global fish production to contribute to human nutrition and food security. However, the exclusive focus on Asian aquaculture overlooks the fact that the “blue revolution” is taking place in most of the world. This paper examines the development models of aquaculture production and presents a new approach for a sustainable blue economy in the EU. The results show that production in some non-Asian countries is growing faster than that of the main Asian producers. Moreover, most developed countries have played a limited role in the Blue Revolution, despite having been top producers since the 1970s.

The sustainable blue economy aims to improve human well-being and social equity, reduce environmental risks, significantly capitalize on "intangible" assets, mitigate the impact of climate change, and provide an inclusive and accessible way for island and coastal states to benefit from the rich ocean resources available on Earth. The use of blue water (i.e. surface and groundwater) in aquaculture also significantly contributes to global fish production. However, the blue revolution of aquaculture is associated with a wide range of environmental concerns, including habitat destruction, water pollution, eutrophication, biota depletion, ecological effects, and disease outbreaks.

In addition, blue carbon emissions (i.e. carbon from coastal and marine ecosystems) are accumulating from mangrove deforestation caused by shrimp farming. To increase fish production for a growing global population, aquaculture must develop sustainably, while its environmental impact must be significantly reduced. There is blue growth potential for increasing seafood production through the expansion of coastal and marine aquaculture, which is essential for the sustainable development of the blue economy.

Keywords: aquaculture, blue revolution, environment, economy

Acknowledgment: The authors are grateful for the technical support offered by MoRAS infrastructure through the Grant POSCCE ID 1815, cod SMIS 48745 (www.moras.ugal.ro)

**PRESENT STATUS AND APPLICATIONS IN THE CULTURE OF
THE EUROPEAN CATFISH (*SILURUS GLANIS* L., 1858)**

Iulia R. Grecu^{1,2*}, Angelica Docan^{1,2}, Lorena Dediu^{1,2}

¹*Faculty of Food Science and Engineering, “Dunarea de Jos”, University of Galati, 111 Domnească Street, RO-800201, Galati, Romania*

²*MoRAS Research Center, Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati, 61 Dr. Alexandru Carnabel Street, Q building, RO-800149, Galați, România*

* Corresponding author: iulia.grecu@ugal.ro

Abstract

The European catfish (*Silurus glanis* L., 1858) represents one of the most important species for freshwater aquaculture in Romania, where its economic and ecological value has steadily increased over the past decades. This paper presents a comprehensive overview of the current status of *S. glanis* aquaculture, addressing both traditional and modern farming systems, including extensive earthen ponds, semi-intensive polyculture setups, and intensive recirculating aquaculture systems (RAS). While conventional pond culture remains dominant in Romania, advanced systems such as RAS and net cages are increasingly explored in other European countries, enhancing productivity and biosecurity.

The study also discusses the potential of *S. glanis* for diversification within the aquaculture sector, highlighting recent advancements in biotechnology. One such application is the triploidy induction, a method aimed to produce sterile individuals with improved growth performance and meat quality, while also preventing uncontrolled reproduction. These biotechnological interventions offer promising perspectives for genetic improvement and sustainable management of the species.

In addition, emerging studies have explored the capacity of *S. glanis* to tolerate brackish water conditions. Experimental evidence suggests that juveniles can be successfully acclimated and reared in waters with salinity levels up to 10 ppt, expanding the potential farming environments. This adaptability may contribute to mitigating the limitations posed by declining freshwater availability and increasing competition for inland water resources.

By synthesizing current knowledge on culture practices, genetic manipulations, and environmental adaptability, this paper emphasizes the growing relevance of *Silurus glanis* in both traditional and innovative aquaculture contexts, with a focus on enhancing production efficiency, sustainability, and species resilience.

Keywords: European catfish, growth conditions, biotechnology, salinity

Acknowledgment: This work was supported by the project AUF-ECO_RI_SRI_2021_16_IMASTUR. The authors are grateful for the technical support offered by MoRAS infrastructure through the Grant POS CCE ID 1815, cod SMIS 48745 (www.moras.ugal.ro).

**VARIATION IN THE BIOCHEMICAL COMPOSITION OF FISH
MUSCLE AS INFLUENCED BY EXPOSURE TO
ENVIRONMENTAL POLLUTANTS**

Iulia R. Grecu^{1,2*}, Mirela Crețu^{2,3}, Angelica Docan^{1,2}, Lorena Dediu^{1,2}

¹*Faculty of Food Science and Engineering, “Dunarea de Jos”, University of
Galati, 111 Domnească Street, RO-800201, Galati, Romania*

²*MoRAS Research Center, Faculty of Food Science and Engineering, “Dunarea de
Jos” University of Galati, 61 Dr. Alexandru Carnabel Street, Q building, RO-
800149, Galați, România*

³*Cross Border Faculty, “Dunărea de Jos”, University of Galati, 111 Domnească
Street, RO-800201, Galati, Romania*

* Corresponding author: iulia.grecu@ugal.ro

Abstract

This paper aims to explore the impact of aquatic contaminants on fish flesh quality, with a particular focus on substances recently identified in freshwater environments. Fish species are increasingly recognized as valuable biological indicators in the evaluation of pollution levels in aquatic ecosystems, offering a dependable means for detecting and anticipating the adverse impacts of anthropogenic pollutants. In recent investigations, imazalil has been detected in the Danube River, raising ongoing concerns about its toxic potential for aquatic fauna and its implications for the safety of fish-derived food products. In addition to the literature review, this work includes a case study investigating the alterations in the biochemical composition of sterlet muscle tissue after a 21-day dietary exposure to imazalil. The analysis of the key nutritional components of fish muscle tissue indicated that imazalil administration led to a statistically significant reduction in protein levels ($p < 0.05$), whereas the concentrations of lipids, ash, and water showed no significant variations ($p > 0.05$). These findings highlight the selective impact of environmental pollutants on fish metabolism, underscoring the need for further investigations into its sublethal effects on nutritional quality and overall fish health.

Keywords: emerging contaminants, imazalil, muscle, biochemical analysis

Acknowledgement: This work was supported by the project AUF-ECO_RI_SRI_2021_16_IMASTUR. The authors are grateful for the technical support offered by MoRAS infrastructure through the Grant POS CCE ID 1815, cod SMIS 48745 (www.moras.ugal.ro).

**ASSESSMENT OF BLOOD BIOCHEMICAL PARAMETERS IN
SCOPHTHALMUS MAEOTICUS EXPOSED TO
ENVIRONMENTAL POLLUTANTS**

**Angelica Docan¹, Diana Moisă (Danilov)², Iulia Grecu¹,
Mirela Crețu³, Lorena Dediu^{1*}**

¹Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati,
47 Domnească Street, Galați, Romania

² National Institute for Marine Research and Development
“Grigore Antipa”, 300 Mamaia Street, Constanța, Romania

³Cross-Border Faculty, “Dunarea de Jos” University of Galati, 47 Domnească
Street, Galați, Romania

*Corresponding author: lorena.dediu@ugal.ro

Abstract

Due to pollution of the aquatic environment, fish are constantly exposed to toxic substances, leading to metabolic disorders that can manifest as changes in blood biochemistry. This study aimed to evaluate the physiological response of the wild turbot, *Scophthalmus maeoticus*, to various emerging pollutants in the Black Sea, based on analyses of specific biochemical plasma parameters. Sampled specimens were collected between 2021 and 2023 from various areas of the Black Sea coastline at depths of 40 to 60 meters. Blood samples from turbot inhabiting four different locations were analysed using the VetTest® dry biochemistry analyser and IDEXX VetTest kits (IDEXX Laboratories, Inc., Westbrook, ME, USA) designed for the General Health Profile, targeting the following parameters: GLU, CHOL, TP, GLOB, ALB, ALT, AMYL, ALKP, TBIL, BUN, CREA, and Ca. Results showed significant increases in ALKP, TP, and GLOB concentrations in samples from the Eforie region, while elevated levels of AMYL and PHOS were detected in turbot from the Mamaia area. However, no significant differences were found for BUN, ALT, ALB, and Ca level. When comparing by gender, higher values of TP, AMYL, and GLOB were recorded in male turbot. These results provide valuable insights into the physiological responses of turbot from the Black Sea littoral zone after exposure to emerging pollutants.

Keywords: turbot, emerging pollutants, toxicity, blood biochemistry

**INNOVATIONS AND ADVANCES IN DELIVERY
TECHNOLOGIES FOR BIOACTIVE COMPOUNDS AND
PROBIOTICS IN AQUACULTURE FEEDS**

Lorena Dediu*, Cristian Dima, Cristian Rimniceanu

*Faculty of Science and Environment, Dunărea de Jos” University of Galati, 47
Domnească Street, RO-800008, Galati, Romania*

*Corresponding author: lorena.dediu@ugal.ro

Abstract

The sustainable growth of the aquaculture industry critically depends on the development of functional feeds that improve disease resistance and fish health, enhance the growth performance of the cultured biomass, and utilize ingredients that also reduce environmental impact. Bioactive compounds and probiotics are increasingly recognized for their potential to confer these benefits. However, their efficacy in aquaculture feeds is often hampered by significant challenges, including degradation during feed processing, poor stability in the aquatic environment, and reduced bioavailability in the fish digestive tract. This paper aims to provide a comprehensive assessment of the latest innovations and advances for living microorganisms or/and bioactive compounds delivery technologies developed to overcome these limitations, thereby maximizing their therapeutic and nutritional potential in aquaculture feeds. Thus, the paper examines various coating/encapsulation and delivery systems, including microencapsulation (e.g., spray drying, coacervation) and nanotechnology-based approaches (e.g., liposomes, polymeric nanoparticles), highlighting their mechanisms for protecting sensitive ingredients and enabling controlled or targeted release. In addition, the review explores emerging trends, such as smart delivery systems, synbiotic formulations, and their integration with precision feeding systems for aquaculture, which promise to revolutionize feed efficiency and fish welfare. The paper also evaluates the performance of the various technologies tested to date, while addressing key regulatory considerations and economic and practical aspects necessary for their adoption at an industrial level. By detailing technological advances, this paper aims to guide future research into previously unexplored areas that will sustainably and efficiently underpin functional feed technologies for large-scale aquaculture.

Keywords: fish health, bioactive ingredients, delivery systems, fish feed

Acknowledgment: This paper was supported by the grant BIOFEED-AQUA, contract no. 955/31.03.2025. The equipment used in this study belongs to the infrastructure of UDJ Research Center MoRAS (www.moras.ugal.ro, accessed on 15 March 2021).

**MODULATION OF ANTIOXIDANT DEFENSES IN SIBERIAN
STURGEON BY FEEDING WITH A KOMBUCHA FERMENTED
PRODUCT IN A RECIRCULATING AQUACULTURE SYSTEM**

**Cristian Rimniceanu¹, Mirela Crețu², Angelica Docan¹, Marina Pihurov¹,
Iulia Grecu¹, Gabriela Bahrim¹, Lorena Dediu^{1*}**

¹*Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati,
47 Domnească Street, RO-800008, Galati, Romania*

²*Cross-Border Faculty, “Dunarea de Jos” University of Galati, 47 Domnească
Street, RO-800008, Galati, Romania*

*Corresponding author: lorena.dediu@ugal.ro

Abstract

This study aimed to investigate the effect of a fermented product with kombucha and milk kefir supplied through fish feed on the growth performance and feed efficiency of Siberian sturgeon. Kombucha is known to have several beneficial effects on health due to the higher source of citric acid, butyric acid, lactic acid, acetic acid, and isovaleric acid, and may be used as an alternate source of probiotics. Milk kefir granules also contain a wide variety of microbiota, which includes lactic acid bacteria, acetic bacteria, and yeast. Fermented product, designed to have increased bioactive properties, was obtained using combinations of artisanal cultures consisting of kombucha and milk kefir granules grown in black tea, sucrose, and bovine colostrum. Fish with an initial weight of 263.80 ± 81.43 g were randomly distributed into four feeding treatment groups, in triplicates (17 fish/tank): V1-control group, where fish were fed normal diet containing 54% crude proteins and 15% lipids, and experimental groups where fermented product was supplemented in the fish diet at 1 g/kg feed (V2), 2 g/kg feed (V3) and respectively 3 g/kg feed (V4). The feed was administered for 35 days. Oxidative stress was assessed using two relevant biomarkers: reduced glutathione (GSH) and malondialdehyde (MDA).

The highest GSH concentration was observed in group VK3 (0.29 ± 0.09 $\mu\text{Mol/dl}$), which was significantly greater than in VK1 (0.22 ± 0.07 $\mu\text{Mol/dl}$). Supplementation of sturgeon feed with 2 g/kg of fermented product (FP) enhanced the antioxidant system by promoting glutathione synthesis and reducing lipid peroxidation, as evidenced by decreased MDA concentrations.

Keywords: fish health, fermentation, fish feed, stress reduction

Acknowledgment: This paper was supported by the grant BIOFEED-AQUA, contract no. 955/31.03.2025. The equipment used in this study belongs to the infrastructure of UDJG Research Center MoRAS.

THE USE OF BLACK SOLDIER FLY (*HERMETIA ILLUCENS*) AS A NUTRITIONAL ALTERNATIVE IN FISH DIET

**Liliana B. Athanasopoulos^{2*}, Floricel M. Dima², Ira-Adeline Simionov¹,
Isabelle Metaxa¹, Aurelia Nica¹, Alina Antache¹, Ștefan-Mihai Petrea¹**

¹Faculty of Food Science and Engineering, “Dunarea de Jos” University of Galati,
Corp Q, Dr. Alexandru Carnabel, street 61, 800149, Galați, Romania

²Institute of Research and Development for Aquatic Ecology, Fishing and
Aquaculture, Portului street 54, Galați, Romania

*Corresponding author: lilianablondina@yahoo.com

Abstract

With the global population continuously growing, it is essential to identify new protein sources for sustainable aquaculture. Modern entomology recommends the culture of insects, which offers several advantages, including high reproductive rates, short life cycles, and intermediate development stages that enable the production of large quantities of insect meals. Regarding biochemical composition, insects are recommended for their high crude protein content of dry matter (35-70%), moderate lipid content (10-40%), low carbohydrate content (5-15%), ash (3-10%), and minerals containing calcium, phosphorus, magnesium, zinc, iron, etc. While insect farming is labor-intensive, its costs are reduced thanks to the use of recyclable vegetable and fruit waste, milling products, and animal manure as feed, which plays a crucial role in the circular economy. Possible disadvantages related to the chitin content of insects are solved by modern techniques of enzymatic hydrolysis and fermentation, which break down complex polysaccharides into simple and easily digestible compounds. Among various insects, the larvae of the black soldier fly (*Hermetia illucens*) are commonly used in fish feed as a partial substitute for fish meal. This is notable because fish meals contain 50-65% crude protein (on a dry matter basis) and are easily digestible and assimilable. However, they are becoming increasingly expensive (1,4\$/kg) due to the decline of fish stocks in natural waters. In terms of environmental impact, under climate change conditions, entomoculture provides black soldier fly larvae (BSFL) a yield of 0.5 kg/m², while soybean (*Glycine max*) cultivation yields only 0.3 kg/m². Although the average costs for insect production (2\$/kg) are higher than soy bean prices (0,5\$/kg), insect farming is more ecological. Traditional agriculture requires large areas of land, irrigation, and the use of environmentally harmful herbicides and pesticides. Summing up, insects can be recommended as the food of the future, for both fish and human consumption, due to their exceptional properties.

Keywords: insect meals, soybean meals, fish feed, aquaculture

**WIDE SCREENING OF NEUROTOXIC COMPOUNDS BASED ON
A BIENZYMATIC BIOSENSOR WITH CO-IMMOBILIZED
ACETYLCHOLINESTERASE AND
BUTYRYLCHOLINESTERASE**

**Madalina-Petruta Bucur¹, Maria-Cristina Radulescu¹, Bogdan Bucur^{1*},
Adela Teban-Man^{2,3}, Maria Daniela Nicoară^{2,3}, Horia Leonard Banciu³ and
Gabriel Lucian Radu¹**

¹ *National Institute of Research and Development for Biological Sciences, Centre
of Bioanalysis, 296, Splaiul Independentei, 060031 Bucharest, Romania*

² *Institute of Biological Research Cluj, NIRDBS, 48 Republicii Street, 400015 Cluj-
Napoca, Romania*

³ *Department of Molecular Biology and Biotechnology, Faculty of Biology and
Geology, "Babeş-Bolyai" University, 5-7 Clinicilor Street, 400006 Cluj-Napoca,
Romania*

* Corresponding author: bogdan.bucur@incdsb.ro

Abstract

Both natural cyanotoxins and synthetic insecticides pose significant risks to human health and the environment. Rapid environmental screening using cholinesterase-based biosensors offers a practical approach for monitoring and provides fast, user-friendly alarm systems for prompt intervention. Monoenzymatic biosensors, typically based on acetylcholinesterase (AChE) or, less commonly, butyrylcholinesterase (BChE), do not detect the full range of toxic compounds. Some substances selectively inhibit one enzyme over the other—for example, methomyl inhibits only AChE, while pirimicarb inhibits BChE at much lower concentrations than AChE. To broaden the spectrum of detectable compounds in a single measurement, a bienzymatic biosensor was developed, co-immobilizing both AChE and BChE on a single electrode. This design enables the sensor to trigger an alarm based on the enzyme with the highest affinity for each neurotoxic compound. In our study, we evaluated carbamate insecticides (pirimicarb and methomyl) and the cyanobacterial toxin guanitoxin using both monoenzymatic and bienzymatic biosensors. The detection limits for pirimicarb were 50 ng/mL with the bienzymatic biosensor, compared to 400 ng/mL with the AChE biosensor. For methomyl, the detection limits were 6 ng/mL with the bienzymatic biosensor and 700 ng/mL with the BChE biosensor. Additionally, we screened 24 cyanobacterial strains for guanitoxin-like cholinesterase inhibition. Only one strain, related to *Aphanizomenon* sp., showed significant inhibition of both AChE and BChE. Notably, fresh cell lysates caused greater enzymatic inhibition than lyophilized biomass, highlighting the critical role of sample preparation in environmental screening.

Reference: M. C. Radulescu, M. P. Bucur, B. Bucur, A. Iosageanu, G. L. Radu, *Talanta*, 2025, **295**, 128339

Keywords: neurotoxic compounds, bienzymatic biosensor, acetylcholinesterase, butyrylcholinesterase

Acknowledgment: This work was performed with the support of MRID through the Core Program within the National Research, Development and Innovation Plan 2022–2027 project no. 23020101(SIA-PRO), contract no 7N/2022 and project PNRR-III-C9-2022 – I5 cod 18/16.11.2022 (RESPONSE)

**THE INFLUENCE OF VARIOUS SUBSTRATE TYPES ON
COCOON DEPOSITION AND REPRODUCTIVE PERFORMANCE
OF LEECHES (*HIRUDO VERBANA* CARENA, 1820)**

**Liliana B. Athanasopoulos, Floricel M. Dima, Magdalena Tenciu, Desimira M.
Stroe, Gabriel Ion, Veta Nistor, Elena Sîrbu**

*Institute of Research and Development for Aquatic Ecology, Fishing and
Aquaculture, Portului street 54, Galați, Romania,*

*Corresponding author: dimafloricel@yahoo.com

Abstract

Leeches contain bioactive substances in their saliva, the most important of which act as anticoagulants, that today's pharmaceutical industry cannot synthesize. The growing demand for leeches, which are used in classical and modern hirudotherapy (post-reparative surgery), is linked to the decline of leech populations in natural waters. The need to develop hirudiculture is essential for supplying sterile leeches used in the treatment of various diseases. This experiment was carried out between February 8, 2024 and June 16, 2025, in two phases. In the first phase, the influence of three reproductive substrates, soil, soil with sand, and hydrogel in three colour variants (white, black, and red), on the cocoon deposition process was investigated. The best results were achieved with red hydrogel, which deposited 66.6% of the total cocoons. In the second phase of the experiment, the substrate that had previously given the best results (red hydrogel) was compared with Sphagnum moss and coconut fiber. The results indicated that the coconut fiber substrate was the most suitable for cocoon deposition, accounting for 38.9% of the total cocoons at temperatures between 22 and 24°C. However, at higher temperatures, the hydrogel substrate proved to be the best for reproduction, achieving 33.3%. This is due to its ability to provide optimal humidity, good visibility, and the advantage of a low cost.

Keywords: leeches, cocoons, reproductive substrate

SYNTHESIS, CHARACTERIZATION AND APPLICATIONS OF ARTEMISIA-BASED METAL NANOPARTICLES

Delia M. Luca¹, Roxana Strungaru-Jijie², Lăcrămioara Oprică^{1*}

¹Faculty of Biology, Alexandru Ioan Cuza University of Iasi, 20A Carol I, 700505, Iasi, Romania,

²SIDNER, RAMTECH, Institute of Interdisciplinary Research, Alexandru Ioan Cuza University of Iasi, Carol I, 700505, Iasi, Romania

*Corresponding author: lacramioara.oprica@uaic.ro

Abstract

Introduction: The field of nanotechnology is rapidly advancing, with increasing emphasis on the green synthesis of metal and metal oxide nanoparticles (NPs) using plant-based resources. *Artemisia* species are well known for their abundance of bioactive compounds, which contribute to their strong medicinal value and wide-ranging biological activities, making them excellent candidates for the biogenic synthesis of NPs.

Aim: This review explores the green synthesis of metal and metal oxide NPs using various *Artemisia* species.

Methods: NPs synthesis with *Artemisia* extracts generally involves five main steps: (i) collection and preparation of plant material (leaves, stems, roots) in fresh or powdered form; (ii) extraction of phytochemicals by boiling in aqueous and organic solvents (ethanol, methanol), or by Soxhlet or microwave-assisted extraction, followed by filtration; (iii) mixing of extracts with metal salt solutions at varying concentrations; (iv) exposure of the mixture to specific conditions (sunlight/UV radiation, darkness, from room to higher temperatures) to induce NP synthesis, typically observed by a visible color change for pale shades to darker tones; and (v) characterization of synthesized NPs in terms of size, shape, crystallinity, stability, and surface charge.

Results: NPs synthesized from *Artemisia* extracts exhibited diverse sizes, morphologies and zeta potentials depending on the metal type, plant species, and synthesis conditions. These *Artemisia*-based NPs exhibited significant biological activities, including antimicrobial, anticancer, and antioxidant effects, as well as potential applications in agriculture, food safety and environmental remediation.

Conclusion: *Artemisia* species serve as effective and sustainable sources for the green synthesis of metal and metal oxide nanoparticles, demonstrating significant potential in medicine, agriculture, food safety, and environmental remediation.

Keywords: *Artemisia*, green synthesis, nanoparticles, biological applications

Funding: This research was supported by the Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P2-2.1-TE-2023-0258, within PNCI IV program.

APPLICATIONS OF PLANT-BASED NANOPARTICLES IN ENVIRONMENTAL REMEDIATION

Delia M Luca ¹, Gabriela Voichița², Lăcrămioara Oprică^{1*}

¹ Faculty of Biology, Alexandru Ioan Cuza University of Iasi, 20A Carol I, 700505,
Iasi, Romania,

²Institute of Biological Research Iasi, 47 Lascar Catargi Street, Iasi, Romania

*Corresponding author: lacramioara.oprica@uaic.ro

Abstract

Introduction: Green nanotechnology is rapidly advancing due to the multifunctional properties of nanoparticles (NPs) including their application in environmental remediation for the degradation of pollutants and the restoration of contaminated ecosystems. Green synthesis offers a cost-effective and eco-friendly alternative to conventional chemical methods by using plant extracts as natural reducing and capping agents, thereby improving NPs stability and biocompatibility. *Matricaria chamomilla* (chamomile), an annual plant belonging to the *Asteraceae* family, is well-known for its antimicrobial, antioxidant, and anti-inflammatory activities. It is also rich in phytochemicals, including flavonoids and phenolics, which play a key role in reducing metal ions and stabilizing NPs.

Aim: This study evaluates the synthesis of NPs using chamomile extracts, with a focus on synthesis methods, NPs characteristics (size, shape, zeta potential), and their diverse applications.

Methods: Green synthesis involves four main steps: (i) preparation of chamomile extracts from flowers, leaves or aerial parts by boiling in various solvents or through sonication; (ii) preparation of the metal salt solutions (e.g., AgNO₃, FeCl₃, Na₂SiO₃, Na₂PdCl₄ etc.) at specific concentrations (e.g., 1 to 20 mM); (iii) mixing of the solutions under controlled conditions of temperature, pH, light, and stirring; and (iv) purification of NPs. Characterization techniques employed include UV-Vis spectroscopy for surface plasmon resonance, SEM/TEM and XRD for morphology and crystallinity, FTIR for functional group identification, and DLS with zeta potential analysis for particle size distribution and colloidal stability.

Results: NPs size, morphology, and stability varied with synthesis parameters such as temperature, pH, light exposure, and the concentration of plant extract and metal salt solutions. Chamomile-based NPs exhibited antimicrobial, antioxidant, cytotoxic, and catalytic properties, with potential applications in medicine, agriculture, and environmental remediation.

Conclusion: Chamomile extract is a valuable, versatile, eco-friendly resource for NPs synthesis, producing stable NPs with diverse biomedical, agricultural, and environmental applications.

Keywords: green synthesis, chamomile, nanoparticles, environmental remediation

LINKING MICROBIAL COMMUNITY DYNAMICS TO ENVIRONMENTAL DRIVERS IN LAKE RAZIM, ROMANIA

Denisa Igescu^{1,2}, Elena -Alina Olaru^{2,3}, Adrian Burada⁵, Ionela Avram^{2,4}

¹ *Research Centre in Systemic Ecology and Sustainability (RCSES), Faculty of Biology, University of Bucharest, Splaiul Independenței 91-95, 050095 Bucharest, Romania*

² *Faculty of Biology, University of Bucharest, Splaiul Independenței 91-95, 050095 Bucharest, Romania*

³ *Research Centre for Environmental Protection and Waste Management (PROTMED), University of Bucharest, Splaiul Independenței 91-95, Sect. 5, Bucharest, 050107, Romania*

⁴ *Faculty of Biology, University of Bucharest, Genetics Depart., Int. Portocalelor nr.3, Bucharest, Romania*

⁵ *Danube Delta National Institute for Research and Development, 820112 Tulcea, Romania*

*Corresponding author: denisa.igescu@g.unibuc.ro

Abstract

Lake Razim, the largest natural lake in Romania, is an ecosystem of high ecological value included in the Ramsar Convention since 1991. Located in the southern part of the Danube Delta Biosphere Reserve, Lake Razim connects Danube River to Black Sea via Lake Sinoe. In September 2024, water and sediment samples were collected from five representative sites to have an integrated view on the Razim Lake ecosystem. Communities were identified through taxonomic and phylogenetic analyses using 16S rRNA gene sequencing data, biodiversity indicators (Shannon and Simpson) were evaluated to assess structural differences between compartments, and physico-chemical variables (nutrients, heavy metals, temperature, pH etc.) were evaluated to highlight correlations between microbial species and habitat conditions. Water samples were quantified for nutrients, heavy metals, and physicochemical parameters, while sediment matrices were assessed for carbon content using HiPerTOC analyzer, pH, and conductivity. Complementary in situ measurements with a multiparameter probe (YSI EXO2) provided high-resolution environmental context.

By analyzing the diversity and spatial distribution of microbial communities in water and sediment in relation to environmental parameters, this study seeks to clarify the mechanisms and impacts of microbial species on aquatic ecosystems.

Sequencing data were processed in USEARCH, with low-quality reads, adapters, and short fragments removed before merging paired ends. Taxonomic assignment

was performed using the ARB-SILVA database with a 90% identity threshold. Microbial diversity was assessed in R using Hill number metrics, integrating species abundance and taxonomic distribution for a robust ecological evaluation.

Taxonomic classification using SILVA database revealed certain limitations, with Bacillariophyta being assigned to the Phylum Cyanobacteria. A marked increase in Bacteroidetes in one site was consistent with elevated total organic carbon (TOC) and water-soluble organic carbon (WSOC) values, underscoring their role in organic matter and polysaccharide degradation. Across all samples, common phyla identified included: *Cyanobacteria*, *Proteobacteria*, *Bacteroidetes*, *Planctomycetes*, *Chloroflexi*, *Actinobacteria* and *Verrucomicrobia*, but a distribution preference was clear with *Nitrospirae*, *Ignavibacteriae* and *Proteobacteria* being dominant in sediment, whereas *Actinobacteria*, *Bacteroidetes* and *Cyanobacteria* prevailed in the water column. Shannon and Simpon indicators revealed that the sediment supports a more stable, diverse and structured community compared to water.

Keywords: Danube, 16S rRNA, Environment, HiPerTOC

Acknowledgment: Part of this study was funded by a European Union's Horizon programme (HORIZON-MISS-2022-OCEAN-01) under the Restore4Life project (Restoration of wetland complexes as life-support systems in the Danube basin).

MEASURES AND ACTIONS IN THE IMPLEMENTATION SITE**IS4 – ROMANIA GRĂDIȘTEA/ BASCEALÎC AREA - ENISALA**

Adrian Burada¹, Cristina Despina^{*1}, Bogdan Petre Gheorghe¹, Daniela Secceanu-Odor¹, Ștefan-Mihai Petrea², Ira Simionov², Catalina Iticescu², Tudor Constantin Racoviceanu³, Mihai Cristian Adamescu³

¹Danube Delta National Institute for Research and Development'' – Tulcea; 165 Babadag Street, 820 112, Tulcea, Romania,

²Dunărea de Jos" University of Galați, 47 Domneasca street, 800008

³Research Center in Systems Ecology and Sustainability - Faculty of Biology, University of Bucharest, Romania

*Corresponding author: cristina.despina@ddni.ro

Abstract

GRĂDIȘTEA / BASCEALÎC area (Implementation Site IS4 – ENISALA) is a component of the Danube Delta Biosphere Reserve, located on the western shore of the Razim – Sinoe Lagoon Complex, near the village of Enisala in Tulcea County, Romania. The whole area is included in the Natura 2000 network, more specifically in the avifaunistic special protection area - ROSPA 0031 - Danube Delta – Razim-Sinoe Complex and in the community importance site ROSCI 0065 - Danube Delta.

The restoration activities in the Grădiștea / Bascealîc area (IS4) aime to restore/improve water circulation, as well as the connectivity of some secondary channels, with impact on 2370 hectares considering the low Danube water levels scenario.

Keywords: ecological restoration, Enisala area, evaluation, restoration planning

Acknowledgment: This research was supported by the Project 101112736 (Restore4Life).

**ADVANCING THE GREEN NEXUS IN THE DANUBE DELTA
THROUGH CLIMAPANNONIA'S ROADMAPS FOR A
RESILIENT BLUE ECONOMY**

**Matei Simionov*, Adrian Burada, Iulian Nichersu, Iulian Fomici, Marian
Tudor, Dragoş Balaican**

*Danube Delta National Institute for Research and Development, Babadag Street
No. 165, Tulcea, Romania*

*Corresponding author: matei.simionov@ddni.ro

Abstract

This work explores how the Horizon Europe project ClimaPannonia will accelerate a green nexus between aquaculture and environmental science to sustain a resilient, inclusive Blue Economy in the Danube Delta. ClimaPannonia mobilizes partners from six Pannonian countries to deploy and scale systemic solutions (SiSs) that improve climate resilience across water–food systems, agroforestry, organic crops, and livestock systems. These efforts are coupled with policy roadmaps, business models, and a digital decision-support application (ClimaPa DigApp) that integrates climate, water management, crop monitoring, and carbon-footprint modules. In the Danube Delta, measurable benefits are targeted for aquaculture and adjacent agri-waterscapes: stronger drought/flood preparedness, reduced nutrient losses to sensitive wetlands, higher productivity with lower environmental footprints, and clearer investment pathways for climate-smart operations. The presentation will outline activity packages, early deployment plans, and opportunities for partners to engage in a Pannonian community of practice to scale water-wise Blue Economy solutions across European deltas.

Keywords: blue economy, Danube Delta, climate resilience, water–food nexus, digital decision support

Acknowledgment: This work is carried out within the ClimaPannonia project, funded by the European Union's Horizon Europe programme (Grant Agreement No. 101156281)

BACTERIAL VALORIZATION OF AQUACULTURE SIDE STREAMS FOR A CIRCULAR BLUE ECONOMY

Samet Kalkan

*Faculty of Fisheries, Recep Tayyip Erdoğan University, Zihni Derin Yerleşkesi,
Fener Mahallesi, 53100 Merkez, Rize, Türkiye*

*Corresponding author: samet.kalkan@erdogan.edu.tr

Abstract

Aquaculture produces nutrient rich side streams such as sludge, suspended solids, and clarified effluents. Treating these flows as resources can reduce pollution, cut costs, and open new revenue channels for the industry. Marine bacteria make this possible through controlled bioprocesses that recover energy and nutrients while maintaining water quality and food safety.

This presentation describes a practical framework that farms and coastal managers can adopt. Anaerobic digestion converts sludge into biogas and a fertilizer grade digestate by utilizing stable bacterial consortia. Aerobic cultivation grows single cell protein from clarified effluents and selected wastes, which can partially replace fishmeal after safety checks. Targeted fermentations generate volatile fatty acids for use as carbon sources in denitrification and as precursors for biosurfactants and other biobased products. Nitrifying and denitrifying biofilters convert ammonia and nitrite and capture nutrients in biomass for further use. Bacterial bioleaching can release calcium and trace elements from shells and scales for feed or soil inputs after quality control. Marine bacteria may also produce biopolymers using side stream derived substrates.

Operational control and safety are central to success. Simple sensors for oxygen, ammonia, pH, and alkalinity guide daily operation. Environmental genetic materials may provide early warning for blooms, pathogens, and process drift. Life cycle assessment reports climate impact and energy balance, while economic assessment tests cost and payback at farm scale. Risk assessment addresses antimicrobial resistance, heavy metals, and product compliance. Clear specifications and traceability support market acceptance of recovered protein and other outputs.

Implementation can start small with settling tank sludge and nursery effluents and then expand to integrated units that pair with recirculating systems or with onshore treatment for cage farms. Pilot work in the Black Sea region can build local skills, reduce uncertainty, and connect projects with green finance. In summary, bacterial valorization turns waste into value and strengthens the circular blue economy while protecting ecosystems and public health.

Keywords: marine bacteria, waste valorization, circular bioeconomy, volatile fatty acids, Black Sea region

TRANSFORMING FISHERY BYPRODUCTS INTO ACTIVE BIOPOLYMER PACKAGING FOR SEAFOOD QUALITY AND SHELF LIFE

Samet Kalkan*

**Faculty of Fisheries, Recep Tayyip Erdoğan University, Zihni Derin Yerleşkesi,
Fener Mahallesi, 53100 Merkez, Rize, Türkiye*

*Corresponding author: samet.kalkan@erdogan.edu.tr

Abstract

Fish processing generates large amounts of skins, bones, scales, and shells that are often discarded. This presentation introduces a practical route to convert these side streams into active packaging and edible coatings that keep seafood fresh for longer and reduce the use of conventional plastics. The focus is on chitosan obtained from crustacean shells, collagen or gelatin obtained from skins and bones, and biopolymers produced by bacteria such as polyhydroxyalkanoates (PHA). Marine bacteria can produce PHA using fish processing residues as feed material, which supports circular use of resources in coastal regions.

In seafood applications these biopolymers act through simple and measurable mechanisms. Film and coating matrices reduce oxygen and water vapor transfer, slow lipid oxidation, and suppress spoilage bacteria. Chitosan provides cationic sites that destabilize microbial membranes. Collagen or gelatin improves film formation and mechanical strength. PHA forms a hydrophobic polyester matrix that is suitable for standalone films. Functionality can be increased with safe natural additives such as plant phenolics, organic acids, or essential oil nanoemulsions. A step by step pilot plan suitable for small and medium enterprises includes by product collection and preprocessing, polymer extraction or bacterial fermentation, formulation of films or spray or dip applied coatings, laboratory tests for barrier, tensile, and antimicrobial performance, simple sensory checks, and migration and safety assessment.

This pathway supports Blue Economy objectives by creating value from waste streams, reducing dependence on petroleum based plastics, lowering the carbon footprint of chilled distribution, and improving product quality along the cold chain. Implementation requires attention to moisture sensitivity, cost, and compliance with food contact rules and labeling. Practical solutions include blends of chitosan with gelatin or PHA, gentle crosslinking with food grade agents to increase water resistance, and end of life options that are compostable or recyclable. Environmental and economic feasibility can be evaluated with streamlined life cycle and technoeconomic screening, enabling scalable adoption across the Black Sea seafood sector.

Keywords: active packaging, blue economy, chitosan, PHA, seafood

EXPLORING INSECT MEAL RESEARCH IN AQUACULTURE: A LITERATURE ANALYSIS FROM DERGIPARK PUBLICATIONS

Tolga Şahin^{1*}

¹Marine Sciences and Technology Faculty, Çanakkale Onsekiz Mart University, Terzioğlu Yerleşkesi, 17020, Merkez, Çanakkale, Türkiye

*Corresponding author: tolgasahin@comu.edu.tr

Abstract

This study investigates recent research trends on the use of insect meals in aquaculture feeds by conducting a systematic analysis of publications indexed in Dergipark, a Türkiye-based academic database, covering the period from 2015 to October 2025. The dataset was prepared by screening titles, abstracts, and keywords for insect species that are currently approved by the European Union for aquaculture nutrition, including *Hermetia illucens* (black soldier fly), *Musca domestica* (housefly), *Tenebrio molitor* (yellow mealworm), *Alphitobius diaperinus* (lesser mealworm), *Acheta domesticus* (house cricket), and *Bombyx mori* (silkworm). Searches for *Gryllobates sigillatus* (banded cricket) and *Gryllus assimilis* (field cricket) did not yield any results, suggesting the absence, or at least the rarity, of national studies focusing on these species. The retrieved publications were then analysed to identify major thematic orientations. In general, the Turkish literature tends to emphasize *T. molitor* and *H. illucens*, with fewer studies concerning *M. domestica* and *B. mori*. Most of the retrieved papers are experimental feeding trials evaluating the potential of insect meals as partial or total replacements for conventional protein sources in aquaculture diets. In these studies, *T. molitor*, *H. illucens*, *A. diaperinus*, and occasionally *Z. morio* were tested with species such as rainbow trout (*Oncorhynchus mykiss*), Nile tilapia (*Oreochromis niloticus*), common carp (*Cyprinus carpio*), and crayfish (*Pontastacus leptodactylus*). Nutritional composition and growth performance indicators (e.g., weight gain, feed conversion ratio, and specific growth rate) are the main research focus, while discussions of sustainability or circular economy remain limited. The experimental outcomes generally suggest that low to moderate inclusion levels of insect meals can be used without adverse effects on growth or survival, though the results vary by species and diet formulation. Overall, the findings indicate that insect meal research within Dergipark remains limited in quantity. This may be due to a relatively low level of national research output on the topic or, more plausibly, to researchers' preference for publishing their studies in other internationally indexed journals rather than in Dergipark. Future studies could broaden this perspective by incorporating data from other national and international indexing platforms.

Keywords: insect meal, aquaculture nutrition, *Tenebrio molitor*, *Hermetia illucens*

DISTRIBUTION OF SPECIES BELONGING TO THE GENUS VIMBA (LEUCISCIDAE PISCES) IN TÜRKİYE

Esra Bayçelebi

Faculty of Fisheries and Aquatic Sciences, Recep Tayyip Erdogan University,
53100 Rize, Türkiye,

Corresponding author: esra.dogan@erdogan.edu.tr

Abstract

Türkiye has a rich biological diversity, the origins of which date back to geological times. Numerous studies have been conducted on the fauna and flora, and inland water fishes form an important part of this diversity. The genus *Vimba*, Fitzinger 1873, is represented by three species in Türkiye distributed in different basins: *Vimba melanops* (Heckel, 1837), *Vimba mirabilis* (Ladiges, 1960), and *Vimba vimba* (Linnaeus, 1758). Fish of the *Vimba* genus exhibit a body shape similar to that of the *Abramis* genus, although they are distinguished by their more rounded and elongated body form. The snout is elongated and extends beyond the lower jaw. The mouth is subterminal and has a crescent shape. A naked (scale-free) carina is located posterior to the ventral fins. It is a benthic fish that favors profundal regions with sedimentary substrates. Their principal diet comprises benthic worms, dipteran larvae, and diverse mollusks. *Vimba* has a relatively limited distribution in Türkiye. In this study, the distribution of the species was determined both field surveys and literature data. Individuals were collected using Samus 1000 pulsed DC electrofishing equipment. After anesthesia, specimens were fixed in 5% formaldehyde and stored in 70% ethanol or directly fixed in 96% ethanol. Methods for counts and measurements followed Kottelat and Freyhof (2007). Measurements were performed using a dial calliper with a precision of 0.1 mm, following a point-to-point approach. And its distribution in Türkiye has finally been established.

Keywords: freshwater, morphology, taxonomy

Acknowledgment: I thank Dr. Davut Turan and Dr. Cüneyt Kaya for helping in the field.

**COMPARISON OF *PHOXINUS COLCHICUS* AND *P. STRANDJAE*
SPECIES AND THE STATUS OF *P. COLCHICUS* IN TÜRKİYE**

Esra Bayçelebi

*Faculty of Fisheries and Aquatic Sciences, Recep Tayyip Erdogan University,
53100 Rize, Türkiye*

Corresponding author: esra.dogan@erdogan.edu.tr

Abstract

Studies conducted after the 1980s have shown that the family Cyprinidae has two main subfamilies (Cyprininae and Leuciscinae), which diverged at different times during the Oligocene (approximately 30 million years ago). The *Phoxinus* species examined in this study belongs to the subfamily Leuciscinae. Stout et al. (2016) demonstrated that this subfamily is a separate family, Leuciscinae, which also includes the genus *Phoxinus* Rafinesque, 1820. Minnows (*Phoxinus*) are small freshwater leuciscid fishes, encompassing roughly 27 species worldwide. Species of this genus are found throughout Europe and Asia, encompassing the Caucasus region and the watersheds of the Black, Aegean, and Azov Seas. Thus, the natural distribution of *Phoxinus* species is quite extensive. In this study, individuals from two different fish museums were compared. The study aimed to compare morphologically two different minnow species, *Phoxinus colchicus* Berg, 1910, and *Phoxinus strandjae* Drensky, 1926, from Türkiye (Recep Tayyip Erdogan University Zoology Museum of the Faculty of Fisheries, Rize) and Russia (FSJF, Fischsammlung J. Freyhof), which are distributed in the Black Sea basin. *P. colchicus* is distinguished from *P. strandjae* by having breast scaled, and the scaled area connected anteriorly, vs. breast scaled connected or scales not connected anteriorly. It further differs from *P. strandjae* by having a small hump on the back of the nape.

Keywords: Black Sea basin, freshwater, minnows, morphology, taxonomy

Acknowledgment: I thank Dr. Davut Turan (FFR) for helping in the field and Dr. Jörg Freyhof (Germany) for the loan of material (FSJF) from Russia.

**INTEGRATIVE PATHWAYS LINKING HEMATOLOGICAL,
OXIDATIVE STRESS AND BEHAVIORAL RESPONSES OF
FRESHWATER FISH EXPOSED TO HYDROPOWER TURBINE
STRESSORS**

**Alina Antache^{*,1,2,3}, Ira A. Simionov^{1,2}, Stefan M. Petrea^{1,2}, Catalina Iticescu^{2,4},
Aurelia Nica^{1,5}**

¹*Faculty of Food Science and Engineering, “Dunărea de Jos” University of Galați,
Galați, Romania*

²*REXDAN Research Infrastructure, “Dunărea de Jos” University of Galați, Galați,
Romania*

³*Faculty of Biology, Alexandru Ioan Cuza University of Iasi, Iasi, Romania*

⁴*Faculty of Sciences and Environment, “Dunărea de Jos” University of Galați,
Galați, Romania*

⁵*Romanian Center for Modelling Recirculating Aquaculture Systems (MoRAS),
“Dunarea de Jos” University of Galati, Galati, Romania*

*Corresponding author: alina.antache@ugal.ro

Abstract

In freshwater the fish are exposed to some environmental stressors which can trigger oxidative stress, what alters blood parameters, like red blood cell counts, and causes behavioral changes such as escape responses or lethargy. This is because oxidative stress, determined by a poor water quality (e.g., low dissolved oxygen), pollutants or various obstacles encountered on their route, lead to the damages cells and impairs the body ability to function. This determines changes at the physiological level which is reflected in blood parameters and in observable behavior. The chain of events is presented below. Fish living near hydropower turbine zones experience environmental stressors such as: rapid pressure changes (barotrauma), turbulence and mechanical injury, noise and vibration exposure, fluctuating oxygen levels and temperature or elevated turbidity and shear stress. These stressors can influence the fish physiology, biochemistry, and behavior, forming a nexus that defines overall fish welfare and ecosystem health. The fish stressors from environment can lead to an oxidative stress, a state where reactive oxygen species (ROS) overwhelm the body antioxidant defenses, causing damage to cells, lipids, and proteins. Then the oxidative stress influences the blood parameters, for example stress can lead to an increase in red blood cell indices, but severe or chronic stress may cause a decrease in white blood cells. There can also be changes in other blood components like hemoglobin and hematocrit. Further, if the stressor is not removed the physiological stress and cellular damage manifest in an altered fish behavior. This can lead to

impaired neurological function, affecting neurotransmitter release and causing behavioral changes like altered feeding patterns, reduced activity or aggression. This can also affect growth and reproductive success. In conclusion, the environmental stressors create a cascade, they trigger oxidative stress, which in turn leads to changes in fish hematology which can affect the fish behavior. This interconnectedness makes physiological and behavioral analysis useful tools for assessing the fish welfare from hydropower turbine zone in freshwater environment.

Keywords: environmental stressors, fish behavior, fish hematology, hydropower turbine zone, oxidative stress.

Acknowledgment: This work was supported by the project "Revolutionary refurbishment for an efficient and eco-friendly (RevHydro)", which received funding through Grant Agreement 101172857 from Horizon Europe, the EU's primary research and innovation funding program.

AI-DRIVEN WATER RESILIENCE IN THE DANUBE DELTA**Mădălin Silion¹, Bogdan-Gabriel Pădeanu^{1*}, Lucian Lumînăroiu¹,****George Suciu¹, Cristian Beceanu¹***¹BEIA Consult International, 12-22 Peroni Str., District 4, 041386, Bucharest***Corresponding author: bogdan.padeanu@beia.ro***Abstract**

This study introduces ReSPonSE, an AI-enabled, model-driven decision support system centered on a web-based platform developed by BEIA within the project framework to operationalize data integration, analytics, and knowledge delivery for aquatic ecosystem management. The study's purpose is to demonstrate how a platform-mediated approach can translate heterogeneous observations into actionable foresight for resilience planning in the Somova-Parcheș aquatic complex of the Danube Delta. The platform integrates soft sensing for difficult-to-measure water-quality indicators, time-series forecasting for short- to medium-term evolution of key parameters, computer-vision pipelines for harmful algal bloom detection from aerial and satellite imagery, and rapid toxin-risk screening via an enzymatic biosensing workflow. These components are exposed through a unified user interface designed for researchers, managers, and the broader public, with emphasis on reproducibility, transparency, and training. Results indicate that the platform sustains an end-to-end workflow from ingestion and quality control of multi-source data to model execution and dissemination of interpretable outputs while maintaining traceability of assumptions and parameters. In the pilot application, the system delivered consistent soft-sensor estimates for selected indicators, generated stable forecast trajectories that support operational planning, and produced reliable bloom alerts by combining spectral indices with learned visual features. The biosensing workflow enabled rapid triage of toxin risk during bloom episodes, and the platform's interaction design facilitated stakeholder engagement, including capacity-building activities and contributions from citizen observers. Collectively, these outcomes show that consolidating analytics within a single tool reduces the latency between observation and decision and improves the consistency of cross-disciplinary assessments. The platform-centered AI for aquatic monitoring provides a scalable path toward Digital Twin style environmental intelligence. The ReSPonSE architecture, implemented through the BEIA's developed platform, is transferable beyond Somova-Parcheș with limited recalibration, offering a pragmatic interface between science and policy through interpretable indicators, early-warning

capabilities, and standardized reporting. By aligning modeling, sensing, and human-computer interaction within one operational tool, the approach strengthens preparedness, accelerates evidence-based interventions, and supports replication across deltaic and lacustrine systems facing similar pressures.

Keywords: AI-driven Decision Support; Digital Twin; Water Quality Forecasting; Soft Sensors.

Acknowledgment: This research was funded by The Romanian Ministry of Research and Digitalization, grant number PNRR-III-C9-2022-I5-18, ResPonSE-Project, No. 760010/2022.

**INNOVATIVE TRAINING FOR A SUSTAINABLE FUTURE:
BEIA'S ROLE IN ADVANCING UNDERWATER TECHNOLOGIES
AND BLUE ECONOMY SKILLS**

**Mădălin Silion¹, Lucian Lumînaroiu^{1*}, George Suciu¹,
Bogdan-Gabriel Pădeanu^{1*}**

¹BEIA Consult International, 12-22 Peroni Str., District 4, 041386, Bucharest

**Corresponding author: lucian.luminaroiu@beia.ro*

Abstract

The global blue economy is rapidly expanding, but it faces a major skills gap in sustainability, carbon neutrality, and advanced underwater technologies. The uBlueTec project, funded by the European Union under the EMFAF-2023-BlueCareers call, aims to close this gap by creating an innovative training model that combines green, blue, and digital competencies. The project supports the transformation of the European Blue Economy toward climate resilience, environmental responsibility, and digital innovation. uBlueTec brings together universities, VET providers, SMEs, and industry clusters to design educational materials and micro-credential curricula focused on underwater robotics, Internet of Things (IoT), artificial intelligence (AI), and marine environmental monitoring. These programs ensure that learners gain relevant and practical knowledge aligned with industry needs. A central component of the initiative is the development of an ICT platform that connects learners, training institutions, and employers. This digital space enables real-time matching between skill demand and job opportunities, improving access to qualified professionals and supporting continuous workforce development. The European Underwater Technologies Hub (UW Tecs Hub) created within the project provides a long-term structure for cooperation between academia and industry. It facilitates ongoing training, knowledge exchange, and research collaboration, ensuring a skilled and adaptable workforce for the evolving blue economy. BEIA, project partner and VET provider, leads specialized courses that address current and future skill shortages in underwater technologies. The training emphasizes sustainability and digital transformation. The first pilot involves 30 students from the Politehnica University of Bucharest. They gain hands-on experience in UAV piloting, access the recruitment platform, and receive guidance for career development within the uBlueTec Hub, preparing them for emerging opportunities in the blue economy.

To enhance employability and innovation, BEIA also organizes an Open Career Day and an Entrepreneurial Bootcamp that connect students with companies and stimulate blue job creation.

Keywords: Blue Green Economy, Underwater Technologies, Digital Skills, Innovative Training, Vocational Education and Training (VET)

Acknowledgment: This work was funded by the European Union through the uBlueTec project. This project received support from the European Climate, Infrastructure, and Environment Executive Agency (CINEA) of the European Union under Grant Agreement number 101124893 – uBlueTec - EMFAF-2023-BlueCareers. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.

**PRELIMINARY ASSESSMENT OF HEAVY METALS
ACCUMULATION IN SEDIMENTS COLLECTED FROM
SEVERAL LAKES FROM DANUBE DELTA**

Carmen Roba¹, Nicoleta Brişan^{*1}

*¹Faculty of Environmental Science and Engineering, “Babeş-Bolyai” University,
Fântânele 30, 400294, Cluj-Napoca, Romania*

**Corresponding author: nicoleta.brisan@ubbcluj.ro*

Abstract

Heavy metals pollution of sediments has become an increasingly serious problem due to their negative impact on the aquatic ecosystems, caused by their toxicity, non-biodegradable nature or biomagnification potential.

The present study was focused on the assessment of heavy metals content in surface sediments of two lakes located in Somova - Parches aquatic complex from Danube Delta, West of Tulcea (Romania). The samples were collected during November 2023. The former anthropic activities that took place in the area, such as the production of ferroalloys and alumina, may have contributed to the content of heavy metals in the aquatic sediments.

The results revealed high concentrations of metals, particularly for Cu, Cd, Zn and Ni, which exceeded the thresholds imposed by national legislation, in some sediment samples.

To assess the possible contribution of anthropic activities and to evaluate the heavy metals pollution degree, enrichment factor (EF) and geo-accumulation index (I_{geo}) were calculated. The EF values suggest a possible anthropogenic contribution, particularly for cadmium, while the I_{geo} indicates a moderate pollution level for Cd and low or no pollution for the other analyzed metals.

Keywords: heavy metals pollution, aquatic ecosystems quality, Danube Delta

Acknowledgment: This work was financially supported by the Romanian Ministry of Research, Innovation and Digitalization, within the project PNRR-III-C9-2022-I5-18_ResPonSE (contract 760010/2022)

**TEMPORAL AND SPATIAL VARIATION OF *Scorpaena porcus* AS
A DISCARD SPECIES IN BOTTOM TRAWL FISHERIES ALONG
THE SOUTHEASTERN BLACK SEA COAST**

Hatice ONAY*

Recep Tayyip Erdoğan University, Faculty of Fisheries, Türkiye

*Corresponding author: hatice.bal@erdogan.edu.tr

Abstract

Scorpaena species are widely distributed, ranging from the British Isles to the Azores, the Canary Islands including Morocco, the Mediterranean Sea, and the Black Sea. This study aims to investigate the temporal and depth-related distribution of catch per unit effort (CPUE) of *Scorpaena* individuals caught by bottom trawl along the southeastern Black Sea coast. The research was conducted aboard a research vessel between April 2017 and March 2018, during which a total of thirty-eight trawl hauls were carried out monthly at a single sampling station across three different depth strata (0–30 m, 30–45 m, and 45–60 m). Throughout the study period, a total of 75.08 kg of *Scorpaena* were caught, with an average of 1.97 kg per haul. When evaluating the catch per unit effort, the highest value was recorded in July at 23.06 kg/hour. Seasonally, catch rates peaked during the summer months. In terms of depth, the highest catch rate was observed in the 0–30 m depth range (42.07 kg/hour), indicating significantly higher productivity compared to the deeper strata. Statistical analysis revealed significant differences in CPUE values depending on both season and depth. The findings suggest that seasonal and depth-related variations in catch efficiency for *Scorpaena* are likely associated with reproductive cycles or migratory behaviors. In this context, the study contributes essential scientific data to support the development of sustainable fisheries management strategies for *Scorpaena* and other demersal species of economic importance.

Keywords: *Scorpaena*, Black Sea, CPUE

**FISHERY SUSTAINABILITY AND RECOVERY: IS A TWO-YEAR
CLOSURE SUFFICIENT FOR STRIPED VENUS CLAM
POPULATIONS?**

Yusuf CEYLAN

¹*Faculty of Fisheries, Recep Tayyip Erdoğan University, Zihni Derin Campus
53100 Rize, TÜRKİYE*

*Corresponding author: yusuf.ceylan@erdogan.edu.tr

Abstract

The sustainability of the striped venus clam (*Chamelea gallina*) fishery, which has been ongoing for many years (since the 1980s) on the Turkish Black Sea coast, has become a growing concern due to declining catch rates despite regulatory closures. This study evaluates whether a two-year fishery closure is sufficient to ensure stock recovery by comparing catch per unit effort (CPUE) and fishing efficiency data from Sakarya and Şile stations between 2017 and 2021.

In the Sakarya region, which reopened after a two-year closure, despite improved selectivity through vibrating screens, the average CPUE value decreased from 3065.4 kg/h in the first year (2018-2019) to 2446.4 kg/h in the second year (2019-2020). In contrast, the Şile region, which remained closed for two years, showed a low CPUE value (768.6 kg/h) when reopened in the 2020-2021 season, and it was observed that the stocks failed to recover during the two years of closure. Increasing fishing activity to meet daily quotas is another sign of declining productivity ($p<0,05$). These findings suggest that the current two-year closure is insufficient for population recovery, particularly in areas under intense fishing pressure like Şile. Sustainable management of the *C. gallina* fishery requires revising closure durations, strengthening enforcement of daily catch quotas, and improving gear selectivity to prevent further depletion of the stocks. Such actions are essential not only for the ecological sustainability of the species but also for maintaining the economic viability of the fishery, as the Black Sea stocks of striped venus clam constitute an important resource for Türkiye's fisheries sector and play a key role in supplying the European Union seafood market.

Keywords: Black Sea, catch per unit effort, striped venus clam fishery, sustainability

Acknowledgment: The author thanks the fishing captains who provided data.

**UNDERWATER WORKFORCE IN SUSTAINABLE
AQUACULTURE: HUMAN EXPERTISE AND FUTURE
PATHWAYS FOR THE BLUE ECONOMY**

Tolga AKDEMİR

*Vocational School of Technical Sciences- Underwater Technology, Recep Tayyip
Erdogan University, Rize, Türkiye*

*Corresponding author: tolga.akdemir@erdogan.edu.tr

Abstract

Aquaculture plays a strategic role in sustainable food production and the blue economy. Among its unseen yet indispensable elements are professional divers, who carry out essential underwater operations. In aquaculture facilities, divers perform a wide range of tasks including installation, inspection, and maintenance of floating cage systems (HDPE), monitoring fish behavior and health, supporting harvesting operations, conducting environmental assessments beneath cages, and performing emergency repairs. These responsibilities encompass net and buoy maintenance, underwater infrastructure control, and observation of organic accumulation and sediment quality—functions that remain highly dependent on human expertise. As global aquaculture production continues to grow, the demand for skilled divers is rising rapidly. However, challenges persist regarding safety, environmental conditions, and technical competency. In this context, technological integration is reshaping the field: Remotely Operated Vehicles (ROVs), artificial intelligence (AI)-based image analysis, and Internet of Things (IoT) systems are transforming underwater work processes. Hybrid ROV-diver operations, deep learning-assisted damage detection, and IoT-based sensor networks are becoming standard in modern aquaculture systems. Nevertheless, in areas such as emergency response, adaptability, and direct observation, the human element remains irreplaceable. In conclusion, while technology is redefining underwater operations, the role of divers is evolving rather than disappearing. The future of aquaculture will rely on a model where human expertise and advanced technology coexist, ensuring safer, smarter, and more efficient underwater ecosystems.

Keywords: Aquaculture diving, ROV, IoT, Blue economy

**ANALYTICAL FRAMEWORK FOR PRIVATE HATCHERIES
CRITICAL POINT ASSESSMENT IN SOUTHEAST ASIA**

**Stefan M. Petrea^{1,2,3*}, Dragos S. Cristea³, Domenico Caruso⁴, Catalin
Platon⁵, Ira-Adeline Simionov^{1,2,6}, Alina Antache^{1,2,7}, Catalina
Iticescu^{2,8}, Aurelia Nica¹, Isabelle Metaxa¹**

¹*Faculty of Food Science and Engineering, "Dunarea de Jos" University of Galati,
Domneasca Street 111, 800201, Galati, Romania.*

²*REXDAN Research Infrastructure, "Dunarea de Jos" University of Galati,
98 George Cosbuc Street, Galati, Romania.*

³*Faculty of Economics and Business Administration, University "Dunărea de Jos"
of Galați, 800008 Galați, Romania.*

⁴*ISEM, University of Montpellier, CNRS, EPHE, IRD, Montpellier, France*

⁵*ROMFISH National Association of Fish Producers,
12A Nicolae Iorga Blvd, Iasi, Romania.*

⁶*Faculty of Automation, Computer Sciences, Electronics and Electrical
Engineering, "Dunarea de Jos" University of Galati
111 Domneasca Street, Galati, Romania.*

⁷*Faculty of Biology, Alexandru Ioan Cuza University, 700506 Iasi, Romania.*

⁸*Faculty of Sciences and Environment, "Dunarea de Jos" University of Galati
111 Domneasca Street, Galati, Romania.*

*Corresponding author: stefan.petrea@ugal.ro

Abstract

The region of Southeast Asia ranks among the world's largest in terms of inland fisheries and aquaculture. However, to create competitiveness and to satisfy a larger share of the demand recorded in the regional fish fingerlings market, the present research aims to create a complex analytical framework, considering various dimensions, that can be further used as a decision support tool for decision makers, thus building resilience among the regional fish hatcheries sector.

Data were collected from private hatcheries/nurseries, quantifying a total number of over 1000 responses and considering over 80 parameters, divided into various dimensions, as follows: D1 (hatchery status), D2 (water dimension), D3 (technological dimension, D4 (technical dimension), D5 (good aquaculture practices - GAqP and biosecurity dimension) and D6 (problems/barriers dimension). Logistic

Regression (LR) and Random Forest (RF) models were trained under two scenarios: unified (using all dimensions) and dimension-specific.

Dimension-level accuracies varied: D1 and D6 achieved acceptable to good performance (≈ 0.60 – 0.80), D4 was moderate (≈ 0.60), whereas D2 and D3 were low (≈ 0.40), and D5 was very low (≈ 0.20), likely due to sparse adoption data. In the unified scenario models, both LR and RF reached high accuracy (≈ 0.80).

The hatchery improvements proved to be the most reliable predictor in determining the success of the fish hatcheries. Predictors related to technical and technological improvements represent the main pillars in building an economically resilient aquaculture sector in the region of Southeast Asia. The GAqP and biosecurity are emerging concepts for the studied region, and, most probably, the impact of their adoption at the level of existing farms will be observed in the following years, after awareness and knowledge transfer stages of these concepts are acquired.

Keywords: fish hatcheries and nurseries, GAqP, biosecurity, Random forest, Logistic Regression.

Acknowledgment: This work was financially supported by the Capfish aquaculture: Hatchery development & research for ecological intensification system IT1-EISACam Ecological Intensification for Sustainable Aquaculture in Cambodia.

ASSESSMENT OF NEEDS FOR THE IMPLEMENTATION OF SOFT SKILLS IN THE EUROPEAN WATER INDUSTRY

Ira-Adeline Simionov^{1,2*}, Nina-Nicoleta Lazăr², Tamara Radjenovic³,
Milan Gocic⁴, Irene Laiz⁵

¹*Faculty of Food Science and Engineering, Dunarea de Jos University of Galati,
Domneasca 47, Galați, Romania,*

²*REXDAN Research Infrastructure, Dunarea de Jos University of Galati,
Domneasca 47, Galați, Romania,*

³*Faculty of Occupational Safety, University of Nis, Univerzitetski trg 2, Niš, Serbia*

⁴*Faculty of Civil Engineering and Architecture, University of Nis, Univerzitetski trg
2, Niš, Serbia,*

⁵*Applied Physics Department, University of Cádiz, P.º de Carlos III, 28,
Cádiz, Spain.*

*Corresponding author: ira.simionov@ugal.ro

Abstract

The European Commission has set an ambitious objective of upskilling the European workforce to address skill and occupation shortages, meet the requirements of EU Green Skills, and overcome future challenges or threats. The water sector is currently facing a rising gap between labour-market demand and the availability of sufficiently trained and qualified professionals, leading to difficulties in retaining employees and finding skilled workers.

The present study aimed to assess the need for soft-skills implementation in the water industry workforce. The survey questionnaire represents a set of combined questions, within which several functional units can be defined. The first unit is common, of a general-informative nature, and consists of six general questions aimed at obtaining information about the country, gender, level, and type of education, and experience in the water sector. Thus, in total, 119 respondents from the following 16 countries participated in the survey: Romania, Spain, the Republic of Serbia, Cambodia, Germany, Belgium, Turkey, the Netherlands, Croatia, South Sudan, Portugal, Norway, Italy, France, Albania, and Austria.

It was concluded that the two most important personal soft skills needed are responsibility and motivation, while the most important interpersonal soft skills are teamwork and communication.

Keywords: soft skills, water industry, survey

Acknowledgment: „Advancing the Integration of Soft Skills in Higher Education for Water”, 2023-1-RO01-KA220-HED-000160511.



23rd-24th of October 2025, On- site and online

ISSN 3008-4687

ISSN-L 1843-5114



FACULTY OF FOOD SCIENCE
AND ENGINEERING

"DUNAREA DE JOS"
UNIVERSITY OF GALATI

Contact: Symposium Secretariat
Faculty of Food Science and Engineering
"Dunarea de Jos" University of Galati
📍 Strada Domneasca nr. 111, 800201, Galati ROMANIA
☎ Tel/Fax: +40 336 130177/+40 236 460 165
✉ euro.aliment@ugal.ro
🌐 www.euroaliment.ugal.ro