



BOOK *of* ABSTRACTS



2024

International Conference
"Adriatic Biodiversity Protection" — AdriBioPro2024
1–4 October 2024
Kotor, Montenegro



ISBN 978-9940-9613-4-3
COBISS.CG-ID 30862084
DOI 10.5281/zenodo.13854380

International Conference
Adriatic Biodiversity Protection
AdriBioPro2024
01-04 October 2024, Kotor, Montenegro

Book of Abstracts

Institute of Marine Biology
University of Montenegro
Kotor, Montenegro
2024

TABLE OF CONTENTS

THE CONFERENCE.....	4
Participants	4
Format	4
Background	4
University of Montenegro	4
AdriaMed Project	4
SKILLS Project	5
Content	5
Topics Addressed	5
COMMITTEES.....	5
Scientific Committee.....	5
Organizing Committee	6
Secretariat	7
T1: Marine and freshwater biodiversity, systematics, taxonomy, and data management .	9
T2: Climate change and impacts to marine ecosystem	33
T3: Aquatic alien and invasive species	39
T4: Fisheries resources and fishing technology	49
T5: Aquaculture and blue growth	61
T6: Marine litter, ecotoxicology, and water pollution	73
T7: Marine protected areas, conservation of aquatic resources and ecosystems.....	89
T8: Environmental education.....	97
T9: Elasmobranch biodiversity, conservation, and management.....	107
Index of Authors	114

THE CONFERENCE

Welcome to the Third International Conference: Adriatic Biodiversity Protection – AdriBioPro2024. This landmark event, commemorating the 50th anniversary of the University of Montenegro and 25 years of the AdriaMed project, promises to be a pivotal gathering for advancing marine science and policy in the South Adriatic region. Against the dynamic backdrop of the SKILLS initiative, AdriBioPro2024 is dedicated to addressing the critical challenges and opportunities within the blue economy.

Participants

Our conference brings together a diverse community of researchers, policymakers, stakeholders, and enthusiasts, all united in their commitment to marine biodiversity, conservation, and sustainable practices. Through a series of plenary sessions, breakout discussions, and the engaging South Adriatic Sea Food Fair, participants will explore pressing issues such as marine litter, aquaculture, climate change impacts, and the conservation of aquatic ecosystems.

Format

Building on the successful formats of previous conferences, AdriBioPro2024 will foster a vibrant platform for sharing state-of-the-art research and innovative solutions. The insights gained here will be instrumental in shaping future marine science priorities and policies, ensuring a resilient and vibrant Adriatic environment. As we strive to balance conservation efforts with the development of the blue economy, this conference marks a significant step forward in our collective journey toward sustainable maritime heritage.

Background

University of Montenegro

In 2024, the University of Montenegro celebrates five decades of continuous contribution to Montenegrin society. The University of Montenegro has been and remains a field of challenging struggle for knowledge, freedom, and progress, where battles for the future of the country are fought through education, science, and art. Over the past fifty years, the university has played a pivotal role in nurturing the intellectual and cultural fabric of Montenegro, providing a platform for innovation and critical thinking that propels the nation forward.

AdriaMed Project

The FAO-AdriaMed Project (Scientific Cooperation to Support Responsible Fisheries in the Adriatic Sea) is an FAO Regional Project funded by the Italian Ministry of Agriculture, Food and Forestry Policies (MiPAAF), the European Commission since 2007, and the Croatian Ministry of Agriculture since January 2016. Operative since September 1999, the project aims to promote scientific cooperation among Adriatic countries, including Albania, Croatia, Italy, Montenegro, and Slovenia. By aligning with the Code of Conduct for Responsible Fisheries

(FAO 1995), AdriaMed seeks to enhance the management of fishing activities, contributing to a broader understanding of the Adriatic Sea's shared fishery resources. This initiative is crucial for the sustainable management of biological resources that transcend geopolitical boundaries.

SKILLS Project

The SKILLS project, spanning from September 2023 to December 2027, aims to bolster the availability of skilled labor in the South Adriatic region's blue economy sectors. With a total budget of close to 6 million euros, including significant EU funding of 4 million euros, the project operates through a consortium of diverse partners. These include the University of Montenegro - Institute of Marine Biology as the lead partner, the Department of Labor Market Policies, Education, Training from Puglia Region, Italy, the Service for the Competitiveness of Productive Systems from Molise Region, Italy, the State Agency for Strategic Programming and Aid Coordination, Albania, the Ministry of Economic Development of Montenegro, and the Ministry of Agriculture and Rural Development, Albania. Through collaborative efforts, the SKILLS project endeavors to enhance existing educational pathways, establish novel ones, and implement on-the-job training schemes, thereby empowering the workforce and fostering economic growth in the region.

Content

AdriBioPro2024 is more than a conference; it is a call to action for the protection and sustainable use of our marine resources. Let us embark on this journey of exploration, collaboration, and innovation, working together to ensure a prosperous and sustainable future for the South Adriatic region.

Topics Addressed

1. Marine and freshwater biodiversity, systematics, taxonomy, and data management
2. Climate change and impacts to marine ecosystem
3. Aquatic alien and invasive species
4. Fisheries resources and fishing technology
5. Aquaculture and blue growth
6. Marine litter, ecotoxicology, and water pollution
7. Marine protected areas, conservation of aquatic resources and ecosystems
8. Environmental education
9. Elasmobranch biodiversity, conservation and management

COMMITTEES

Scientific Committee

- **Dr Mirko Đurović**, University of Montenegro, Institute of Marine Biology, Chairman of the Scientific Committee
- **Dr Ali Serhan Tarkan**, Mugla Sıtkı Kosman University, Türkiye

- **Dr Aleksandar Joksimović**, University of Montenegro, Institute of Marine Biology, Montenegro
- **Dr Ana Pešić**, University of Montenegro, Institute of Marine Biology, Montenegro
- **Dr Andreja Ramšak**, Marine biology station, Piran, Slovenija
- **Dr Belma Kalamujić**, University of Sarajevo, Institute for Genetic Engineering and Biotechnology
- **Dr Borut Mavrič**, Marine biology station, Piran, Slovenija
- **Dr Danijela Joksimović**, University of Montenegro, Institute of Marine Biology, Montenegro
- **Dr Davor Lučić**, University of Dubrovnik, Institute for Marine and Coastal Research, Croatia
- **Dr Dragana Milošević**, University of Montenegro, Faculty of Sciences and mathematics, Montenegro
- **Dr Jasmina Obhodaš**, Institute Ruđer Bošković, Croatia
- **Dr Jure Jugovic**, University of Primorska, Koper, Slovenia
- **Dr Michael Chatziefstathiou**, Pan-Hellenic Society of Technologists Ichthyologists, Piraeus, Greece
- **Dr Milica Mandić**, University of Montenegro, Institute of Marine Biology, Montenegro
- **Dr Nada Ćujić Nikolić**, Institute for Medicinal Plants Research "Dr. Josif Pančić", Serbia
- **Dr Nedo Vrgoč**, Institute of Oceanography and Fisheries Split, Croatia
- **Dr Olivera Marković**, University of Montenegro, Institute of Marine Biology, Montenegro
- **Prof Dr Pavle Andus**, University of Belgrade, Faculty of Biology, Serbia
- **Dr Pero Tutman**, Institute of Oceanography and Fisheries Split, Croatia
- **Dr Radoje Laušević**, Faculty of Biology, University of Belgrade, Serbia
- **Dr Rigers Bakiu**, Department of Aquaculture and Fisheries, Faculty of Agriculture and Environment, Agricultural University of Tirana, Albania
- **Prof Dr Samir Muhamedagić**, University of Sarajevo Faculty of Agriculture and Food Science, Bosnia & Hercegovina
- **Dr Sandi Orlić**, Institute Ruđer Bošković, Croatia
- **Dr Slavica Petović**, University of Montenegro, Institute of Marine Biology
- **Dr Stefano Piraino**, Laboratorio di Zoologia e Biologia Marina Dipartimento di Scienze e Tecnologie Biologiche ed Ambientali - Lecce, Italy
- **Dr Tatjana Bakran Petricoli**, University of Zagreb Faculty of Science, Department of Biology, Croatia
- **Dr Vesna Mačić**, University of Montenegro, Institute of Marine Biology, Montenegro
- **Dr Živana Ninčević-Gladan**, Institute of Oceanography and Fisheries Split, Croatia
- **Prof Dr Zoran Marković**, University of Belgrade, Faculty of Agriculture, Serbia
- **Dr Giorgio Bavestrello**, University of Genoa, Italy

Organizing Committee

- Dr Aleksandra Huter
- Dr Ana Perošević Bajčeta
- Dr Branka Pestorić, Chair
- Dr Dragana Drakulović
- Dr Ilija Ćetković
- Mr Ilinka Alorić

- Dr Rajko Martinović
- Dr Sandra Jokanović
- Dr Slađana Nikolić
- Dr Zdravko Ikica

Secretariat

- Ana Krivokapić
- Emilija Nikčević
- Jovana Đurović
- Marija Đurović
- Milica Peković
- Tatjana Rađenović
- Vladan Vuković

The Green Secret of the Adriatic Sea: New Approaches to Utilize *Ulva* spp. from Boka Kotorska Bay

Nada Čujić Nikolić^{1*}, Dragana Drakulović², Zorana Mutavski¹, Slađana Rakita³, Ivana Čabarkapa³, Katarina Šavikin¹, & Muki Spighel⁴

¹Institute for Medicinal Plants Research “Dr. Josif Pančić”, Belgrade, Serbia,
*ncujic@mocbilja.rs

²Institute of Marine Biology, University of Montenegro, Kotor, Montenegro

³Institute of Food Technology, University of Novi Sad, Novi Sad, Serbia

⁴Morris Kahn Marine Research Station, University of Haifa, Israel

Abstract

The seas have become attractive alternatives for exploiting valuable nutrient resources. Macroalgae, commonly known as seaweeds, are probably the future functional food or pharmaceuticals since they have been recognized as multi-food use sea crops, with many nutritional and health benefits. The *Ulva* spp. are among the most widespread edible seaweeds, rich with polyphenolics and natural pigments, but not sufficiently exploited due to the specific taste and sensitivity of these bioactive compounds. The focus of this research was to establish new ways of utilizing *Ulva*, by applying green and safe innovative technologies for extracting and preserving bioactive compounds, making *Ulva* more acceptable for food or pharmaceutical consumption. The sampling of *Ulva* spp. in Boka Kotorska Bay (Adriatic Sea) was performed in July 2023 (Institute of Marine Biology, Kotor, Montenegro). The dried samples were prepared for extraction, before the microencapsulation process. Optimal extract, rich with bioactive compounds was produced by the principles of green chemistry, using ethanol-water as a solvent, by the traditional extraction method, maceration. Innovative microencapsulation approaches were performed for the preservation of *Ulva*-extracted bio-compounds (spray and freeze-drying techniques). The obtained microencapsulates improved *Ulva*'s physicochemical stability, limiting the inactivation of the polyphenolic compounds, and achieving high encapsulation efficiency associated with good bioactive protection. The microencapsulates demonstrated good powder properties, parameters important for further applications. The thermal analysis proved *Ulva* microencapsulates have good thermal stability important for food processing. All fragments from this valuable sea resource may be used as uncstly bio-products rich in functional compounds, which could have commercial utilization and benefit *Ulva* species present along the Adriatic Sea.

This experimental research work has been performed by the frame of Cost Action 20106 (SeaWheat), supported by the grant for the STSM project, and experiments with *Ulva* spp. were performed at the Institute of Marine Biology, Kotor, Montenegro. Authors acknowledge the Cost Action 22161 (FLAVOURsome) and the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, grant number 451-03-66/2024-03/200003.

Keywords: *Ulva*, extraction, microencapsulation, carriers, polyphenols