



BOOK OF ABSTRACTS

XXI EUROFOODCHEM

22-24 November 2021

On-line conference

TITLE

Book of Abstracts of the XXI EuroFoodChem Congress

EDITORS

Joana S. Amaral, Cristina Todasca, Michael Murkovic, Marco Arlorio, Tanja Cirković Veličković, Hans-Jacob Skarpeid, Karel Cejpek, Irena Vovk, Livia Simon Sarkadi, Małgorzata Starowicz, Matthias Wüst, Robert Tincu, Vuk Filipovic.

EDITION

Sociedade Portuguesa de Química
Av. Da República, 45 – 3º Esq
1050-187 Lisboa – Portugal

DATE

November 2021

ISBN

ISBN 978-989-8124-34-0



@ Sociedade Portuguesa de Química

All rights reserved.

The editors state that the content of scientific abstracts is of the responsibility of their respective authors.

XXI EUROFOODCHEM CONFERENCE

Scientific Committee

Joana Amaral (Portugal) – Chair, FCD-EuChemS
Cristina Todasca (Romania) – Secretary, FCD-EuChemS
Michael Murkovic (Austria) – Treasurer, FCD-EuChemS
Marco Arlorio (Italy) – past-Chair, FCD-EuChemS
Tanja Cirković Veličković (Serbia)
Celestino Santos-Buelga (Spain)
Hans-Jacob Skarpeid (Norway)
Irena Vovk (Slovenia)
Karel Cejpek (Czech Republic)
Lillian Barros (Portugal)
Livia Simon Sarkadi (Hungary)
M. Beatriz P.P. Oliveira (Portugal)
Małgorzata Starowicz (Poland)
Manuel Coimbra (Portugal)
María J. Cantalejo (Spain)
Matthias Wüst (Germany)
Michael Granvogl (Germany)
Reto Battaglia (Switzerland)
Slavica Ražić (Serbia, Division of Analytical Chemistry - EuChemS)
Wiesław Wiczkowski (Poland)
Zuzana Ciesarová (Slovakia)

Organizing Committee

Joana Amaral (Portugal)
Cristina Todasca (Romania)
Michael Murkovic (Austria)
Marco Arlorio (Italy)
Tanja Cirković Veličković (Serbia)
Hans-Jacob Skarpeid (Norway)
Irena Vovk (Slovenia)
Karel Cejpek (Czech Republic)
Livia Simon Sarkadi (Hungary)
Małgorzata Starowicz (Poland)
Matthias Wüst (Germany)
Robert Tincu (Romania)
Vuk Filipovic (Serbia)

Conference organized under the auspices of the Food Chemistry Division of the European Chemical Society (FCD-EuChemS), the Portuguese Chemical Society (SPQ) and the Serbian Chemical Society.

Probing the stability of the food colourant R-phycoerythrin from dried Nori flakes

Ana Simovic¹, Sophie Combet², Tanja Cirkovic Velickovic^{1,3,4,5}, Milan Nikolic¹, Simeon Minic^{1,*}

¹ Center of Excellence for Molecular Food Sciences & Department of Biochemistry, University of Belgrade - Faculty of Chemistry, Belgrade, Serbia

² Université Paris-Saclay, Laboratoire Léon-Brillouin, UMR12 CEA-CNRS, CEA-Saclay, Gif-sur-Yvette CEDEX, France

³ Ghent University Global Campus, Yeonsu-gu, Incheon, South Korea

⁴ Faculty of Bioscience Engineering, Ghent University, Ghent, Belgium

⁵ Serbian Academy of Sciences and Arts, Belgrade, Serbia

* *sminic@chem.bg.ac.rs* (corresponding author)

The high content of vitamins, minerals, antioxidants, and proteins makes red algae *Porphyra* sp. (Nori) superfood with exceptional health-promoting benefits. Its intense colour originates from R-phycoerythrin (R-PE), phycobiliprotein containing covalently attached tetrapyrrole chromophores: red phycoerythrobilin and orange phycourobilin. The present study aims to characterize the stability of R-PE, a natural colourant with a high potential for application in the food, cosmetic, and pharmaceutical industries. We purified R-PE from dried Nori flakes with a high purity ratio ($A_{560}/A_{280} \geq 5$). Far-UV CD spectroscopy showed that α -helix is the dominant secondary structure (75%). The thermal unfolding of α -helix revealed two transitions (T_{m1} and T_{m2} at 56 and 72°C, respectively), ascribed to the different subunits of R-PE. Absorption measurements showed that high pressure (HP) induces dissociation of R-PE into subunits followed by subunit unfolding. Contrary to temperature, HP treatment showed a significant advantage under applied conditions: the protein unfolding is partly reversible, and the R-PE colour bleaching is minimized. Based on the fluorescence quenching approach, R-PE's binding affinities for Cu^{2+} and Zn^{2+} ions were 6.27×10^5 and $1.71 \times 10^3 \text{ M}^{-1}$, respectively. Absorption and near-UV/VIS CD spectroscopy suggested conformational changes in protein chromophores upon metal ions binding. Far-UV CD spectroscopy did not reveal that metal binding affects R-PE structure. The obtained results give new insights into the stability of R-PE with a good use-value in replacement of toxic synthetic dyes, preservation of R-PE red colour in fortified food and beverages by HP processing, and as a biosensor for Cu^{2+} in aquatic life systems.

Acknowledgments: This study was financially supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia, Contract number: 451-03-9/2021-14/200168 and the European Commission, under the Horizon2020, FoodEnTwin Project, GA No. 810752.