

# SANJA BABIĆ

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Birth date: Oct 11, 1989

## RESEARCH EXPERIENCE

2024 Present	<b>SENIOR RESEARCH ASSOCIATE</b> Laboratory for Biotechnology in Aquaculture, Division of Materials Chemistry, Ruđer Bošković Institute, Bijenička cesta 54, 10000 Zagreb, Croatia
2018 2013	<b>RESEARCH ASSOCIATE</b> Laboratory for Biotechnology in Aquaculture, Division of Materials Chemistry, Ruđer Bošković Institute, Bijenička cesta 54, 10000 Zagreb, Croatia
2016 2018	<b>ASSOCIATE AT THE "CENTRE OF EXCELLENCE FOR MARINE BIOPROSPECTING (BIOPROCRO)"</b> Laboratory for Biotechnology in Aquaculture, Division of Materials Chemistry, Ruđer Boskovic Institute, Bijenička cesta 54, 10000 Zagreb, Croatia
2015 2016	<b>ASSOCIATE ON THE PROJECT "PANNONIAN COMPETENCE CENTRE FOR WOOD"</b> Laboratory for Biotechnology in Aquaculture, Division of Materials Chemistry, Ruđer Bošković Institute, Bijenička cesta 54, 10000 Zagreb, Croatia
2013 2014	<b>VOCATIONAL TRAINING</b> Laboratory for Biotechnology in Aquaculture, Division of Materials Chemistry, Ruđer Bošković Institute, Bijenička cesta 54, 10000 Zagreb, Croatia

h-index :

11 (WoS) / 12 (Scopus)

Personal page:

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## EDUCATION

2016 2017	<b>POSTDOCTORAL RESEARCH</b> Biochemistry in Medical Science, Faculty of Health Sciences, University of Ljubljana, Zdravstvena pot 5, 1000 Ljubljana
2013 2016	<b>POSTGRADUATE UNIVERSITY STUDY PROGRAMME (PH.D.) IN BIOLOGY</b> Faculty of Science, University of Zagreb, Horvatovac 102a, 10000 Zagreb
2008 2011	<b>UNDERGRADUATE UNIVERSITY STUDY PROGRAMME IN ENVIRONMENTAL SCIENCES (BCC)</b> Department of Biology, Faculty of Science, University of Zagreb, Horvatovac 102a, 10000 Zagreb

Skills:

- Developmental toxicity
- Behavioral toxicity
- Mutagenicity
- Fluorescence microscopy
- Spectrophotometry
- Bioactivity testing *in vivo* (antioxidative, regenerative, osteogenic, neuroprotective potential)

## PROJECTS

2024	Beneficial effects of molecules from Adriatic Sea macroalgae on tissue regeneration in zebrafish ( <i>Danio rerio</i> ), Croatian Academy of Science and Arts - <b>Principal Investigator</b>
2022	Determination of antioxidant potential of bioactive compounds isolated from Adriatic sea macroalgae: comparison of <i>in vivo</i> , <i>in vitro</i> and <i>in silico</i> approaches, Croatian Academy of Science and Arts - <b>Principal investigator</b>
2020 2023	Center of Competence (CEKOM 3LJ) of the Operational Programme Competitiveness and Cohesion (€ 9,780.000) – <b>Team member</b>
2020 2023	Development of Innovative Biobased Products by <i>in silico</i> Assessment of Microalgae Bioactivity of the Operational Programme Competitiveness and Cohesion (€ 3,854,000) – <b>Team member</b>
2020 2023	SUPERFOOD – Microalgae to Innovative Bakery Products and Pasta of the Operational Programme Competitiveness and Cohesion (€ 1,034,100) – <b>Team member</b>
2020 2022	Associate on the research project "Partnerships between scientists and fishermen" - Measure I.3., EU Operational Programme for Maritime Affairs and Fisheries of the Republic of Croatia for the programming period 2014-2020 (€ 395.000) - Partnership between Science and Fisheries (European Maritime and Fisheries Fund, Ministry of Agriculture) – <b>Team member</b>
2020 2023	Biomimetic intelligent composite systems, Croatian Science Foundation (€ 190.000) – <b>Team member</b>
2017 2023	Bioprospecting of the Adriatic Sea (ERDF fond), European Regional Development Fund, ERDF (€ 5,000.000) – <b>Team member</b>
2018 2020	Bilateral Chinese-Croatian scientific project: Development of biological methods for toxicity assessment of nanoparticles in soil – <b>Team member</b>
2014 2016	Panonic Wood Center of Competence, European Regional Development Fund (€ 7,000.000) – <b>Team member</b>

## TEACHING ACTIVITIES

2014 2015	Teaching Assistant, Department of Biology, Faculty of Science, University of Zagreb
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## INSTITUTIONAL RESPONSIBILITIES

2023 present	Member of the Bioethics Committee at Ruđer Bošković Institute
2022 present	Member of the Bioethics Committee at the Ministry of Agriculture

## AWARDS AND CERTIFICATES

- 2017 Ruđer Bošković Institute award for the best article of ZKM employee who did not have a doctorate at the time of publication, for scientific work (Journal of Hazardous Materials 318, 477-486)
- 2017 Annual award of the Society of young scientists and artists for the article published in 2016 (Journal of Hazardous Materials 318, 477-486)
- 2016 Training course for individuals working with experimental animals, Category B, FELASA equivalent. Certificate number: 179.3-16, HR 191/02/P.
- 2016 City of Zagreb Scholarship for Ph.D. students
- 2015 Scholarship given by FEBS and Croatian society for biochemistry and molecular biology for the attendance at the FEBS3+ Meeting – Molecules of life, Slovenia
- 2012 Special Rector's prize for participation at the event "Night of biology", University of Zagreb
- 2011 Rector's prize for student work "Range expansion of invasive amphipods and their impact on benthic communities in the Drava River" during the academic year 2011/2012

## SUPERVISION OF STUDENTS

- 2024 Ongoing: J. Požeg Krisković: Ecotoxicity of serotonin reuptake inhibitors citalopram, tramadol, and nortriptyline on zebrafish (*Danio rerio*) embryos. Supervision of graduate thesis
- 2022 K. Begić: Evaluation of the antioxidant activity of polysaccharides isolated from the Adriatic Sea macroalgae using zebrafish *Danio rerio* embryos (Hamilton, 1822). Supervision of a student work awarded with the Rector's prize
- 2021 G. Prgić: Ecotoxicological assessment of the impact of cardiovascular pharmaceuticals present in aquatic ecosystems on zebrafish embryos *Danio rerio* (Hamilton, 1822). Supervision of graduate thesis.
- 2021 K. Begić: Evaluation of the antioxidant activity of polysaccharides isolated from the Adriatic Sea macroalgae using zebrafish *Danio rerio* embryos (Hamilton, 1822). Supervision of a student work awarded with the Rector's prize.
- 2020 Mentorship of Klaas Van Halewyck, student of Bioscience Engineering, University of Ghent, Belgium within the ERASMUS+ program
- 2021
- 2018 A. Sima Cota: Toxicity assessment of the water from Sava River using algae, plants and fish. Supervision of graduate thesis
- 2017 H. Višić: Toxicity of contaminated sediment from the Sava River on zebrafish embryos (*Danio rerio*). Supervision of a student work awarded with the Rector's prize.

## PUBLICATIONS

**34 (Wos), 35 (Scopus)**

- 2024 Matulja D, Grbčić P, Matijević G, Babić S, Bojanić K, Laclef S, Vrček V, Čož-Rakovac R, Kraljević Pavelić S, Marković D: Synthesis and biological evaluation of granulatamide B and its structural analogues. *Current Medicinal Chemistry* (in press)
- 2023 Topić Popović N, Jambrošić MK, Janči T, Babić S, Beer-Ljubić B, Fiket Ž, Bojanić K, Strunjak-Perović I, Tomljanović T, Čož-Rakovac R: Effect of seasonal temperature shifts on body homeostasis, biochemical parameters and chemical composition of green ormer (*Haliotis tuberculata*) in the Northern Adriatic. *Food Chemistry* 421, 136204
- 2023 Martić A, Čižmek L, Ul'yanovskii N, Paradžik T, Perković L, Matijević G, Vujović T, Baković M, Babić S, Kosyakov DS, Trebše P, Čož-Rakovac R: Intra-species variations of bioactive compounds from marine algae: antioxidant, antimicrobial, dermatological, dietary, and neuroprotective potential. *Antioxidants* 12(4), 857
- 2023 Topić Popović N, Čižmek L, Babić S, Strunjak-Perović I, Čož-Rakovac R: Fish liver damage related to the wastewater treatment plant effluents. *Environmental Science and Pollution Research* 30(17), 48739-48768
- 2023 Matijević G<sup>1</sup>, Babić S<sup>1</sup>, Maršavelski A, Stipaničev D, Repec S, Čož-Rakovac R, Klobučar G: Estimating risk of cardiovascular pharmaceuticals in freshwaters using zebrafish embryotoxicity test-statins threat revealed. *Chemosphere* 313, 137574
- 2022 Topić Popović N, Kazazić S, Bilić B, Babić S, Bojanić K, Bujak M, Tartaro Bujak M, Jadan M, Strunjak-Perović I, Kepec S, Čož-Rakovac R: *Shewanella* spp. from wastewater treatment plant-affected environment: isolation and characterization. *Environmental Science and Pollution Research* 29(55), 82986-83003
- 2022 Radman S, Cikoš AM, Babić S, Čižmek L, Čož-Rakovac R, Jokić S, Jerković I: *In vivo* and *in vitro* antioxidant activity of less polar fractions of *Dasycladus vermicularis* (Scopoli) Krasser 1898 and the chemical composition of fractions and macroalga volatilome. *Pharmaceuticals* 15(6), 743
- 2022 Križanac S, Topić Popović N, Barišić J, Beer-Ljubić B, Bujak M, Babić S, Bojanić K, Čož-Rakovac R, Matulić D, Strunjak-Perović I: Comparative study of physiological changes in turbot *Scophthalmus maximus* in different living conditions. *Applied Sciences* 12(9), 4201
- 2022 Radman, S, Čižmek L, Babić S, Cikoš AM, Čož-Rakovac R, Jokić S, Jerković I: Bioprospecting of less-polar fractions of *Ericaria crinita* and *Ericaria amentacea*: Developmental Toxicity and antioxidant activity. *Marine drugs* 20(1), 57
- 2022 Malev O<sup>1</sup>, Babić S<sup>1</sup>, Cota AS, Stipaničev D, Repec S, Drnić M, Lovrić M, Bojanić K., Radić Brkanac S, Čož-Rakovac R, Klobučar G: Combining short-term bioassays using fish and crustacean model organisms with ToxCast *in vitro* data and broad-spectrum chemical analysis for environmental risk assessment of the river water (Sava, Croatia). *Environmental Pollution* 292, 118440

- 2021 Galić Perečinec M, Babić S, Čižmek L, Selmani A, Topić Popović N, Dutour Sikirić M, Strunjak-Perović I, Čož-Rakovac R. Selenite as a lipid inductor in marine microalga *Dunaliella tertiolecta*: Comparison of one-stage and two-stage cultivation strategies. *Applied Biochemistry and Biotechnology* 1-20
- 2021 Topić Popović N, Gajdoš Kljusurić J, Strunjak-Perović I, Barišić J, Palić D, Beer Ljubić B, Babić S, Čož-Rakovac R. Association of wastewater determinants with fish hematological and plasma biochemical responses: Multivariate analysis approach. *Aquaculture Reports* 21, 100877
- 2021 Radman S, Cikoš AM, Flanjak I, Babić S, Čižmek L, Šubarić D, Čož-Rakovac R, Jokić S, Jerković I. Less polar compounds and targeted antioxidant potential (*in vitro* and *in vivo*) of *Codium adhaerens* C. Agardh 1822. *Pharmaceuticals* 14(9), 944
- 2021 Jerković I, Cikoš AM, Babić S, Čižmek L, Bojanić K, Aladić K, Ul'yanovskii N.V., Kosyakov D.S., Lebedev AT, Čož-Rakovac R, Trebše P, Jokić S. Bioprospecting of less-polar constituents from endemic brown macroalga *Fucus virsoides* J. Agardh from the Adriatic Sea and targeted antioxidant effects *in vitro* and *in vivo* (zebrafish model). *Marine Drugs* 19(5): 235
- 2021 Topić Popović N, Krbavčić M, Barišić J, Beer Ljubić B, Strunjak-Perović I, Babić S, Lorencin V, Matulić D, Tomljanović T, Čož-Rakovac R. Comparative tissue responses of marine mollusks on seasonal changes in the northern Adriatic Sea. *Applied Sciences* 11(6): 2874
- 2021 Babić S, Čižmek L, Maršavelski A, Malev O, Pflieger M, Strunjak-Perović I, Topić Popović N, Čož-Rakovac R, Trebše P. Utilization of the zebrafish model to unravel the harmful effects of biomass burning during Amazonian wildfires. *Scientific Reports* 11: 2527
- 2021 Cikoš AM, Flanjak I, Bojanić K, Babić S, Čižmek L, Čož-Rakovac R, Jokić S, Jerković I. Bioprospecting of Coralline Red Alga *Amphiroa rigida* J.V. Lamouroux: Volatiles, Fatty Acids and Pigments. *Molecules* 26(3): 520
- 2020 Pačič A<sup>1</sup>, Babić S<sup>1</sup>, Maršavelski A, Galić M, Topić Popović N, Strunjak-Perović I, Čož-Rakovac R, Bronić J, Valtchev V. Nanosized zeolite beta - determining the safety of usage by zebrafish *Danio rerio* embryos. *Microporous and Mesoporous Materials* 299, 110103
- 2020 Topić Popović N, Beer Ljubić B, Strunjak-Perović I, Babić S, Lorencin V, Jadan M, Čižmek L, Matulić D, Bojanić K, Čož-Rakovac R. Seasonal antioxidant and biochemical properties of the Northern Adriatic *Pecten jacobaeus*. *PlosONE* 15(3): e0230539
- 2019 Pečur Kazazić S, Topić Popović N, Strunjak-Perović I, Babić S, Florio D, Fioravanti M, Bojanić K, Čož-Rakovac R: Matrix-assisted laser desorption/ionization time of flight mass spectrometry identification of *Vibrio (Listonella) anguillarum* isolated from sea bass and sea bream. *PLoS ONE* 14(11), e0225343
- 2019 Topić Popović N, Kepec S, Pečur Kazazić S, Barišić J, Strunjak-Perović I, Babić S, Čož-Rakovac: The impact of treated wastewaters on fish bacterial flora: A public health perspective. *Croatian Journal of Fisheries* 77, 132-135

- 2019 Pečur Kazazić S, Topić Popović N, Strunjak-Perović I, Florio D, Fioravanti M, Babić S, Čož-Rakovac R: Fish photobacteriosis-The importance of rapid and accurate identification of *Photobacterium damsela* subsp. *piscicida*. Journal of Fish Diseases 42(8), 1201-1209
- 2019 Babić S, Malev O, Pflieger M, Lebedev A.T., Mazur D.M., Kužić A, Čož-Rakovac R, Trebše P: Toxicity evaluation of olive oil mill wastewater and its polar fraction using multiple whole- organism bioassays. Science of the Total Environment 686, 903-914
- 2019 Topić Popović N, Kazazić S, Barišić J, Strunjak-Perović I, Babić S, Bujak M, Gajdoš Kljusurić J, Čož-Rakovac R: Aquatic bacterial contamination associated with sugarplant sewage outfalls as a microbial hazard for fish. Chemosphere 224, 1-8
- 2018 Babić S, Barišić J, Stipaniev D, Repec S, Lovrić M, Malev O, Martinović-Weigelt, Čož-Rakovac R, Klobučar G: Assessment of river sediment toxicity: Combining empirical zebrafish embryotoxicity testing with *in silico* toxicity characterization. Science of the Total Environment 643, 435-450
- 2017 Bielen A, Šimatović A, Kosić-Vukšić J, Senta I, Ahel M, Babić S, Jurina T, González Plaza JJ, Milaković M, Udiković-Kolić N: Negative environmental impacts of antibiotic-contaminated effluents from pharmaceutical industries. Water Research 126, 79-87
- 2017 Župan I, Tkalčić S, Čož-Rakovac R, Strunjak-Perović I, Topić Popović N, Babić S, Bujak M, Šarić T: Biochemical parameters in the blood of gilthead sea bream (*Sparus aurata* Linnaeus, 1758) supplemented with commercially available  $\beta$ -glucan-based product (IMUNO-2865®). Aquaculture Research 49(2), 786-792
- 2017 Babić S, Barišić J, Višić H, Sauerborn Klobučar R, Topić Popović N, Strunjak-Perović I, Čož-Rakovac R, Klobučar G: Embryotoxic and genotoxic effects of sewage effluents in zebrafish embryo using multiple endpoint testing. Water Research 115, 9-21
- 2016 Topić Popović N, Strunjak-Perović I, Barišić J, Kepec S, Jadan M, Beer-Ljubić B, Matijatko V, Palić D, Klobučar G, Babić S, Gajdoš Kljusurić J, Čož-Rakovac R: Native Prussian carp (*Carassius gibelio*) health status, biochemical and histological responses to treated wastewaters. Environmental Pollution 218, 689-701
- 2016 Barišić J, Čož-Rakovac R, Delaš I, Topić Popović N, Gavrilović A, Jug-Dujaković J, Brajlo M, Sauerborn-Klobučar R, Babić S, Strunjak-Perović I: Predictive modeling of European flat oyster (*Ostrea edulis* L.) fatty acid composition. Aquaculture International 25(2), 805-825
- 2016 Babić S<sup>1</sup>, Barišić J<sup>1</sup>, Bielen A, Bošnjak I, Sauerborn Klobučar R, Ujević I, Strunjak Perović I, Topić Popović N, Čož-Rakovac R: Multilevel ecotoxicity assessment of environmentally relevant bisphenol A concentrations using the soil invertebrate earthworm *Eisenia fetida*. Journal of Hazardous Materials 318, 477-486
- 2016 Babić S, Barišić J, Malev O, Klobučar G, Topić Popović N, Strunjak-Perović I, Krasnići N, Čož-Rakovac R, Sauerborn Klobučar R: Sewage sludge toxicity assessment using earthworm *Eisenia fetida*: can biochemical and histopathological analysis provide fast and accurate insight? Environmental Science and Pollution Research 23(12), 12150-12163

- 2015 Babić S, Dragun Z, Sauerborn Klobučar R, Ivanković D, Bačić N, Fiket Ž, Barišić J, Krasnići N, Strunjak-Perović I, Topić Popović N, Čož-Rakovac R: Indication of metal homeostasis disturbance in earthworm *Eisenia fetida* after exposure to semi-solid depot sludge. *Science of the Total Environment* 526, 127-135
- 2015 Topić Popović N, Strunjak-Perović I, Sauerborn Klobučar R, Barišić J, Babić S, Jadan M, Kepec S, Kazazić S, Matijatko V, Beer Ljubić B, Car I, Repec S, Stipaničev D, Klobučar G, Čož-Rakovac R: Impact of treated wastewater effluent on fish and toxicity biosensors. *Science of the Total Environment* 538, 23-37
- 2014 Bošnjak I, Bielen A, Babić S, Šver L, Topić Popović N., Strunjak-Perović I, Čož-Rakovac R, Sauerborn Klobučar R: First evidence of the P-glycoprotein gene expression (P-gp/Abcb1) and MXR activity modulation in earthworm *Eisenia fetida*, Savigny. *Archives of Industrial Hygiene and Toxicology* 65(1): 67-74