



2023 Master internship at University of Gdańsk



TITLE: Effect of pharmaceuticals on microphytobenthic communities

LAB & PEOPLE

- Name of the hosting lab: Department of Marine Ecosystems Functioning
- General activities of the lab: field and laboratory experiments on marine organisms
- Website:
- Number of staff / PhD: 16 / 9
- Supervisor name and contact: Filip Pniewski (filip.pniewski@ug.edu.pl), Marek Klin (marek.klin@ug.edu.pl)

TOPIC OF THE INTERNSHIP

- Scientific context of the internship (max 20 lines)

Numerous pollutants affect marine ecosystems. One of the compounds recognized as contaminants of emerging concern (CEC) are various pharmaceuticals. They are designed to be highly active at very low concentrations, thus they may constitute a serious threat to marine organisms since the marine water bodies are the final sinks for chemical substances discharged into the environment. Despite the fact that in recent years they have been the focus of many researchers, data on the influence of pharmaceuticals on microalgal communities remains relatively scarce (e.g., Johansson et al. 2014). Furthermore, there is also a lack of information on the combined effects of pharmaceuticals and other environmental variables, while such interactions may significantly alter microalgal response to pollutants (e.g., Diniz et al. 2021). This internship aims to assess the influence of ciprofloxacin (a recalcitrant antimicrobial agent commonly found in marine waters) on microphytobenthic communities. Ecotoxicity of ciprofloxacin will be studied using algal growth inhibition tests (as described in ISO recommendations) applying a wide range of drug concentrations; Diversity of microphytobenthos will be investigated via multiple techniques, including: (i) classical microscopic observations, (ii) marker pigment analysis and (iii) metabarcoding approach. Subsequently, generated data will be used to describe functional diversity of microphytobenthos and its variations driven by the presence of the drug. In addition, chlorophyll a fluorescence will be measured to track potential changes in photosynthetic performance of the studied communities, and thus its primary production

Keywords : ecotoxicity, ciprofloxacin, pharmaceuticals, microphytobentos, taxonomic diversity

Bibliography :

1. Johansson, C. H., Janmar, L., Backhaus, T., 2014: Toxicity of ciprofloxacin and sulfamethoxazole to marine periphytic algae and bacteria. *Aquatic Toxicology*, 156, 248–258.
2. Vinicius Diniz, V., Rath, G., Rath, S., Rodrigues-Silva, C., Guimarães, Cunhac, D.G.F., 2021: Long-term ecotoxicological effects of ciprofloxacin in combination with caffeine on the microalga *Raphidocelis subcapitata*. *Toxicology Reports*, 8, 429–435.

Tasks and duties entrusted to the student:

- (1) collecting field material
- (2) performing ecotoxicity test
- (3) analysis of microphytobentos taxonomic composition and structure via: (i) microscopic observations, (ii) photosynthetic pigment analysis, (iii), fluorescence measurements, (iv) metabarcoding
- (4) data processing and statistics.

Skills to be acquired or developed:

- (1) ecotoxicity evaluation
- (2) water chemical analysis
- (3) micralgal diversity analysis using various statistical tools (such as implemented in e-PRIMER)
- (4) development of protocols and data processing in HPLC photosynthetic pigments analysis
- (5) laboratory skills for metabarcoding analysis (DNA extraction, purification, PCR) and basic bioinformatics training.

PROFILE OF THE DESIRED STUDENT

- Minimum level of study required: first year of Master
- Field(s) of study: marine ecology, biology, chemistry
- Scientific skills : experience in laboratory works, handling of microalgal/bacterial cultures and statistical data analysis
- Language skills required: good spoken and written English

THE INTERNSHIP ASSIGNMENT:

Desired duration of the internship (in months): 5 months

Desired Starting date of the mission: Feb-March 2024

Indicative weekly schedule: *40h / week*

Remuneration:

Erasmus grant: could be asked to your own university

Internship agreement: *an internship agreement will be signed.*

To SEA-EU students:

*If you're interested please send your CV and letter of motivation to the scientist in charge,
filip.pniewski@ug.edu.pl, before the 31.10.2023.*