The potential of bioactive compounds from marine bioresources is unexplored and may offer a 'sea of opportunities' in several sectors, e.g. food and feed, nutraceuticals, pharma, cosmetics, agriculture and bio-based materials. The present study describes our bioprospecting efforts in exploring the marine environment of the Belgian part of the North Sea with unprofiled biodiversity. Our goal is to investigate the diversity and to find new bioactive compounds with antibacterial and electrophysiological activities from local under explored marine macro-organisms. The knowledge base generated in this project will trigger further innovation to foster new commercial developments in various sectors.

** INTRODUCTION **

** METHODOLOGY **

** Collection of North Sea species **

- Sampling campaigns in 4 seasons (2020 + 2021)
- RV Simon Stevin with beam trawl, plankton net, Van Veen grab
- Scientific diving team sampling tripods + shipwrecks

** Screening for bioactive compounds **

- Solvent extraction
- SPE-C18 extraction
- GC-HRMS analysis
- UPLC-HRMS analysis
- Freeze-dried samples
- Solvent extraction and evaporation
- Pongtiprung of all species
- Fingerprinting of all species
- Ready for bioactivity assays

** Electrophysiological testing of bioactive compounds **

- Methodology: experimental setup
- Xenopus laevis
- Partial ovariectomy
- Xenopus oocytes
- Membrane-bound proteins
- Biofilm eradication
- Biofilm inhibition
- Two-electrode Voltage Clamp (HiClamp, high-throughput set-up)
- Electrophysiological characterization: targets
- Preliminary results

- 0 1/512 1/256 1/128 1/64 1/32 1/16 1/8 1/4 1/2
- Halocline block
- MIC

** Antimicrobial testing of bioactive compounds **

- Methodology: experimental setup
- Gram-negative bacteria:
  - Escherichia coli
  - Pseudomonas aeruginosa
  - Acinetobacter baumannii
- Gram-positive bacteria:
  - Staphylococcus aureus
  - Candida albicans
- Testing against planktonic organisms
- Testing against biofilms in a simple HFP system
- MIC
- 96-well microtitre-plates
- Ready for bioactivity assays

** Bioactivity assays **

- Spraying fractionation
- 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
- Preliminary results
- For compounds with MIC ≤ 40 µM
- So far, 7 sets of 96 fractions (5 different organisms have been screened)
- Active fractions were identified in 4 out of 5 species
- For example, fraction 2 from one species and fraction 5 from another species showed 100% inhibition up to a dilution of 1/9

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