ASSESMENT THE POTENTIAL ADVERSE EFFECTS OF PHARMACEUTICALS AND PERSONAL CARE PRODUCTS (PPCPs) ON MARINE PHYTOPLANKTON USING ADVANCED OPTICAL INSTRUMENTS : DEVELOPMENT OF METHOD AND APPLICATION IN ECOLOGICAL RISK ASSESMENT (AER)

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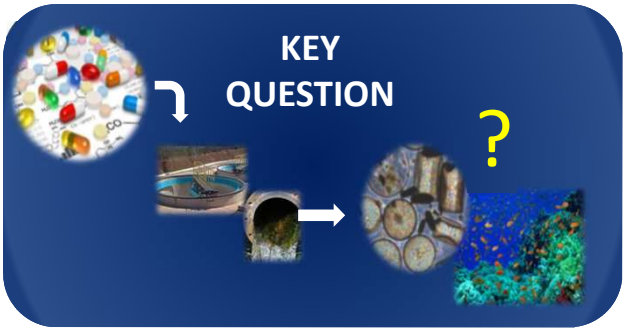
HIGHLIGHTS

- OCEANS AND COASTAL AREAS ARE AT THE HIGHEST RISK AS CONSEQUENCES OF GLOBAL CHANGES AND ENVIRONMENTAL ANTHROPOGENIC PRESSURES (IPCC - 2014)
- IN THE CURRENT GLOBAL SCENARIO THERE ARE MANY STRESSORS ON PHYTOPLANKTON COMMUNITIES AND PRIMARY PRODUCTION:
  - CLIMATE CHANGE AND WARM WATERS
  - OCEAN ACIDIFICATION
  - EXOTIC SPECIES INVASION
  - HIGHER FREQUENCY OF HARMFUL ALGAL BLOOMS (HBAS)
  - EUTROPHICATION AND CHEMICAL POLLUTION
- PPCPs - PHARMACEUTICAL AND PERSONAL CARE PRODUCTS - HAVE RECENTLY BECOME A NEW ENVIRONMENTAL CONCERN ON COASTAL WATERS
- MANY OF THESE PPCPS, THAT INCLUDES ANTIDEPRESSANTS, ANTIEPILETICS, ANTI-MICROBIAL, ANTI-INFLAMMATORY, Β-BLOCKERS, CONTRACEPTIVES, DRUGS AND OTHER COUMPOUNDS, ARE NOT DEGRADED IN SEWAGE TREATMENT PLANTS
- THE KNOWLEDGE ON EFFECTS OF PHARMACEUTICAL ON MARINE ENVIRONMENTS, ESPECIALLY ON PHYTOPLANKTON AND FOOD WEB ARE LIMITED.



CONCEPTUAL FRAMEWORK

DUE TO THE GREAT ECOLOGICAL IMPORTANCE OF PHYTOPLANKTON AS PRIMARY PRODUCER FOR THE PELAGIC FOOD WEB, THE ASSESSMENT OF POTENTIAL ADVERSE EFFECTS ON THIS COMMUNITY ARE EXTREMELY NECESSARY IN RELATION TO ECOLOGY, LOCAL ECONOMIC AND PUBLIC HEALTH

→ PHYTOPLANKTON IS USUALLY EMPLOYED AS WATER QUALITY INDICATOR AND FOR THE ASSESMENT OF ECOLOGICAL STATUS OF WATER BODIES

→ RESEARCHERS ARE ALERTING TO THE NEED FOR IMPROVEMENT NEW PHYTOPLANKTON EVALUATION METHODS AND NEW APPROACHES, WHICH PROVIDE MORE EFFECTIVE RESPONSES ON THE POTENTIAL ANTHROPIC EFFECTS ON THESE COMMUNITY

RESEARCH MAIN GOALS

- ASSES THE POTENTIAL ADVERSE EFFECTS OF 4 PHARMACEUTICALS (CARBAMAZEPINE, ATENOLOL, IBUPROFEN AND CAFFEINE) ON ECOLOGICAL, PHYSIOLOGICAL AND BEHAVIORAL ASPECTS OF MARINE PHYTOPLANKTON
- TESTING AND VALIDATING A STANDARD ALGAL BIOSSAY USING ADVANCED VIDEO TECHNIQUES
- ASSES THE APPLICABILITY OF PREVIOUS STEPS IN AN ECOTOXICOLOGICAL RISK ASSESMENT (ARE)

METHODOLOGIE

STEP 1

MESOCOSM EXPERIMENTS
- ALGAL BIOSSAYS-

CARBAMAZEPINE
ATENOLOL
IBUPROFEN
CAFFEINE

TARGET CONTAMINANTS

GROW RATES
PHOTOSYNTHETIC EFFICIENCY

MORPHOLOGICAL AND BEHAVIORAL INVESTIGATION

DETERMINATION OF END-POINTS

STEP 2

ECOLOGICAL RISK ASSESSMENT (ERA)

LINES OF EVIDENCE (LOEs):
- CHEMICAL
- BIOLOGICAL/ECOLOGIAL
- ECOTOXICLOGICAL

STUDY AREA
UBATUBA BAY
(SP)/BRAZIL

EXPECTED CONTRIBUTIONS

✓ FILL GAPS OF HOW SIGNIFICANT AND ECOLLOGY RELEVANT IS THE EFFECTS OF STUDIED PHARMACEUTICALS ON AQUATIC BIOTA

✓ PRESENT AVAILABLE TECNIQUES AND TOOLS THAT COULD FACILITATE A SCIENTIFACALLY APROACH FOR MONITORING COASTAL WATERS QUALITY