

BIOLOGICAL WATER TREATMENT. EFFLUENT AND BIOMASS CHARACTERIZATION.

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Introduction

Photochemistry Research Group of Chemical Engineering Department, has a proven experience in biological treatment of effluents with SBR, SBBR and biofilter reactors, as **posttreatment** integrated with **Advanced Oxidation Processes (AOP)**. Current researching works are focused on wastewater contaminated with emerging pollutants such as:

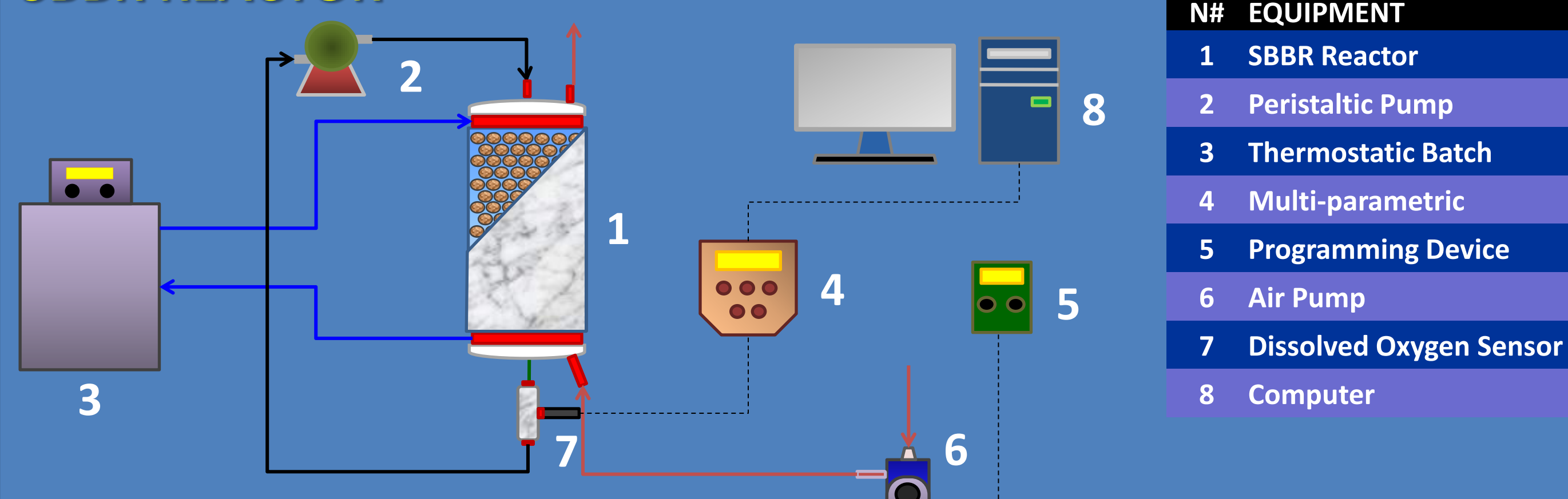
- **Pharmaceutical products**
 - Beta-blockers
 - Anti-inflammatories
 - Antibiotics
- **Herbicides**
- **Insecticides**
- **Endocrine disruptor substances**



Biological treatment

Sequencing Batch Biofilm Reactor (SBBR) and biofilters, both based on supported biomass, should be pointed out as the most interesting treatments, due to its versatility and good performance

SBBR REACTOR



AOP + SBBR technology can be proposed as an innovative treatment for **pharmaceutical** waste effluents

- Economical viability
- Robustness in front of load variations

BIOFILTER



AOP + BIOFILTER technology applied to refine conventional **secondary effluent** for reuse purposes

This technology is also being studied as a novel treatment for the reuse of **hydroponic greenhouses** waste effluents

- Device specially designed for biocolonies study
- Easy implementation on field

Characterization

PHYSICO-CHEMICAL PARAMETERS

- TOC
- Alkalinity
- Turbidity
- TVSS & TSS
- Ion concentration
- COD
- BOD
- N_{total}
- UV₂₅₄

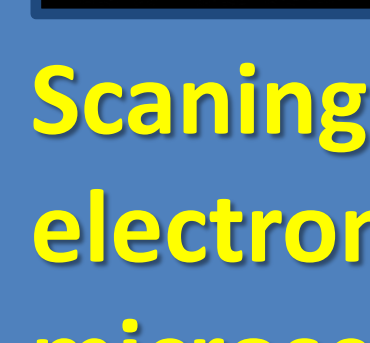
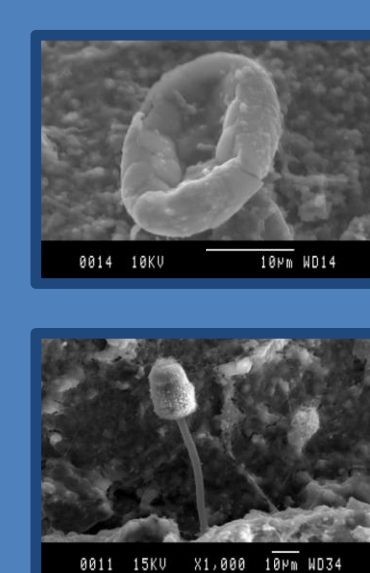


ECOTOXICITY

- Microtox
- Luminotox
- Acti. sludge inhibition test
- Seed germination test



SEM/MOLECULAR BIOLOGY TECHNIQUES



Scanning electron microscopy applied to characterize supported biomass morphology



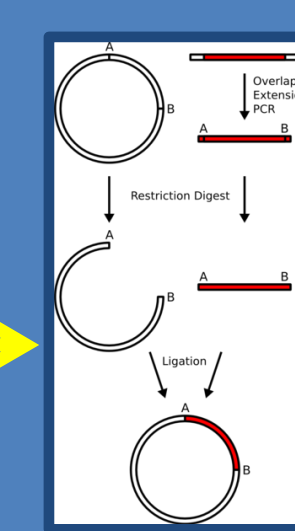
Withdraw of liquid and solid samples from the SBBR



DNA Extraction



PCR for multiplication



Ligation



DNA cloning isolation in colonies



PCR for sequencing



Bacteria identification

- Wautersia
- Nitrobacter
- Pseudomona
- Rhodococcus
- Wautersia

Molecular biology techniques employed for the identification and quantification of the biomass, and to establish a relationship between population and reactor performance

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