



MEMBRANE PHOTOBIOREACTOR FOR NUTRIENT RECOVERY FROM URINE

Context

Nowadays, nutrient removal is becoming an important priority for wastewater treatment plants. Aerobic membrane bioreactors are increasingly being used in wastewater treatment due to their better effluent quality, compact nature and low footprint compared to conventional activated sludge processes. With sufficient oxygenation, high carbon removal from the wastewater as well as significant nitrification commonly takes place in most MBRs. However, the nitrate (NO₃), nitrite (NO₂) and phosphate (PO₄) concentrations of the effluent increase after aerobic MBR treatment. Aerobic treatment processes alone are insufficient for removal of nutrients, e.g. nitrogen and phosphorous from wastewater. Biological nutrient removal these days typically make use of anaerobic/anoxic and aerobic processes to be used one. Many of these processes require several tanks, internal recycles of activated sludge, long HRTs that increase costs, process complexities and high energy input. In some cases, an external carbon source such as acetate, methanol, ethanol or volatile fatty acids have to be added to wastewater in order to achieve denitrification for ammonia removal. This increases chemical use at the plant, and leads to increased operating costs for the plant in terms of energy, chemical consumption and sludge disposal. Alternative methods for nutrient removal that could reduce energy cost, do not require the addition of chemicals or is simplified without numerous modes of operations and internal recycles will be preferred. Microalgae have been previously considered as one alternative method for the removal of nutrients from wastewater. Furthermore, microalgae sludge has much post-application potential for example it can be used as health food, biofuels, animal feed, fertilizers and in the pharmaceutical industry. Some previous studies showed microalgae are able to enhance high nutrient recovery when its cultivation applied in photobioreactor coupled with membrane, namely membrane photobioreactor (MPBR). In this study, thus, the team proposed the topic "Membrane photobioreactor for nutrient recovery in urine"

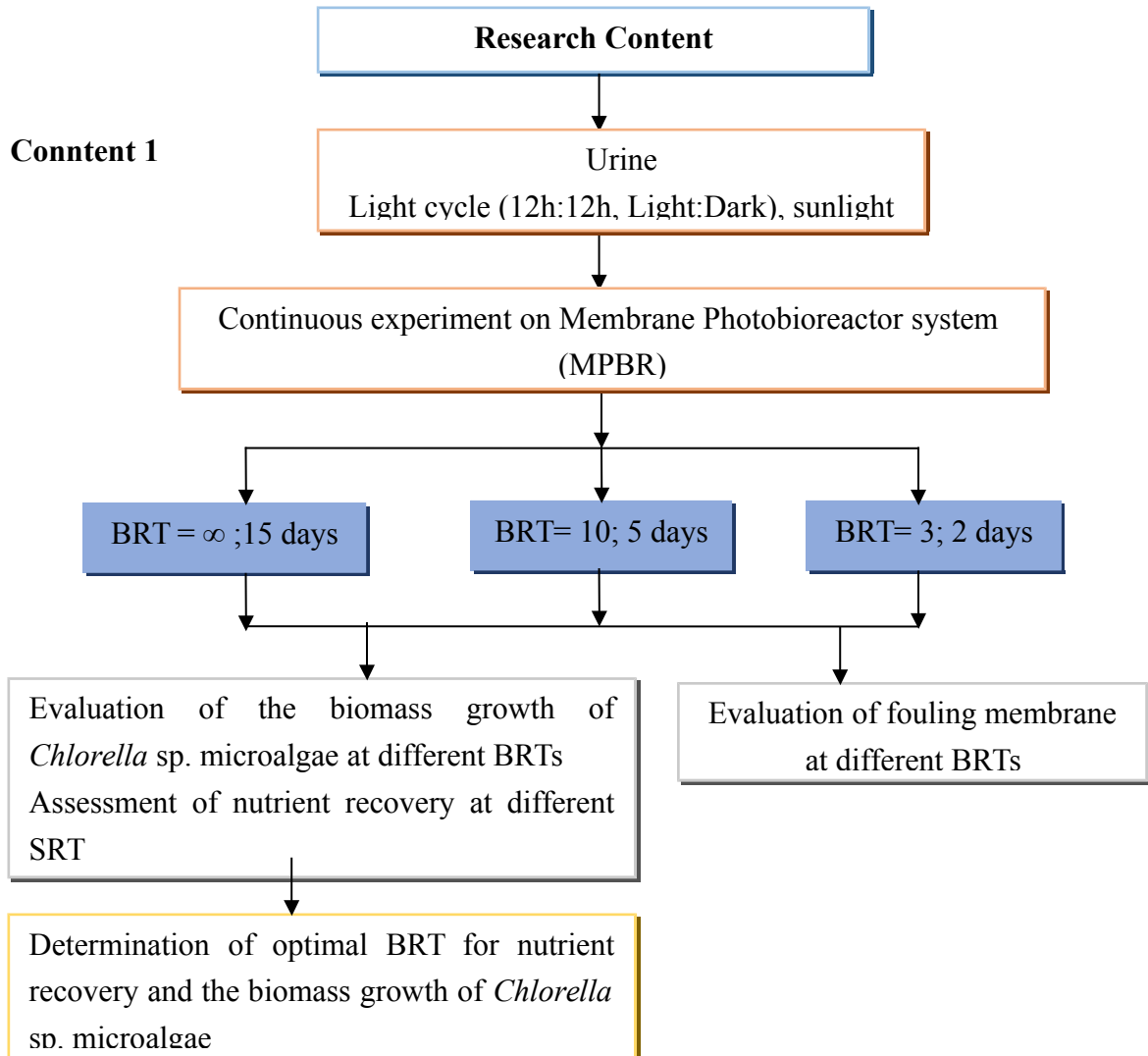
Objectives

The research project aims to utilize nutrient in urine based on membrane photobioreactor technology. The specific objectives are as follows:

- Assessment study of nutrient recovery (Nitrogen and Phosphorus) and the potential biomass growth of *Chlorella* sp. Microalgae;
- Evaluation study of fouling membrane of MPBR system;



Overall research content



Qualification requirement

- Passion for research, honest and responsibility
- Teamwork skill

Length of the internship: 3-5 months

Coaching institution: Ho Chi Minh City University of Technology (HCMUT)
& CARE-RESCIF

Location of the internship: HCMUT