CALL FOR ABSTRACTS

1st EUALGAE WORKSHOP OF ALGAE BIOPRODUCTS FOR EARLY CAREER INVESTIGATORS

Date: April 4th 2016

Venue: School of Industrial Engineerings, Valladolid University, Valladolid, Spain

Target attendees: Early Career Investigators[1] (prioritized) and PhD students from countries participating in the COST Action EUALGAE (http://eualgae.eu/). Only those candidates selected for oral presentation will be reimbursed.

Workshop structure (1 day): 17 Oral presentations (15 min presentation + 5 min questions) selected based on scientific relevance (evaluated from the abstracts submitted to the Working Group Leaders). Selection criteria will also include Working Group balance, country balance and gender balance. **ONLY ONE ABSTRACT PER RESEARCH GROUP WILL BE CONSIDERED**

Local Organizers: Dpt. Chemical Engineering and Environmental Technology, Raúl Muñoz (mutora@iq.uva.es)

Abstract MUST BE SUBMITTED TO mutora@iq.uva.es BEFORE MARCH 4TH 2016.

A concise and factual abstract is required. The abstract should state briefly the purpose of the research, Working Group classification (click here to check the Working Groups), the principal results and major conclusions. The abstract should not be greater than 350 words (SEE TEMPLATE ATTACHED). Make sure to include your name, institution (research group), country, date of the PhD/doctorate (ECIs) and contact data.

[1] ECI= researcher whose career spun less than 8 years between the date of the PhD/doctorate (or similar experience) and the date of involvement in the COST Action. Periods of career leave have to be added to this time span.

Working Group 1 - Efficient carbon, nitrogen and phosphorus removal from domestic wastewater in an innovative anoxic-aerobic algal-bacterial photobioreactor coupled with biogas upgrading.

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Algal-bacterial processes have received increasing attention as a cost-efficient technology for wastewater treatment as a result of their low-cost oxygenation and CO_2 mitigation potential. However, this technology only exhibits consistent C, N and P removal efficiencies at a high C/N ratio (≈100/18), ratios not typically encountered in domestic or livestock wastewaters. This work evaluated the performance of an innovative photosynthetic technology for the treatment of real domestic wastewater based on a 0.9 L anoxic bioreactor for C and N removal via denitrification interconnected with a biogas supplemented 2.7 L algal-bacterial photobioreactor supporting both nitrification and biogas upgrading (the latter conducted in an external absorption column interconnected to the photobioreactor), and incorporating a biomass settling step followed by biomass recirculation to the anoxic tank. The system was operated at 25 ºC, a hydraulic retention time of 2 days, a sludge retention time of 10 days under a 12h/12h light/dark irradiation cycle at 400 µE m^{-2} s^{-1}. The mass balance calculations over the 208 days of operation showed recoveries for TN of 100±5 %, TOC of 100±1 %, IC 99±4 %, and P-PO_4 of 100±14 %, which validated the analytical and instrumental methodologies used. An increase in the removal efficiency for TN from 48% to 79%, NH_4^+ from 58% to 92%, and P-PO_4^{3-} from 47% to 63% was recorded when additional CO_2 was supplied to the photobioreactor via a biogas absorption bubble column (operated at a L/G of 10) to support an almost complete nitrification of the NH_4^+ to NO_3^- and to promote microalgae growth. TOC removal remained constant at 89±6 % regardless of the addition CO_2, while the effluent TSS achieved an average value of 26±12 mg/L by the end of the experimentation. A DGGE analysis of the bacterial community revealed the occurrence of 11 phyla, proteobacteria being the dominant phylum with 17 of the 33 bands sequenced. Finally, the morphological characterization of the microalgae population dynamics revealed a gradual dominance of the genus *Scenedesmus*, which accounted for 46 % of the total microalgal population in the absence of biogas supply, and for 94-100 % when biogas was supplemented.