Biological Carbon CaptureTechnologies

PROGRAM

Physical component

<u>Monday 1st July 2024</u>

9:00-9:15 Arrival and registration

9:15-9:30 Welcome and introduction

María del Rosario Rodero/Raúl Muñoz (organizing committee)/Pedro A. Encina (Head of the Institute of Sustainable Processes)/José Ramón González (Director of the Doctorate School). Welcome to the Biological Carbon Capture Technologies Course and presentation of the Institute of Sustainable Processes

Module 1. Organic carbon capture and bioconversion via anaerobic non-phototrophic processes

9:30-11:00 María del Rosario Rodero (Institute of Sustainable Processes, UVa). Biogas production and biological technologies for biogas upgrading

11:00-11:30 Coffee break

11:30-12:30 Yadira Rodríguez (Institute of Sustainable Processes, UVa). Alternative biogas applications to its energetic use

12:30-13:30 Octavio García Depraect (Institute of Sustainable Processes, UVa). Biohydrogen production via dark fermentation

13:30-15:00 Lunch

Module 2. Anaerobic microbial cultivation and catalysis for conversion of C1 substrates

15:00-17:00 Martijn Diender (Wageningen University & Research). Fundamentals and basics of anaerobic C1 microbiology

<u>Tuesday 2nd July 2024</u>

Module 1. Organic carbon capture and bioconversion via anaerobic non-phototrophic processes

9:00-11:00 Ramon Ganigué (Ghent University). The Carboxylate platform: dark fermentation for the production of chemicals, plastics and materials

11:00-11:30 Coffee break

Module 2. Anaerobic microbial cultivation and catalysis for conversion of C1 substrates

11:30-13:30 Martijn Diender (Wageningen University & Research). Microbial (co-)cultivation strategies for conversion of C1 substrates

13:30-15:00 Lunch

15:00-17:00 Ramon Ganigué (Ghent University). Acetogens: alternative C1 feedstocks and mixotrophy

17:00-18:00 Technical visit to the laboratories of the Institute of Sustainable Processes

Wednesday 3rd July 2024

Module 2. Anaerobic microbial cultivation and catalysis for conversion of C1 substrates

9:00-11:00 Martijn Diender (Wageningen University & Research). Infrastructure, methods and future perspectives of anaerobic C1 microbiology

11:00-11:30 Coffee break

11:30-12:30 Ramon Ganigué (Ghent University). Reactor technology for C1 conversions

12:30-13:30 Ramon Ganigué (Ghent University). Modelling tools to understand and study fermentations

13:30-15:00 Lunch

Module 3. Photosynthetic bioprocesses for carbon capture and recycling

15:00-16:00 Luis Diaz Allegue (Department of Bioscience Engineering, University of Antwerp). Introduction to Purple Phototrophic Bacteria (PPB)

16:00-17:00 Luis Diaz Allegue (Department of Bioscience Engineering, University of Antwerp). Purple Phototrophic bacteria and resource recovery: why are they interesting?

Thursday 4th July 2024

Module 2. Anaerobic microbial cultivation and catalysis for conversion of C1 substrates

09:00-11:00 Martijn Diender (Wageningen University & Research) and Ramon Ganigué (Ghent University). Workshop: Comparison of bioprocesses for the production of biochemicals in terms of efficiency and pathways

11:00-11:30 Coffee break

Module 3. Photosynthetic bioprocesses for carbon capture and recycling

11:30-12:30 Luis Diaz Allegue (Department of Bioscience Engineering, University of Antwerp). Purple Phototrophic bacteria and resource recovery: scale-up options

12:30-13:30 Laura Vargas Estrada (Institute of Sustainable Processes, UVa). Fundamentals of microalgae-based wastewater treatment

13:30-15:00 Lunch

15:00-17:00 Luis Diaz Allegue (Department of Bioscience Engineering, University of Antwerp). Workshop 1: Fundamentals of mechanistic modelling of bioprocesses based on Purple Phototrophic bacteria

Friday 5th July 2024

Module 3. Photosynthetic bioprocesses for carbon capture and recycling

9:00-10:00 Luis Diaz Allegue (Department of Bioscience Engineering, University of Antwerp). Purple Phototrophic bacteria and resource recovery: biorefinery integration

10:00-11:00 Roxana Ángeles (Institute of Sustainable Processes, UVa). CO2 conversion into value added products by anoxygenic photosynthetic bacteria

11:00-11:30 Coffee break

11:30-13:30 Luis Diaz Allegue (Department of Bioscience Engineering, University of Antwerp). Workshop 2: Development and implementation of a model for enriched purple phototrophic bacteria for PHA production

13:30-15:00 Lunch

15:00-16:30 Project preparation by students. Instructors: Ramon Ganigué (Ghent University) and María del Rosario Rodero (Institute of Sustainable Processes, UVa)
16:30-17:00 Coffee break
17:00-17:30 María del Rosario Rodero (Institute of Sustainable Processes, Uva). Questionnaire
17:30 Raúl Muñoz (Institute of Sustainable Processes, UVa). Closure of the presential course

Virtual Component

Monday 8th July 2024
Module 1. Organic carbon capture and bioconversion via anaerobic non-phototrophic processes
09:00-10:00 Andrea Turolla (Politecnico di Milano). Biological carbon sequestration from waste streams
Module 4. Microbial protein production coupled to carbon capture
10:00-11:00 Myrsini Sakarika (Ghent University). Coupling microbial protein production to carbon capture and utilization
11:00-11:15 Break
11:15-12:15 Silvio Matassa (Università degli Studi di Napoli "Federico II"). Capturing carbon and upcycling nitrogen into microbial protein through hydrogen-oxidizing bacteria

Tuesday 9th July 2024
Module 2. Anaerobic microbial cultivation and catalysis for conversion of C1 substrates
9:00-10:00 Ioannis Vyrides (Cyprus University of Technology). Iron-Driven Bioconversion: Turning CO2 into methane and acetic acid with metallic iron and anaerobic microbes
Module 3. Photosynthetic bioprocesses for carbon capture and recycling
10:00-11:00 Elena Ficara (Politecnico di Milano). Microalgae-based bioremediation
11:00-11:15 Break
11:15-12:15 Giuseppina Oliva (University of Salerno). Biorefinery perspectives for the valorization of microalgae biomass with circular economy approach

Wednesday 10th July 2024
Module 5. Microbial electrochemical technologies for resource recovery from gaseous and liquid waste streams
09:00-10:00 María Fernanda Pérez Bernal (Laboratoire de Biotechnologie de l'Environnement, INRAE). Introduction to microbial electrochemical technologies: main anodic and cathodic based processes for resource recovery
10:00-11:00 Daniel Puyol/Amanda Prado de Nicolás (Rey Juan Carlos University). Resource recovery from waste sources via microbial photoelectrosynthesis with purple phototrophic bacteria
11:00-11:15 Break

Module 6. Techno-economic analysis of bioprocesses

11:15-13:15 Víctor Pérez (Institute of Sustainable Processes, UVa). Techno-economic analysis of bioprocesses. Case study: biogas bioconversion into ectoine in waste treatment plants

Thursday 11th July 2024

9:00-11:00 Presentation of projects by students

11:00 Closure of the course