

Industrial Biotechnology for Lignocellulose Based processes

2023 Course Program

Lecture	Group work & exercises	Inspirational talk
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Monday October 23rd

Introduction, raw material composition and sources

Time	Title	N. ¹	By
9:00-9:30	Welcome, course overview and practicalities Short presentation of course participants		YN
9:30-10:00	Bioethanol and the development towards biorefining	1	LO
10:00-10:15	<i>Break</i>		
10:15-11:15	Fractionation and pre-treatment methods	2	MG
11:15-12:00	Plant cell wall fundamentals, the composition of biomass and unconventional biomass derived streams	3	JL
12:00-13:00	<i>Lunch break</i>		
13:00-13:45	Enzymatic hydrolysis and other applications	4	LO
13:45-14:45	Introduction to group work		YN
14:45-15:00	<i>Break</i>		
15:00-15:45	Challenges in sample preparation of lignocellulose polymeric materials	5	MH
15:45-16:00	<i>Break</i>		
16:00-17:00	Davinia Salvachúa, National Renewable Energy Laboratory: Lignin valorization Presentation of the Division of Industrial Biotechnology at Chalmers		
17:00 -	Lab visits Pizza Poster session		

Tuesday October 24th

Enzymes and enzymatic degradation of lignocelluloses

Time	Title	N. ¹	By
9:00-9:30	CAZY and nomenclature	6	JL
9:30-10:15	Enzyme basics – activity measurements	7	SM
10:15-10:30	<i>Break</i>		
10:30-11:15	Enzyme discovery	8	JL
11:15-12:00	TBD	9	
12:00-13:00	<i>Lunch break</i>		
13:00-15:00	Group work/ exercises		
15:00-15:45	Peter Westh, Technical University of Denmark: TBD		
15:45-16:00	<i>Break</i>		
16:00-16:45	Vincent Eijsink, Norwegian University of Life Sciences: LPMOs and other redox enzymes in polysaccharide degradation – fundamental and applied aspects		

Wednesday October 25th

Microorganisms as cell factories

Time	Title	N. ¹	By
9:00-10:00	Strain improvement by mutagenesis, directed evolution and screening	10	CG
10:00-10:15	<i>Break</i>		
10:15-11:15	Strain improvement by metabolic engineering	11	YN
11:15-12:00	Development of industrial production strains and production of biochemicals	12	YN
12:00-13:00	<i>Break</i>		
13:00-15:00	Group work/ exercises		
15:00-15:45	Eric Öste & Yvonne Nygård, Cirkulär AB: Development of industrial strains and a fungal start-up company		
15:45-16:00	<i>Break</i>		
16:00-16:45	Carsten Freidank-Pohl, TU Berlin: Fungal cell factories for material applications		
18:30	Course dinner, SS/ Marieholm (Göteborg Centre)		

Thursday October 26th

Fermentation processes

Time	Title	N. ¹	By
9:00-10:00	Stoichiometry, rates, yields, mass balances and modes of operation of basic fermentation processes	13	CJF
10:00-10:15	<i>Break</i>		
10:15-11:00	Fermentation of lignocellulosic media: inhibitors and short term adaptation	14	LO
11:00-12:00	Fermentation of lignocellulosic media: mode of operation, detoxification, prehydrolysis multifeed and up-scaling perspectives	15	CJF
12:00-13:00	<i>Break</i>		
13:00-15:30	Group work/ exercises		
15:30-15:45	<i>Break</i>		
15:45-16.20	Lisbeth Olsson: Microbial robustness		
16.20-17.00	Cecilia Geijer: Exploring and exploiting non-conventional yeasts for biotechnological applications		

Friday October 27th

Time	Title
9:00-10:00	Richard van Kranenburg, Corbion, Wageningen University and Research, The Netherlands: Bacterial cell factories for the biobased economy
10:00-10:30	Johan Larsbrink: Microbial deconstruction of bark
10:30-10:45	<i>Break</i>
10.45-11:45	Grzegorz Kubik, Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB: Value added products from biomass – Closing the gap between lab & commercial scale
11:50-13:00	<i>Lunch break</i>
13:00-14:00	EXAM
14:00-16:00	Presentation of group work
16:00-16.15	Closing the course

Course lecturers:

Chalmers University of Technology; Gothenburg, Sweden

Lisbeth Olsson, Carl Johan Franzén, Cecilia Geijer, Johan Larsbrink, Scott Mazurkewich, Yvonne Nygård, Merima Hasani

Corbion, Wageningen University and Research, The Netherlands

Richard van Kranenburg

Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB, Germany

Grzegorz Kubik

Lund University, Sweden

Mats Galbe

National Renewable Energy Laboratory, USA

Davinia Salvachúa

Norwegian University of Life Sciences, Norway

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