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Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

AQUEOUS TWO-PHASE SYSTEMS FOR EXTRACTIVE ENZYMATIC HYDROLYSIS OF BIOMASS

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Sugars derived from lignocellulosic materials are the main carbon sources in bio-based processes aiming to produce renewable fuels and chemicals. One of the major drawbacks during enzymatic hydrolysis of lignocellulosic materials to obtain sugars is the inhibition of enzymes by reaction products (cellobiose and glucose). This effect is even more pronounced in hydrolysis containing high solid content (15-20% or higher water-insoluble solids – WIS), which is desired in order to obtain hydrolysates containing high total reducing sugar concentration and reduced water usage[1]. The aim of this project is to develop a new process for sugarcane bagasse hydrolysis using aqueous two-phase system. This system will be applied as *in situ* extraction aiming to remove the reaction products as they are released. As a consequence of product removal, enzymes tend to maintain their maximum activity[2]. The phase-components of the systems will be chosen taking into account their costs, viscosity, capacity of regeneration, melting point, solubility and partition of sugars and proteins. The pre-selected components will be studied and tested in high-throughput experiments[3], in order to determine their partition coefficients of sugars and enzymes, phase diagrams and volumetric ratios. The results of this project will make possible to design a process that enables high sugar concentration during the hydrolysis reaction, overcoming one of the biggest drawbacks regarding the production of second-generation ethanol: the enzymatic inhibition. The achievement of the project's goal can lead to, but not limited to, three consequences: enhancement of sugarcane mills productivity; reduction of fossil fuels usage, which can accelerate the energetic independence in many countries; and contribution to a more sustainable economy. This paper will present optimal aqueous two-phase systems for the separation of sugars and enzymes, which allow the development of an improved second-generation ethanol process.

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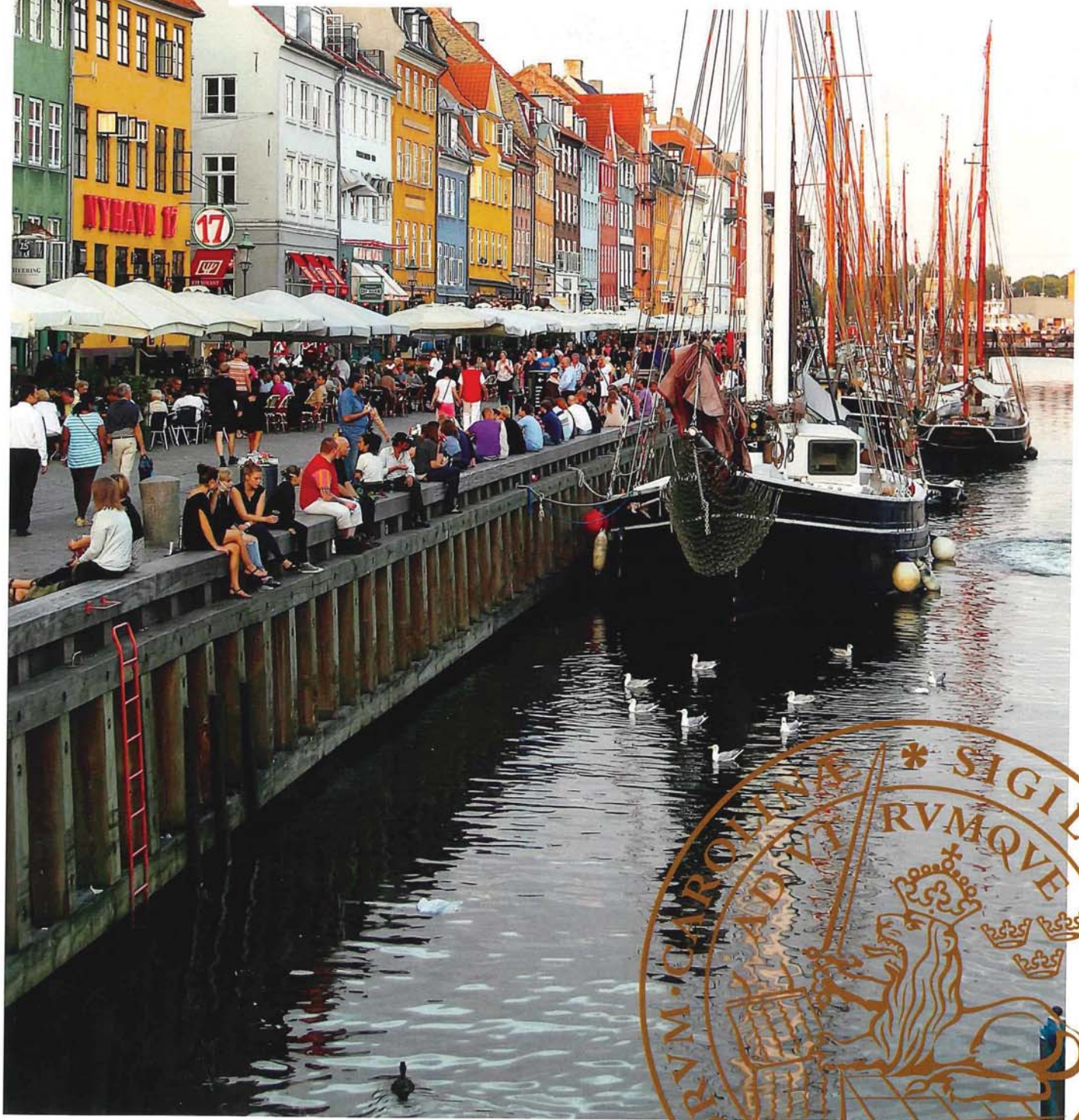

Posters:

(P1) DESIGN AND OPERATION OF A CONTINUOUS SEPARATOR FOR AQUEOUS TWO-PHASE SYSTEMS

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(P2) AQUEOUS TWO-PHASE SYSTEMS FOR EXTRACTIVE ENZYMATIC HYDROLYSIS OF BIOMASS

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(P3) ENHANCED CATALYTIC ACTIVITY AND STABILITY OF CYTOCHROME C IN BIO-IONIC LIQUIDS

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(P4) PARTITION BEHAVIOR OF LACCASE IN IONIC-LIQUID-BASED AQUEOUS BIPHASIC SYSTEMS

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(P5) THE HYDROGEN BOND BASICITY OF IONIC LIQUIDS AS A TOOL FOR PREDICTING THE FORMATION OF AQUEOUS BIPHASIC SYSTEMS

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ADSDSORPTION OF NON-VOLATILES FROM FOOD PRODUCTS

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(P8) BIOPROCESSING OF INTERFERON ALPHA 2B USING IONIC-LIQUID-BASED SYSTEMS

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