Accepted Manuscript

Short Communication

A novel ternary combination of deep eutectic solvent-alcohol (*DES-OL*) system for synergistic and efficient delignification of biomass

Ramesh Kandanelli, Chiranjeevi Thulluri, Ramkumar Mangala, Peddy V.C. Rao, Sriganesh Gandham, Harshad R. Velankar

PII: S0960-8524(18)30781-8
DOI: https://doi.org/10.1016/j.biortech.2018.06.002
Reference: BITE 20019

To appear in: *Bioresource Technology*

Received Date: 12 April 2018
Revised Date: 31 May 2018
Accepted Date: 1 June 2018

Please cite this article as: Kandanelli, R., Thulluri, C., Mangala, R., Rao, P.V.C., Gandham, S., Velankar, H.R., A novel ternary combination of deep eutectic solvent-alcohol (*DES-OL*) system for synergistic and efficient delignification of biomass, *Bioresource Technology* (2018), doi: https://doi.org/10.1016/j.biortech.2018.06.002

A novel ternary combination of deep eutectic solvent-alcohol (*DES-OL*) system for synergistic and efficient delignification of biomass

Ramesh Kandanelli, Chiranjeevi Thulluri, Ramkumar Mangala, Peddy V C Rao, Sriganesh Gandham and Harshad R Velankar*

Bioprocess Division, Hindustan Petroleum Green R & D Center, KIADB Industrial Area, Devanagonthi, Bengaluru 560067, India

**For correspondence: harshadrv@hpcl.in*

ABSTRACT

A novel ternary system consisting of deep eutectic solvent-alcohol (DES-OL) mixture was developed for the effective delignification of lignocellulosic biomass. Optimization studies included selecting suitable co-solvent (among *n*-BuOH, *n*-PrOH&EtOAc) for treating biomass (rice husk, rice straw and wheat straw), altering the DES-to-alcohol ratio (2:1, 1:1&1:2) as well as the reaction temperature (50, 80 & 120°C). The highest delignification (~50%) was observed using *n*-butanol assisted DES (ChCl: OA) at a ratio of 2:1, with high solid loading of 15 % (*w/v*) at 120°C (~1.2 bar) in a 60 min reaction. Post pretreatment, high purity lignin was recovered after distilling off butanol for recycling. Microscopy and CPMAS/NMR studies confirmed the effectiveness of DES-OL pretreatment on biomass delignification.

Key words:*DES-OL; Pretreatment; Lignocellulosic biomass; Delignification.*