

PEG-linked dicationic acidic ionic liquids for red macroalgal hydrolysis

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PEG-linked dicationic acidic ionic liquids (PEG-DAILs) were synthesized and utilized for red macroalgal hydrolysis to sugars. The structure of various PEG-DAILs bearing a hydrogen sulfate ($[\text{HSO}_4]^-$) counter-anion and its precursors were confirmed using NMR, FT-IR and ESI-MS spectroscopy. Moreover, the physico-chemical properties such as viscosity, thermal stability and acidity of the prepared ionic liquids were determined. The effects of cation ether chain length, water and biomass loading, reaction time and temperature were investigated for maximum sugar yields from *G. amansii*, a red macroalgae. Optimal conditions were determined from the kinetic studies on sequential sugar formation and degradation. Overall results show the potential of PEG-DAILs for one-pot solubilisation and hydrolysis of red macroalgae to sugars. This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Ministry of Education (No. 2009-0093816) and by the Ministry of Science, ICT & Future Planning (No. 2015R1C1A2A01054605).