

Brown algae hydrolysis in 1-n-butyl-3-methylimidazolium chloride with mineral acid catalyst system

Lenny Malihan^{1,2}, Grace M. Nisola^{1,2}, 정옥진^{1,2,*}, 한미덕^{1,2}

¹명지대학교 환경생명정보학과 에너지공학; ²Energy and Environment Fusion Technology Center (E2FTC)
(wjc0828@gmail.com*)

The amenability of three brown algal species to acid-catalyzed hydrolysis in the ionic liquid (IL), 1-n-butyl-3-methylimidazolium chloride ([BMIM]Cl) was investigated. Kinetic studies revealed the importance of mineral acid catalyst and its loading as well as reaction temperature for the maximum release of sugars. The selected optimum hydrolysis time and temperature were those which yielded the highest sugar with minimal side product formation. Compared with conventional pretreatment, hydrolysis of all types of brown algae were more productive in [BMIM]Cl with hydrochloric acid (HCl) as catalyst. The regenerated biomass had homogenous macrostructures as observed via scanning electron microscopy. This affirms the ability of the IL to disrupt the fibrillar walls of the biomass and enhance release of sugars. X-ray diffraction patterns affirmed the solvency power of [BMIM]Cl/HCl system; conspicuous reductions in biomass crystallinity were observed after hydrolysis. This work was supported by Priority Research Centers Program through the Korea National Research Foundation funded by MEST (2011-0022968).