

Application of Ionic Liquids in Biotechnology

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Ionic liquids are compounds that composed only of ions and are liquid at room temperature. Thus, it is normally named room temperature ionic liquid (RTIL). RTILs are environmentally benign, non toxic and have excellent physical and chemical properties as a substitute of conventional organic solvents. However, few studies have been conducted on biotechnology. In this study, the application of RTILs to the enzyme reaction and extractive fermentation of biomaterials was investigated as a substitute of organic solvents. For enzyme reaction, lipase is stable at temperature as high as 60°C. The acylation of sucrose was accomplished at 50°C. The optimum conditions for the acylation of sucrose, such as molar ratio of substrates, lipase, water, and ionic liquid, were determined. The relative toxicity of the RTILs on the growth of *E. coli* was tested. The inhibition of cell growth in the presence of various ionic liquids was measured using EC_{50} . Effective concentrations of toxicity (EC_{50}) in these tested systems were similar with conventional solvents. The viability of *E. coli* was affected by the polarity and ionic properties of ionic liquids. The resistance of the microorganisms against ionic liquids was different with the cations and anions composing ionic liquids.