

## Effects of Physicochemical Properties of Ionic Liquids on the Enzyme Activity

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Room temperature ionic liquids (ILs) are currently regarded as green solvents due to their non-volatile, thermally stable, and highly polar property. They are also noted as designer solvents since a proper one for certain purpose can be chosen by simply exchanging their cations or anions. In this study, catalytic activity of Lipozyme RM IM was investigated in 1-alkyl-3-methylimidazolium based ILs with variety of anions including bistrifluoromethanesulfonimide ( $[\text{Tf}_2\text{N}]^-$ ), hexafluoroantimonate ( $[\text{SbF}_6]^-$ ), hexafluorophosphate ( $[\text{PF}_6]^-$ ), tetrafluoroborate ( $[\text{BF}_4]^-$ ), and trifluoromethanesulfonate ( $[\text{TfO}]^-$ ). Before the reactions were performed, water activity of each IL, lipase, and substrate was controlled. The initial rates and kinetic parameters were determined by measuring the product concentration with an HPLC system. The reactivity of lipase was  $[\text{Tf}_2\text{N}]^- > [\text{PF}_6]^- > [\text{TfO}]^- > [\text{SbF}_6]^- > [\text{BF}_4]^-$  and declined as the alkyl chain length of ILs increased. To understand the relationship between the physicochemical properties of ILs and enzyme activity,  $V_M$  and  $K_M$  values were analyzed using the LSER equation. by multi-parameter correlation, the influences of 5 parameters ( $\lambda$ ,  $\pi^*$ ,  $\alpha$ ,  $\beta$ ,  $\delta_H$ ) of ILs exerted on the enzyme activity could be found.