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Protein Structure and Stability in Neat Ionic Liquid MALVIKA BIHARI, THOMAS P. RUSSELL, DAVID A. HOAGLAND, Univ. of Massachusetts Amherst — Ionic liquid (IL) as a medium for room temperature preservation of biomacromolecules has been proposed, and to investigate the possibility, we studied physicochemical and enzymatic properties of several proteins in the neat hydrophilic IL, ethylmethyl imidazolium ethyl sulfate [EMIM][EtSO4]. Molecular dissolution of α-chymotypsin, cytochrome-c and other proteins could be achieved with moderate heating (60C). Dynamic light scattering and dilute solution viscometry typically reveal protein size slightly larger than in buffer, suggesting different solvation or protein unfolding. Spectroscopic methods (UV-Vis, fluorescence, FTIR, CD) show largely unchanged secondary structure but significantly changed tertiary structure. IL-dissolved cytochrome-c has heightened peroxidase activity, supporting the same conclusions. Transfer of dissolved protein from IL to buffer and ensuing alterations to protein conformation/activity will be discussed.

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