STRUCTURAL INTEGRITY OF PROTEIN NANOCAGE AT LIQUID-LIQUID INTERFACE

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Globular proteins adsorb at the interface of two immiscible liquids by maintaining thermodynamically favorable state which often results in a denatured structure and compromised functionalities. However, the behavior of highly structural proteins at the interface of two immiscible liquids is still unexplored. In this study, we focused on the structural behavior of supramolecular protein at the interface. Our previous studies show that highly structural protein adsorbs at the interface and act as a Pickering emulsifier. Theoretical analyses by Molecular Dynamic Simulation proved that the supramolecular protein E2, a highly structured protein nanocage, has retained structural integrity at the liquid-liquid interface. Further, experimental analyses by Small angle X-ray scattering (SAXS) and quartz crystal microbalance and dissipation (QCM-D) confirm the adsorption of E2 on the liquid-liquid interface with zero penetration depth. Moreover, molecular structural analyses using Circular Dichroism (CD) and tryptophan fluorescence for secondary and tertiary structures respectively, also suggest the structural integrity of the cage structure of E2 at the oil-water interface. This study brings new insights into the behavior of highly symmetrical supramolecular protein assembly at the liquid-liquid interface.