

Fabrication of Thermoresponsive Hydrogel Enzyme Bioconjugates and Study their Catalytic Application

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Abstract—First time reported new crosslinked hydrogel platform for polymer-urease bioconjugates. The hydrogel platform has designed with less crosslinked network by HEMA and no use of any conventional divinyl benzene or divinyl acrylamide derivatives based crosslinker. Three different grades of bioconjugates have been synthesized to achieve good swelling-deswelling and thermo-responsive properties without affect the urease enzyme activity. Bioconjugates (BCs) have dually optimized by varying the HEMA (crosslinker) and CHMA (thermo-responsive unit). BCs were well characterized by FT-IR, Powder XRD, SEM, TGA and UV-Vis. Spectroscopy. Bioconjugates have well designed to availed, thermal stability, longer storage in buffer and active microenvironment for urease enzyme to work on higher temperature. Urea hydrolysis have analysed by BCs at 25°C, 45°C and 70°C. BCs catalytic activity and effect of temperature, crosslinking and time was studied in different parameters.

Keywords: Hydrogel; Urease; Thermo-responsive hydrogel; Polymer-Enzyme Bioconjugates; Catalytic Activity.