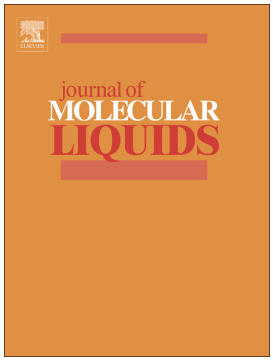

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Preparation and Characterization of Papain Embedded in Magnetic Cellulose Hydrogels Prepared from Tea Residue

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Abstract

Papain was embedded and immobilized in hydrogels prepared from tea cellulose by dissolving in ionic liquid of 1-allyl-3-methylimidazolium chloride and coating with magnetic Fe_3O_4 via reaction of $FeCl_3$/$FeCl_2$ solution with ammonium hydroxide. The prepared magnetic-cellulose-hydrogel-embedded papain was characterized via vibrating sample magnetometer, scanning electron microscope, X-ray diffraction, Fourier transform infrared, thermogravimetry analysis and differential scanning calorimetry. Thermal stability, optimal pH, optimal temperature, Michaelis constant and maximum reaction rate were compared between free papain and magnetic-cellulose-hydrogel-embedded papain. The magnetic-cellulose-hydrogel-embedded papain was sensitive to magnetic field and showed paramagnetic behavior, higher thermal stability and lowed substrate affinity. The optimal pH and optimal temperature of the magnetic-cellulose-hydrogel-embedded papain were shifted to 8.0 and 90 °C respectively.

Keywords

cellulose; ionic liquid; hydrogel; magnetic; papain

1 Introduction

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