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Chemical modification of polyvinyl alcohol fibrous carrier support for immobilization and stabilization of alcohol dehydrogenase

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Immobilization of yeast alcohol dehydrogenase (ADH) on polyvinyl alcohol fiber (PVA) carrier has been investigated with regards to increase in stability at different pHs, storage and reusability. The strategy for immobilization involved functionalization of the fibrous carrier with chloropropionyl chloride followed by amination with ethylenediamine (EDA) serving as a spacer and finally crosslinking the ADH via glutaraldehyde (GA). The immobilization of ADH on PVA fibrous carrier results in optimal reaction pH shift from 7 to 9 and improvement in thermal stability by preserving 80% activity upon heating at 60°C for 2 h. In addition the immobilized enzyme maintained 60% of its original activity after 8 repetitive use and showed reasonable storage stability at 4°C in phosphate buffer (PBS) for 28 days. Alcohol dehydrogenases (ADHs) are widely used enzyme from dehydrogenase group of the enzyme to perform selective oxidations and reductions ranging from kinetic resolution to asymmetric reduction and can be used to generate an asymmetric center to facilitate the synthesis of chiral drugs. Therefore there is an interest for stabilization of ADH which in turn can be used in the development of flow reactors and biosensor applications.

Biography

Priydarshani Shinde has completed his MSc in Organic Chemistry from University of Pune and pursuing Doctoral research from Monash University in collaboration with National Science Agency of Australia (CSIRO), Melbourne, Australia. She has industrial experience in the biotech industry with a strong background of Biochemistry, Organic and Analytical Chemistry. She completed her Post-graduate Diploma in Patent Law. Currently, her research area extends the enhancement of ADH enzyme activity by immobilization methods for industrial applications.

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