

Immobilization of β -glucosidase onto silicon oxide nanoparticles and augment of phenolics in sugarcane juice

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Original Article

First Online:

[25 July 2016](#)

DOI: 10.1007/s13197-016-2269-x

Cite this article as:

Agrawal, R., Srivastava, A. & Verma, A.K. J Food Sci Technol (2016) 53: 3002. doi:10.1007/s13197-016-2269-x

• 68 Views

Abstract

Purified β -glucosidase was immobilized on SiO₂ nanoparticles with 52 % efficiency and 14.1 % yield. It had a temperature optima at 60 °C and pH optima of 5.0. Immobilized enzyme was fairly stable at 60–70 °C. After immobilization, the K_m value of β -glucosidase for *p*-nitrophenyl- β -D-glucopyranoside (pNPG) increased from 0.9 to 1.074 mM and V_{max} decreased from 3.5 to 1.513 U/mg. The immobilized enzyme showed improved storage stability at temperature 4 and 25 °C and was reusable for up to ten cycles with 70 % residual activity in pNPG and 60 % residual activity in sugarcane juice treatment. Sugarcane juice density, viscosity; surface tension etc. changed after treatment with immobilized β -glucosidase. β -Glucosidase treated sugarcane juice showed higher phenolics

than untreated sugarcane juice. Caffeic acid which was absent in juice, was detected in β -glucosidase treated juice at a concentration of about 1 mg/L.

Keywords

Immobilized enzymes β -Glucosidase Kinetic parameters Silicon oxide nanoparticles Sugarcane juice Phenolics

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