

Title: Novel method of enzyme immobilization with magnetic nanoparticles for effective biofuel production

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Abstract:

Novel method for the covalent immobilization of recombinant thermostable α -amylase enzyme has been introduced by this research. Thermostable α -amylase was successfully expressed in *E. coli* and further purified. Thermostable α -amylase was immobilized on the surface of magnetic nanoparticles coated with silica by the carbodiimide activation. Immobilized enzyme was further characterized and the stability and activity of free and immobilized enzyme was evaluated. FT-IR analysis confirmed the immobilization of enzyme with magnetic nanoparticles. Low enzyme loading (6 mg/ml) was responsible for the efficient activity of enzyme after immobilization by carbodiimide activation. Immobilized enzyme showed significant activity at neutral and acidic pH. In addition, better resistance of α -amylase to the inhibitory effect of metal ions and inhibitors was observed after immobilization. Immobilization with magnetic nanoparticles ensured fast and efficient recovery. Enzyme showed increased activity even at higher temperature of 100°C after immobilization. The reusability factor of immobilized α -amylase was also evaluated and enzyme retained 50% of its activity after 30 consecutive operations at 90°C. Successful optimization and characterization of α -amylase bound magnetic nanoparticles achieved in this research could prove to have significant benefits for the starch hydrolysis and ethanol industry. It offers a more economical approach for biofuel production.

Biography

NaumanAftab is the professor of Microbiology in IIB department of GCU, Lahore. His major area of interest is genomics and bioinformatics. He made investigations into a whole range of areas such as molecular biology, Nanobiotechnology, bioinformatics and industrial microbiology. He

has collaborated an international project with Bartin University, Turkey.

Speaker Publications:

“The functional characterization of long noncoding RNA SPRY4-IT1 in human melanoma cells”

“Wheat bran as a brown gold: nutritious value and its biotechnological applications”

“Long noncoding RNAs as putative biomarkers for prostate cancer detection”

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