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Role of a student in the field of biotechnology from developing world

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The life sciences offer wide variety of opportunities for revolutionizing human welfare activities. Biotechnology is an applied branch of science which deals with the application of principal of process and products of living beings for the betterment of mankind sometimes shortened to "Biotech". It is enriched by the inputs from genomic research biotech in a major force for development in all countries. Entwined or involved in culture and socio-ethical values, biotech contributes to solving problems like medicine food and water, insecurity that impedes national development and threaten peace in the developing world. Many years ago people used to apply the technology in various fields like selective breeding, microbial culture, antibiotics, etc. The four major applications of these all industrial area, health care crop production and agriculture. Several branches of it are bio-informatics, blue, green, red and white biotechnology. The practice of biotech is different in many developing countries. The establishment of biotechnology parks and medicinal plant farms may give high policy status in national development. So, hereby I conclude that biotechnology is very necessary for mankind to develop the production of drugs, medicines, etc., in larger scale. In one word, we can say biotechnology is a boon for the researchers to develop our country.

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Purification, partial biochemical characterization and immobilization of *Vigna mungo* α-galactosidase on magnetic chitosan nanoparticles

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α-galactosidase (α-D-galactoside galacto hydrolase, E.C. 3.2.1.22) catalyses the hydrolysis of α-1, 6-linked terminal galactose residues from oligosaccharides like melibiose, raffinose and stachyose as well as galactomannans, galactolipids and galactoproteins. α-galactosidase have plethora of applications in food & feed (improvement in nutritional value food/feed, gelling properties of gums & beet sugar crystallization), medicine (blood group transformation, treatment of Anderson-Fabry's disease and xeno-rejection) and paper & pulp industry. In the present study, α-galactosidase from locally available variety of black gram (*Vigna mungo*) seeds was purified to homogeneity by using a combination of citric acid precipitation, ammonium sulphate precipitation (25-60% saturation), DEAE-Cellulose, CM-Sepharose followed by ConA Sepharose 4B chromatography with 39.1% yield and 1500-fold purification. The purified enzyme migrated as a single band (M_w≈40 kDa) on silver stained SDS-PAGE. Purified α-galactosidase showed high activity in a narrow range of pH 4-5 with maximal activity at pH 5. The enzyme had less than 20% of its activity at acidic pH (3) or alkaline pH (8). The optimum temperature of α-galactosidase was found to be 55o C. Most of the tested metal ions were found to reduce the activity of α-galactosidase by up to 29% at 1 mM concentration. However, Hg^{++} drastically inhibited enzyme activity. The purified α-galactosidase was immobilized on chitosan iron oxide nanoparticles (α-GAL-MNP) using glutaraldehyde (540 mM) as a cross linker with high immobilization efficiency (≈90%). The α-galactosidase loaded nanoparticles were further characterized by Scanning Electron Microscopy and Fourier Transform Infrared Spectroscopy. Further, cross-linked enzyme aggregates of crude α-galactosidase were made and also immobilized on chitosan iron oxide nanoparticles (α-GAL-CLEA-MNP). The α-GAL-MNP and α-GAL-CLEA-MNP showed good retention of activity after repeated usage.

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