Termeh Ghorbanian Bolouri et al., J Cell Sci Ther 2018, Volume 9
DOI: 10.4172/2157-7013-C3-047

A spectroscopic report on the ingestion of carbonic anhydrase onto the nanoporous silica nanoparticle

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Herein, KIT-6 nanoporous silica nanoparticles were used as a solid support for immobilization of bovine carbonic anhydrase, isoform II (BCA II). The zeta potential study revealed that KIT-6 and BCA II provided negative (-13.58±1.95 mV) and positive (4.23±0.72 mV) charge distribution, respectively. Dynamic Light Scattering (DLS) analysis also showed that the hydrodynamic radius of KIT-6 is less than 100 nm. In addition, the structural studies of free and immobilized BCA II against urea-induced denaturation were investigated by Circular Dichroism (CD) and fluorescence spectroscopy. CD studies showed that the absorbed BCA II, in comparison with the free enzyme, demonstrated higher stability against rising urea concentration. Fluorescence spectroscopy showed lower values of Stern-Volmer constant (KSV) for immobilized BCA II relative to free enzyme, reflecting the relative enzyme stability of BCA II after immobilization. Melting temperature (Tm) measurement of free and immobilized BCA II showed that immobilized enzyme had a more stable structure (Tm=71.9 °C) relative to the free counterpart (Tm= 64.7 °C). In addition, the immobilized BCA II showed pronounced stabilities against pH and thermal deactivation. This study may provide new and complementary details regarding the design and development of enzymes in industrial applications.

Biography

Termeh Ghorbanian Bolouri has completed her bachelor degree in cellular and molecular biology, microbiology from Islamic Azad University, Pharmaceutical Sciences Branch; and master degree from Islamic Azad University, Tehran Medical Branch. She has been a student researcher in Motamed Cancer Institute, recombinant protein department, also she is a researcher in Dr. Houshmand Genetic Laboratory. She has published an article in nanotechnology in International *Journal of Biological Macromolecule*. She presented an abstract in European Breast Cancer Conference. Right now she is working on a project with Dr Houshmand. She is also planning to continue her studies.

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