

Preparation of emulsified encapsulated bovine serum albumin nanoparticles of *Azadirachta indica* alkaline phosphatase

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Nanoparticles are spherical particles which allow the controlled release of active ingredient. Nanoparticles have been used as carriers in the delivery of drugs, antigens, hormones, enzymes and genes. Besides, it has many advantages in the industrial application. Albumin is a major plasma protein constituent and its biodegradation leads to form natural products such as amino acids (tyrosine, tryptophan & asparagines). As well as these, albumin nanoparticles are non-toxic and non-antigenic in nature. Albumin nanoparticles are easily metabolized in the body as well as the size of particles, degree of stabilization. Hence, its colloidal forms have been considered as potential carriers of drugs for their site-specific localization. Thus, albumin, being biodegradable, biocompatible, and nontoxic, was chosen as a matrix material for the preparation of the nanoparticles. Our work involves usage of bovine serum albumin for entrapment of biologically active materials *Azadirachta indica* alkaline phosphatase using cross linking agent (glutaraldehyde) and emulsifier (coconut oil). Glutaraldehyde is used as cross linking agent and coconut oil is used as emulsifier which given the newly formed fluorescent complex which consists of tryptophan residues as its diene adduct. The oil bath was prepared by adding glutaraldehyde and n-butanol in coconut oil along with 50 U of *Azadirachta indica* alkaline phosphatase. This solution was filled in the syringe and dispersed in prepared oil bath as well as stirred for overnight at 37°C. Centrifuged at 5000rpm for 10min and supernatant was removed and pellet was collected which contain prepared nanoparticles. These prepared nanoparticles were washed with cold ether and acetone. The emulsification with coconut oil was increased the stability of encapsulated nanoparticles as well as responsible for controlled release of enzyme in the delivery system in the presence of proteases. The prepared nanoparticles were spherical in shape and exhibit fluorescent at 495nm. The specific activity of *Azadirachta indica* alkaline phosphatase was studied at different time intervals (1 to 7 days) as well as using different concentration of proteases such as trypsin, chymotrypsin and papin (6U, 12 U & 18U) to understand the biodegradability of the cross linked entrapped *Azadirachta indica* alkaline phosphatase. The enzyme activity of *Azadirachta indica* alkaline phosphatase in emulsified encapsulated bovine serum albumin nanoparticles was estimated by p-nitrophenyl-phosphate method. Among them the chymotrypsin was found to be the best proteolytic enzymes which release the maximum activity of *Azadirachta indica* alkaline phosphatase in solution at the fifth day, thereby confirming the proper immobilization of enzyme in prepared nanoparticles of bovine serum albumin under specified conditions. In the absence of proteolytic enzymes, *Azadirachta indica* alkaline phosphatase was not detected. This immobilized *Azadirachta indica* alkaline phosphatase in emulsified encapsulated bovine serum albumin nanoparticles can be used in detergent and leather industries along with the different proteases to wash the fabrics as well as to leach the leather. These emulsified nanoparticles of bovine serum albumin of bound *Azadirachta indica* alkaline phosphatase can be used in food and pharmaceutical industries too as a preservative in different kind of syrups preparation such as fructose syrups.

Biography

Kirti Rani has done her M.Sc. in 2000 and completed her Ph.D (2004) at the age of 25 years from Department of Biochemistry, Maharshi Dayanand University, Rohtak, India. She is ex-senior resident/demonstrator of department of Biochemistry, Post-graduate Institute of Medical Education & Research, PGIMER, Chandigarh, India (2004-2007). She has also worked as lecturer 7 invited as guest faculty in others private/Govt. affiliated Indian colleges/institutions (2007-2008). She is Assistant Professor in Amity Institute of Biotechnology, Amity University, Noida, India (2008-till date). She has more than 25 international & national publications including research articles/ monographs/ books/ patents/ abstracts. She is also member of Society of Biological Chemists, India and Stem Cell Voice of India. She is also reviewer of more than 8 international journals.

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