

Preparation of BSA-EA-MWCNTs submicron hybrid composite

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Abstract

Bovine serum albumin-egg albumin-multiwalled carbon nanotubes (BSA-EA-MWCNTs) submicron hybrid composite was prepared by using suitable organic solvent and emulsifier as surface modifier. The prepared submicron hybrid composite was subjected for their size characterization by using scanning electron microscopy (SEM) under optimal conditions. This albumin based hybrid submicron complex was found to have particle size up to 2 micrometer. This prepared BSA-EA-MWCNTs submicron hybrid composite can be further used as good biosensing interface because of using electrochemical active MWCNTs in the proposed fabrication which might be considered for carrying out various clinical analytical approaches and pharmaceutical applications.

Keyword: Bovine serum albumin, Egg albumin, Multi-walled carbon nanotubes, Submicron hybrid composite

Introduction

Various conductive polymeric hybrid complexes have been synthesized that have nano/micro morphology which have high specific surface area and improved organic and inorganic solvent dispersion. These unique properties were lead to increase their electronic conductivity and electrochemical response to various sensor applications.^(1,2,3) Their physico-chemical fabrication have been noticed to enhanced their advantage for offering their unlimited possibilities as electrochemical active complexes unlike other semiconductor inorganic metals.^(1,4) Recently, various nanocomposite formulations have been proposed in site specific delivery system to improve the delivery efficacy of loaded components due to having potent functional groups (amino and carboxylic groups) that can be easily subjected to suitable emulsification based surface modifications to load any biological and chemical components.^(5,6)

Materials and Method

BSA-EA-MWCNTs submicron hybrid composite was prepared by using 10 ml mixture of bovine serum albumin (BSA) and egg albumin (EA) in 1:1 ratio and 5-6 n-butanol in which 2mg of activated multi-walled carbon nanotubes (MWCNTs) was added. This reaction mixture was incubated for overnight with constant stirring and next day, it was subjected to sonication for 3-4 hours to get a BSA-EA-MWCNTs hybrid composite. This prepared composite was characterized to observe its expected size by using scanning electron microscopy (SEM).

Results and Discussion

Characterization of BSA-EA-MWCNTs submicron hybrid composite by scanning electron microscopy (SEM)

Scanning Electron Microscopy (SEM) result of prepared hybrid composite was lead to observe its size

upto 2 μ m which in submicron range (Fig. 1) whose results are comparable with previous observations.^(2,3)

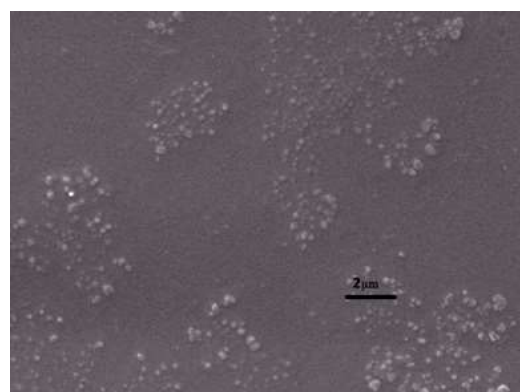


Fig. 1: Scanning electron microscopy result of BSA-EA-MWCNTs submicron hybrid nanocomposite

Conclusion

The synthesized advanced submicron bovine serum albumin-Egg albumin-multiwalled carbon nanotubes (BSA-MWCNTs) complex are found to have submicron structures (mixture of nano and micro structures) which were confirmed by scanning electron microscopy (SEM) result. So, these prepared submicron materials can be further fabricated to achieve its minimal size as discrete nanostructures that might be used to load biological or chemical components and can be proposed good sensing interface as working electrodes in any desired chemical combinations and electrochemically active nanoparticles like MWCNTs.

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