ABSTRACT

In this research, glucose oxidase enzyme was immobilized on zinc oxide nanoparticles. Zinc oxide nanoparticles have attained great attention in the field of food packaging. Due to high surface area to volume ratio it assists in effective enzyme loading. The activity of glucose oxidase was increased after immobilized with zinc oxide nanoparticles. In this work, glucose oxidase was produced by *Aspergillus niger* in laboratory. Different growth parameters were optimized for maximum production glucose oxidase by *A. niger*. From UV-Visible spectrophotometer, it was concluded that at 10% glucose (w/v), 0.2 % urea (w/v) and 1.75 $CaCO_3$ (w/v) *A. niger* gave maximum enzyme activity after the incubation of 48 h. Zinc oxide nanoparticles were prepared from zinc nitrate hexahydrate and NaOH by using co precipitation method. From UV-Visible spectrophotometric analysis, it was noticed that ZnO-Nps showed the maximum absorbance at 370 nm. Scanning electron microscopy showed spherical shaped nanoparticles. By plotting histogram 44 nm average size was observed. For immobilization, first surface of ZnO-Nps was modified by using L-cysteine HCl. After surface modification, GOx was immobilized with nanoparticles by using gluteraldehyde. From UV-Visible spectrophotometric analysis, it was observed that after immobilization enzyme activity was increased as compare to free enzyme. This solid bioconjugates was used in food application to increase the shelf life of fruits and vegetables.