Abstract

In this study, quaternized structure have been successfully prepared by green protocol from biopolymers. For this, biopolymers (chitosan, cyclodextrin and sucrose) were alkylated with different alkyl halides. Alkylated samples were reacted with epichlorohydrin for further functionalization to integrate choline chloride a quaternary ammonium group. The structure and extent of the derivatization were confirmed by precipitation titration, Fourier Transform Infrared (FTIR) spectroscopy, Scanning Electron Microscopy (SEM) and elemental (CHN) characterization results. Analytical results showed highest degree of quaternization in QS-C_{10}-II. While, among various synthesized quaternary chitosan products, QC-C_{10}-II showed maximum degree of quaternization. The antibacterial activity was studied by agar well diffusion method, minimum inhibitory concentration (MIC) by micro dilution method and colony forming units (CFU). In-vitro antibacterial assessment, the quaternized products exhibited a pronounced inhibitory effect against two bacteria i.e. *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Quaternary chitosan (QC-C_{10}-II) revealed best results with minimum inhibitory concentration of 12.5 µg/ml for both bacterial strains (*S. aureus* and *P. aeruginosa*). In conclusion, the applied protocol is efficient and revealed high extent of modification with almost good uniformity from the characterization studies.