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Synthesis and characterization of modified chitosan via microwave route for novel antibacterial application

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Highlights

- Chitosan is modified through grafting as well as crosslinking process.
- Modified samples were characterized with FTIR, XRD, SEM, EDX, TGA etc.
- Modified samples exhibited excellent antibacterial character.

Abstract

Herein we report the synthesis of novel antibacterial graft [Chit-g-Poly (AA-co-An)] and crosslink [Chit-cl-Poly (AA-co-An)] copolymer, consisting of acrylic acid (AA), acrylonitrile (An) and chitosan by using the microwave route, and it has been observed that grafting and crosslinking copolymers possess excellent antimicrobial properties. Studies of antibacterial activities of graft and crosslink samples were carried out against gram positive [*Staphylococcus aureus* (*S-aureus*)], gram negative [*Escherichia coli* (*E-coli*) and *Pseudomonas aeruginosa* (*P-aeruginosa*)] bacteria. The graft [Chit-g-Poly (AA-co-An)] and crosslink [Chit-cl-Poly (AA-co-An)] copolymers were characterized by Fourier transform infrared spectroscopy (FTIR), scanning electron microscope (SEM), thermogravimetric analysis (TGA), X-ray diffraction (XRD) techniques etc to study structural characteristics of synthesised chitosan derivatives. The graft [Chit-g-Poly (AA-co-A)] copolymer showed excellent antibacterial activities against *E-coli*, *P- aeruginosa* and *S-euros* 30, 31 and 26 mm zone inhibition, respectively, while [Chit-cl-Poly (AA-co-A)] showed antibacterial activities against *E-coli*, *P- aeruginosa* and *S-euros* 26, 36 and 21 mm zone inhibition respectively.

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