

Mixed Polymer Nano-carriers for Improved Antibacterial Efficacy of Beta-Lactam Antibiotics [†]

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Abstract: The present study aims to establish the efficacy of nanoformulations of beta-lactam antibiotics. In this direction, a mixed polymer has been synthesized using natural polymer sodium alginate and chitosan. The mixed polymer nanoparticles can improve the solubilization of hydrophobic and hydrophilic drugs. In the present formulation, the alginate was used to entrap the drug, and chitosan was used to induce cationic charges on nanoparticles' surface. The drug amoxicillin was encapsulated in the mixed polymer to show the efficiency against *Escherichia coli*. The encapsulation efficiency was 64%, calculated spectrophotometrically and antibiotic sensitivity tests demonstrated that the encapsulated drug has superior efficacy against the bacteria than the bare drugs. The current nanoformulations with cationic charges on the surface can be a better alternative to inactivate amoxicillin-resistant *E. coli*.

Keywords: Beta lactum antimicrobials; polymer nanoparticles; hydrophilic drugs; encapsulation.

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Conflicts of Interest

The authors declare no conflict of interest.