

Biopolymer Coating of Chemically Synthesized Magnetite for Sustained Drug Delivery †

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Abstract: Drug delivery using nanoparticles is attracting the attention of most researchers as it has got its targeted delivery, reduced side effects, and controlled release of drugs for a prolonged period of time is possible. In this study, magnetite was synthesized by a chemical method using the mixture of solutions of FeSO₄ and FeCl₃ as the iron source. The synthesized magnetite was subjected to analysis by FeSEM, XRD and VSM and hence characterized to have a size of 40-60nm and with a paraferromagnetic activity. The magnetite nanoparticle with the antibiotic rifampicin was coated with four different biopolymers, namely chitosan, starch, casein, and PHB. PHB coated nanoparticles were 80-90 nm-sized, which is the smallest size of all. The biopolymer coated nanoparticles were subjected to antimicrobial assay against *E.coli* by well diffusion method of which the PHA coated particles was found to be the best for holding rifampicin. The different biopolymer coated nanoparticles were also subjected to biofilm inhibition assay and MTT based cytotoxicity assay. Magnetite was found to have a LC₅₀ at 60 µg/ml.

Keywords: magnetite; targeted delivery; PHB; chitosan; antimicrobial assay.

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Conflicts of Interest

The authors declare no conflict of interest.