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## Preparation of catalyst-loaded viscose rayon fibers with sustainable antimicrobial functionality

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Viscose rayon cellulose fiber was first selectively oxidized on its surface without significant loss of its pristine fiber structure so that carboxylate functional group was introduced on the fiber. Separately, uniformly dispersed silver nanoparticles (AgNPs) having sizes of 2-5 nm were prepared by using amine-terminated fourth generation poly (amido amine) dendrimer as a capping agent. Then, the AgNPs were immobilized on viscose rayon fibers through chemical reaction to form amide bond between terminal amine groups of dendrimer protector with the carboxylic acids on oxidized fibers. The loaded nanoparticles did not release from the fiber even after 60 times washings. The AgNPs-loaded fibers (0.3 wt.%) exhibited excellent biocidal activity against *E. coli*. Therefore, this procedure can be effective for the prolonged sustainment of similar bioactive agents on fibers and maximize the efficiency of the cellulose product for anticipated purposes.

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## Assessment of bioplastic producing potential of *Bacillus subtilis* using some agro residues as carbon source

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The assessment of bioplastic producing potential of *Bacillus subtilis* using a variety of pretreated agro-residues was carried out. The agro residues were rice husks, molasses, bagasse, and corn cobs. Acid, alkaline and oxidative pretreatment of the agro-residues were done using standard procedures. Bioplastics produced were extracted using chloroform precipitation and quantified spectrophotometer. Acid, base and peroxide concentrations in g/L of polyhydroxybutyrate (PHB) were obtained for rice husks  $1.52 \pm 0.02$ ,  $1.82 \pm 0.01$ , and  $1.70 \pm 0.01$ ; molasses  $1.82 \pm 0.01$ ,  $1.52 \pm 0.02$ , and  $1.69 \pm 0.01$ ; bagasse  $0.87 \pm 0.06$ ,  $1.10 \pm 0.10$ , and  $0.96 \pm 0.07$  and; corn cobs  $0.5 \pm 0.00$ ,  $0.77 \pm 0.06$ , and  $0.60 \pm 0.10$ . The bioplastic yield of the agro-residues for acid, base and peroxide pretreatments were: rice husks  $50.33 \pm 0.76$ ,  $53.69 \pm 2.23$  and  $53.29 \pm 0.15$ ; molasses  $54.94 \pm 0.14$ ,  $50.55 \pm 0.25$  and  $53.09 \pm 0.17$ ; bagasse  $53.33 \pm 6.68$ ,  $55.00 \pm 0.25$  and  $54.50 \pm 7.12$  and; corn cobs  $51.85 \pm 3.21$ ,  $63.94 \pm 2.59$  and  $60.11 \pm 8.89$ . Statistical analysis revealed that PHB concentration of alkaline pretreated rice husk had a significant ( $p < 0.05$ ) higher value than other pretreatments. However, among all the agro-residues used peroxide pretreated corn cobs had a significantly ( $p < 0.05$ ) higher percentage yield of bioplastic ( $63.94 \pm 2.59$ ).

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