ABSTRACT

The purpose of this research is to use cow compost as a raw material for the extraction of Nano cellulose. A chemical method was used to synthesize ZnO NPs on nano crystal of cellulose in order to form ZnO /CNCs hybrid. According to the results, Fourier transform infrared, Scanning electron microscopy and Uv-vis spectroscopy characterized the ZnO /CNCs hybrid. Uv-vis spectra showed maximum absorption at 377nm related to zinc oxide. Fourier transform infrared spectra exhibit a weak peak at 476 cm^{-1} attributed to zinc oxide vibration, confirming the formation of zinc oxide nanoparticle on cellulose nanocrystals. The results of scanning electron microscopy showed the surface of CNCs uniformly covered with spherical-shaped grains is revealed to be continuously smooth and light grey, with no signs of pores or fissures. This ZnO /CNCs hybrid was tested against pathogenic fungus (Aspergillus Niger) and bacteria (Bacillus and E. Coli). The results obtained showed that the hybrid of ZnO /CNCs synthesized form cow compost have the effectiveness of an antifungal activity against Aspergillus Niger and also shows antibacterial activity against gram positive bacteria (Bacillus) and gram negative bacteria (E. Coli). All these results shows that ZnO /CNCs hybrid have excellent potential against antimicrobial compounds. So, this can be used in development of antimicrobial pharmaceutical industries and can be used against various diseases caused by these organisms. It can also be used as an food preservatives to inhibit the microbial growths.