Synthesis of nitrogen-doped zinc oxide nanostructures and their application in antibacterial activity against *e.coli, lactis, aerogenes, s.marcescens*

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The nanoparticles made of zinc oxide are well known because of their broader applications in various optoelectronic devices. The current work was dedicated to the synthesis, characterization, antibacterial testing and statistical assessment of the N-doped zinc oxide nanostructures (N-doped ZnO-NStr). The nanostructures were prepared via a hydrothermal treatment of zinc nitrate and ethylenediamine at 200^{o}C for 3 h. The bacterial activity of synthesized N-doped zinc oxide nanostructures were tested on four different bacterial species: E.coli, Lactis, Aerogenes, S.marcescens at the range of concentration of the N-doped ZnO-NStr (0.078-0.78 mg/ml), estimated by UV-visible spectrophotometry. The bacteria were prepared with LB broth at the ratio 1:500000. The assessment of the results revealed that the low concentration (0.078-0.15 mg/ml) of the N-doped ZnO-NStr enhances the bacteria growth and the high concentration (0.78 mg/ml) of the nanoparticles reduces the population of bacteria. The N-doped zinc oxide nanostructures were well characterized by fluorescence spectroscopy, atomic force microscopy, Fourier transform infrared spectroscopy. Statistical assessment was also conducted for the bacterial pathogens with synthesized nanoparticles.