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# ZnO nanoparticles and biocidal effect of nanostructured ZnO filmson Escherichia coli

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**Abstract:** The biocidal effect of ZnO nanostructured films was studied using Escherichia coli ATCC 43897. TheZnO nanoparticles were synthesized in diethylene glycol by using zinc acetate forced hydrolysis.X-ray diffraction analysis confirmed the formation of single wurtzite-type ZnO phase with a crystallitesize of 20.59 nm. Transmission electron microscopy observations revealed spherical-shaped particlesin the nanoscale regime with a mean particle size of 21.96 nm. It was found that the addition oftrioctylphosphine during synthesis favored much improved dispersion of ZnO nanoparticles, withsmaller particle size; that is, 16.28 nm. Meanwhile, ZnO film grown onto glass substrate by spin-coatingrevealed single phase with the formation of aggregates (?700) having mushroom-like morphologyformed of very fine particles in the nanoscale regime. The as-deposited nanostructured films exhibiteda hydrophilic character. The classical bacteriological and electrochemical impedance spectroscopymeasurements enabled the biocidal effect of ZnO nanostructured films with 94% inactivation efficiencyafter 90 min of contact time.

**Keywords :** ZnO; Spin-coating; Nanostructured film; Biocide effect; E. coli; EIS