Biocompatible Artificial Blood Vessels Fabricated from Thermoplastic Polyurethane Added with ZnO Nanoparticles Conjugated with Olive Seed and Chladophora prolifera Extracts with Bacterial Cellulose Exterior and Heparin Interior Coatings

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Our study aimed at transforming thermoplastic polyurethane (TPU) into artificial blood vessels to preserve and transmit the properties of extracts of antimicrobially active olive seed and Chladophora prolifera (alga) by adding ZnO-Olive seed (ZnO-OS) and ZnO-Alga (ZnO A) conjugates compounded and synthesized with ZnO nanoparticles to TPU, and at manufacturing biocompatible, antimicrobial blood vessels. Antimicrobial activity displayed by olive seeds against E.coli (NRRL B-3008), S.aureus (RSKK95047) and C.albicans (DSMZ5817) was detected using disk diffusion method. Zinc oxide nanoparticles (ZnO NP) were synthesized in oil bath with hydrothermal method. ZnO NP were silicated with tetraethylorthosilicate to increase stability. Extracts of olive seeds and algae were conjugated with ZnO nanoparticles. SEM images were taken from manufactured ZnO NP, ZnO-OS and ZNO-A conjugates that are 20 nm in size. Changes in their bond structures were viewed with FT-IR analysis. MTT viability assay detected no toxicity in 25µg ZnO NP, 100µg olive oil extract, 100µg alga extract, 25µg ZnO-A conjugate and 50µg ZnO-OS conjugate concentrations. Pellets from TPU, TPU with ZnO NP, ZnO-OS and ZnO-A conjugates were formed through an extrusion process. Pellets were transformed into artificial blood vessels using

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