

Green Synthesis of Silver Nanoparticles (AgNPs) Using a Local Bio-derived Product-BSH

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This research article represents a strong approach of green synthesis of silver nanoparticles (AgNPs) using a local bio-derived product-honey called black seed honey (BSH). Antioxidant activity of BSH had been determined by 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay and found to be 91.34% scavenging activity. Antibacterial activity of BSH and AgNPs was investigated against six pathogenic strains; *Escherichia coli*, *Proteus mirabilis*, *Klebsilla pneumoniae*, *Pseudomonas aeruginosa* (Gram-negative), *Staphylococcus aureus*, *Streptococcus mutans* (Gram-positive). BSH can reduce silver ions into silver nanoparticles after 20 min with stirring the reaction mixture. Nanoparticles of different sizes could be obtained and the solution turned to black by time. Characterization of the AgNPs was done by UV-Visible Spectroscopy, Fourier transform infrared spectroscopy (FTIR), transmission electron microscopy (TEM) and scanning electron microscope (SEM) imaging. The colloid obtained at a pH of 9 was found to be spherical in shape distributed with some agglomeration. An intense surface plasmon resonance band at 400 nm in the UV-visible spectrum clearly revealed the formation of AgNPs after 72h. Transmission electron microscopy (TEM) showed spherical shaped of AgNPs, and the size of nanoparticles was in range of 25 ~70 nm. The results suggest that the synthesized AgNPs act as an effective antibacterial agent more than natural black seed honey, and can potentially be used in human contacting areas.