

Green synthesis of silver nanoparticles using local honey

Abstract

In this work, silver nanoparticles have been successfully prepared with a simple, cost-effective and reproducible aqueous room temperature green synthesis method. Honey was chosen as the eco-friendly reducing and stabilizing agent replacing most reported reducing agents such as hydrazine, sodium borohydride (NaBH_4) and dimethyl formamide (DMF) which are highly reactive chemicals but also pose a biological risk to the society and environment. The size and shape of silver nanoparticles were modulated by varying the honey concentration and pH of the aqueous solution that contain silver nitrate as the silver precursor, sodium hydroxide as the pH regulator and ethylene glycol as the solvent. The silver nanoparticles obtained are characterized by field-emission scanning electron microscope (FESEM), ultraviolet-visible spectra (UV-Vis) and Fourier transform infrared spectroscopy (FTIR). From SEM analysis, it was found that by increasing the concentration of honey, the size of silver nanoparticles produced decreased, from the range of 18.98 nm - 26.05 nm for 10 g of honey to 15.63 nm - 17.86 nm for 40 g of honey. Similarly, the particle size decreased as the pH of the aqueous solution increased. UV-Vis spectra revealed large anisotropic and polydispersed Ag nanoparticle were produced.

Keywords — Honey, green method, silver nanoparticle, UV-Vis Spectra