

Synthesis and characterization of Cu@Cu₂O core shell nanoparticles prepared in seaweed *Kappaphycus alvarezii* media

ABSTRACT

This study reports a synthesis of Cu@Cu₂O core shell nanoparticles (NPs) in *Kappaphycus alvarezii* (*K. alvarezii*) media via a chemical reduction method. The nanoparticles were synthesized in an aqueous solution in presence of *K. alvarezii* as stabilizer and CuSO₄·5H₂O precursor. The synthesis proceeded with addition of NaOH as pH moderator, ascorbic acid as antioxidant and hydrazinium hydroxide as the reducing agent. The resulting nanoparticles were characterized by using UV-vis spectrum, X-ray diffraction, Transmission electron microscopy, Fourier transform infrared (FT-IR) and atomic force microscopy (AFM). The UV-visible spectra indicate two peaks at 590 nm and 390 nm which confirmed the formation of Cu@Cu₂O-NPs. The XRD was used in analysis of the crystal structure of nanoparticles. The morphology and structure of the *K. alvarezii*/Cu@Cu₂O-NPs were investigated by TEM and AFM. The average size of Cu@Cu₂O-NPs obtained were around 53 nm that confirmed by using X-ray diffraction, TEM and AFM. The Fourier transform infrared (FT-IR) spectrum suggested the complexation present between *K. alvarezii* and Cu@Cu₂O-NPs.

Keyword: *Kappaphycus alvarezii*; Copper nanoparticles; Seaweed; Copper (I) oxide; Core shell nanoparticles; Zeta potential