

## INTISARI

### **Studi Perbandingan Sintesis *Cu Nanoparticles* (CuNPs) Metode Basah dengan Bahan Prekursor, Reduktor, *Capping Agent* yang Berbeda dan Stabilitasnya dalam Koloid**

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Telah dilakukan sintesis Cu *nanoparticles* (CuNPs) menggunakan metode reduksi kimia dengan tiga pendekatan yang dimodifikasi yaitu dengan tiga komposisi sebagai berikut, pertama CuSO<sub>4</sub> 2,5M dan asam askorbat 2,27 M menggunakan *microwave*, kedua CuSO<sub>4</sub>.5H<sub>2</sub>O 0,01 M, PEG 6000 0,75%, NaOH 0,1 M, dan NaBH<sub>4</sub> 0,1M, dan ketiga Cu(NO<sub>3</sub>)<sub>2</sub>.3H<sub>2</sub>O 0,01M, gelatin 5% dan hidarazin 30% 1,5ml. Hasil sintesis CuNPs dikarakterisasi menggunakan UV-Vis, *X-ray Diffraction* (XRD), spektrometer *Fourier Transform Infra Red* (FTIR), *Scanning Electron Microscope* (SEM), *Transmittance Electron Microscope* (TEM). Diameter yang dihasilkan berturut-turut adalah 870 nm, 14 nm dan 13 nm. Studi kestabilan CuNPs dalam koloid menunjukkan hasil komposisi pertama tidak stabil, komposisi kedua memiliki kestabilan 3 hari, komposisi ke tiga memiliki kestabilan 8 minggu yang ditandai adanya puncak absorbansi pada 576 nm. Hasil uji XRD menunjukkan bahwa komposisi pertama menghasilkan partikel Cu murni sedangkan komposisi kedua dan ketiga menghasilkan nano partikel Cu dan CuO. Dari ketiga komposisi, dalam hal sifat monodispersi yang terbaik dimiliki oleh komposisi ketiga. Berdasarkan hasil uji yang dilakukan oleh peneliti sebelumnya, hasil sintesis menggunakan komposisi kedua dan ketiga memiliki potensi sebagai anti bakteri karena ukurannya yang hampir sama.

Kata kunci: Cu *nanoparticles*, reduksi kimia, kestabilan, antibakteri



## ABSTRACT

### **Comparative Study of Copper Nanoparticle Produced by Wet Synthesis Methods using Different Precursors, Reductants, Capping Agents and Their Colloid Stabilities**

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Cu nanoparticles (CuNPs) have been synthesized using a chemical reduction method with three modified approaches, namely three compositions as follows, first 2.5M CuSO<sub>4</sub> and 2.27 M ascorbic acid using microwave, second CuSO<sub>4</sub>·5H<sub>2</sub>O 0.01 M, PEG 6000 0.75%, 0.1M NaOH, and 0.1M NaBH<sub>4</sub>, and third Cu (NO<sub>3</sub>)<sub>2</sub>·3H<sub>2</sub>O 0.01M, 5% gelatin and 30% 1.5 ml hidarazine. The results of CuNPs synthesis were characterized using UV-Vis, X-ray Diffraction (XRD), Fourier Transform Infra Red (FTIR) spectrometer, Scanning Electron Microscope (SEM), Transmittance Electron Microscope (TEM). The diameter produced is 870 nm, 14 nm and 13 nm, respectively. The study of the stability of CuNPs in colloids showed that the results of the first composition were unstable, the second composition had a stability of 3 days, the third composition had a stability of 8 weeks which was indicated by the peak absorbance at 576 nm. The XRD test results showed that the first composition produced pure Cu particles while the second and third compositions produced nano Cu and CuO particles. From these three methods, in the case of monodispersion the best is possessed by the third composition. Based on the results of the tests conducted by previous researchers, the synthesis results using the second and third compositions have the potential as anti-bacterial because of their similar size.

**Keywords:** Cu nanoparticles, chemical reduction, stability, anti-bacterial