

SYNTHESIS AND CHARACTERIZATION OF COPPER(II), IRON(II), AND MAGNESIUM(II) COMPOUNDS COMPLEX WITH CURCUMIN LIGAND

by Regina Tutik Padmaningrum, Anti Kolonial Prodjosantoso, Siti Marwati

ABSTRACT

Curcumin has a wide range of biological and therapeutic effects, but its stability is low. The stability of curcumin can be increased by the formation of complex compounds with metal ions, such as Fe^{2+} , Cu^{2+} , and Mg^{2+} . This research was aimed to synthesize Fe(II)-curcumin, Cu(II)-curcumin, and Mg(II)-curcumin complex compounds and determine their characteristics. The metal-curcumin complex was synthesized by reflux method. The synthesized results were then characterized by UV-Vis, IR, XRD and AAS spectrophotometers. The research data obtained were analyzed using Excel and Origin software. A brownish yellow Fe(II)-curcumin complex and a dark brown Cu(II)-curcumin complex compound has been synthesized. The maximum wavelength of Fe(II)-curcumin and Cu(II)-curcumin solutions with DMSO solvent were 432.8 and 434.2 nm, respectively. There is a difference in the absorption of functional groups in curcumin and Fe(II)-curcumin synthesis results, namely the absorption of -OH and C=O strains. The crystal sizes of curcumin and Fe(II)-curcumin were 11.93 and 8.99 nm. The degree of crystallinity of curcumin and Fe(II)-curcumin were 77.26 and 32.69 %. The Fe(II)-curcumin complex compound has a metal content of Fe²⁺ as much as 14.86%. At pH 4-10, the Fe(II)-curcumin complex was more stable than curcumin. The stability of Fe(II)-curcumin and Cu(II)-curcumin complex compounds is better than curcumin. There was a shift in the wave number in the C=O ketone functional group of curcumin and the Cu(II)-curcumin complex. The crystal sizes of curcumin and Cu(II)-curcumin were 15.10412 and 9.7807 nm, respectively. The degree of crystallinity of curcumin and Cu(II)-curcumin was 41.86 and 94.48%, respectively. The average content of Cu metal in Cu(II)-curcumin compounds is 10.1%.

Kata Kunci: *synthesis, characterization, metal-curcumin complex compounds*