

ABSTRACT

Chitosan is a biopolymer that has biological activities such as antibacterial and its ability as a capping agent. The existence of chitosan functional groups such as reactive amine groups can make the formation of a modified chitosan derivative that has better antibacterial ability and activity than chitosan. The formed derivative compound was synthesized into a composite with Ag particles. The chitosan used was determined by the degree of deacetylation and molecular weight through the baseline method in the FT-IR spectrum and viscometry. In this study, chitosan was modified into β -Amino carbonyl chitosan-benzaldehyde (BAKK-B) and β -Amino carbonyl chitosan-piperonal (BAKK-P) based on the principle of one-pot Mannich reaction with reflux method. The formed β -Amino carbonyl chitosan product was made into a composite with silver particles based on the precursor reduction principle using a bioreductor. The products were characterized by UV-Vis spectrophotometry, FT-IR, AAS and antibacterial activity test using total plate count (TPC) method. Chitosan has a molecular weight of 73,840 g/mol with a degree of deacetylation of 73%. The BAKK-B product is a brown solid with a yield of 75.5% and a degree of substitution (DS) of 23.26%. The BAKK-P product is a brown solid with a yield of 45.23% and a DS of 10.8%. The synthesis of chitosan/Ag-derived composites produced K/Ag composites in the form of greenish brown solids with a yield of 61.39%, SPR phenomenon at 424 nm, and Ag content of 0.73%, BAKK-B/Ag composites in the form of greenish brown solids with a yield of 45.76%, SPR phenomenon at 433 nm and Ag content of 0.57% and BAKK-P/Ag composites in the form of dark greenish solids with a yield of 44.80% without SPR phenomenon and Ag content of 0.53%. The antibacterial test showed the best colony reduction percentage of chitosan by 74.58% on day 7, BAKK-B compound by 92.35% on day 3, BAKK-P compound by 92.08% on day 3, K/Ag composite by 74.5% on day 7, BAKK-B/Ag composite by 96.3%, and BAKK-P/Ag composite by 95.4% on day 3.

Keywords: Chitosan, piperonal, basa Mannich, β -amino karbonil, silver, antibacterial.