

ABSTRACT

This study aims to synthesize modified Mannich bases from chitosan in the form of β -Amino carbonyl chitosan-ortho-vanillin (BAKK-OV) and β -Amino carbonyl chitosan-ortho-vanillin/Ag composites (BAKK-OV/Ag) and determine their antibacterial activities. Chitosan was chosen because it has antibacterial activity, has the potential as a capping agent and is easily degraded. Mannich bases have the ability as good capping agents when composite synthesis is carried out with silver metal, so that it will increase its antibacterial ability. Chitosan was analyzed for the degree of deacetylation (DD) and molecular weight (MW) using the baseline method on the FTIR spectrum and viscometry. The synthesis of β -Amino carbonyl chitosan-benzaldehyde (BAKK-B) and BAKK-OV compounds used the reflux method with the principle of one-pot reaction catalyzed by sulfamic acid through the Mannich reaction. The synthesis of chitosan/Ag derivative composites was obtained through a chemical reflux method (bottom-up method) with the principle of reducing metal precursors by ascorbic acid bio-reductant. The products were analyzed using TLC, UV-Vis Spectrophotometer, FTIR, AAS and antibacterial test using the Total Plate Count (TPC) method. Chitosan has a DD of 73% and a MW of 73.8 KDa. The synthesis of BAKK-B produced a brown solid product with a yield of 75.50% (w/w) and a degree of substitution (DS) of 23%. The synthesis of BAKK-OV produced a reddish-brown solid product with a yield of 50.58% (w/w) and a DS of 96.8%. The synthesis of the chitosan/Ag composite produced a yield of 61.40%, in the form of a greenish brown solid, with a Surface Plasmon Resonance (SPR) effect at a wavelength of 423 nm and an Ag content of 0.73%. The BAKK/Ag composite produced a yield of 43.83% (w/w), in the form of a greenish brown solid, with an SPR effect at a wavelength of 433 nm, and an Ag content of 0.57%. The BAKK-OV/Ag composite produced a yield of 70.20%, in the form of a greenish brown solid, with an SPR effect at a wavelength of 435 nm and an Ag content of 0.93%. The results of antibacterial testing showed that the BAKK-OV/Ag composite was the most effective bacterial inhibitor agent up to the 7th day, with a percentage reduction in bacterial colonies of 94.35%. These results are better than BAKK-B/Ag which was only able to inhibit bacterial growth up to the 3rd day.

Keyword: *chitosan, basa Mannich, benzaldehyde, ortho-vanilline, antibacteria.*