

ABSTRACT

Chitosan can be applied as a preservative in food ingredients and its antibacterial properties can be improved by modifying the chitosan structure. The modification effort of chitosan in this study was to make it into a Chitosan-Piperonal Schiff Base which has better capping and stabilizing ability of silver nanoparticles, so that this compound can be composited with silver nanoparticles. This study aims to synthesize a Chitosan-Piperonal Schiff Base/silver nanoparticle (BS-KP/AgNP) composite as an antibacterial agent using the Total Plate Count (TPC) method. This study began by determining the molecular weight and degree of deacetylation of chitosan. The synthesis of Chitosan-Piperonal Schiff Base is the first stage. The second stage is the synthesis of the Chitosan/AgNP composite with the addition of STTP through the sonication and water bath methods. The third stage is the synthesis of the BS-KP/AgNP Composite with the same method as in the second stage through heating/non-heating, sonication/non-sonication and water bath/non-water bath. All synthesis products were characterized by UV-Vis spectrophotometer, FTIR, and AAS. Antibacterial test was carried out on the synthesis products using the TPC method. Chitosan has a molecular weight of 338080 g/mol and a DD of 65.09%. The synthesis of BS-KP has a yield of 60% (w/w) and a DS of 54.77%. Chitosan/AgNP with the addition of STTP before Ag⁺ reduction has the best results with a yield of 81.9% (w/w) and SPR phenomenon at 439 nm. The synthesis of the BS-KP/AgNP composite without heating, sonication, and water bath has the best results with a yield of 78.3% (w/w) and SPR phenomenon at 420 nm. The best BS-KP/AgNP composite product had the highest percentage reduction of total bacteria colonies of 99.5% (2500 ppm) on the third day of observation, then on the seventh day of observation of 98.7% (2500 ppm).

Keywords: antibacterial, Schiff base, chitosan, composite, silver nanoparticles.