

POTENTIAL STUDY OF POLYETHYLENE GLYCOL/CHITOSANE/L-METHIONINE CAPPED SILVER NANOPARTICLES POLYETHYLENE GLYCOL/CHITOSANE/L-METHIONINE AS A COLORIMETRY BASED SENSOR OF *Escherichia coli* BACTERIA

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ABSTRACT

This study aims to study the application of silver nanoparticles as a sensor for *Escherichia coli* or *E. coli* bacteria with a UV-vis spectrophotometer detector. Silver nanoparticles were successfully synthesized electrochemically using silver plate precursors as cathode and anode, and polyethylene glycol as reducing agent and stabilizer. The synthesized silver nanoparticles were then stamped with other compounds, namely chitosan and L-methionine. Spectra of AgNps-PEG, AgNps-PEG-chitosan, and AgNps-PEG-L-methionine were recorded using a UV-vis spectrophotometer. Based on the absorption signal response, the stability of the particles and their characteristics will be analyzed. Instruments used for characterization include TDS meter, particle size analyzer/PSA, Zeta-sizer, voltammetry, and X-ray Diffraction (XRD). After that, the capped nanoparticles were tested for their potential as sensors for *E. coli* bacteria. Based on the results of the study, it was found that the synthesized nanosilver had high crystallinity with a zeta potential value of -38.6 mV. Silver nanoparticles synthesized with PEG-1000 content of 2% showed the highest concentration value of silver nanoparticles and the smallest nanoparticle size. PEG-chitosan capped silver nanoparticles did not show consistent signal changes with changes in *E. coli* concentrations, while PEG-L-methionine capped silver nanoparticles showed consistent signal changes with changes in *E. coli* concentrations, in the form of decreased absorption peaks. UV-vis at maximum wavelength. Thus, L-met-PEG@AgNPs has the potential as an *E. coli* sensor. The analytical performance of PEG-L-methionine coated silver nanoparticles as a sensor for *E. coli* bacteria is in good category with the linearity equation: $Y = 0.36766 X + 0.46689$, r^2 value = 1, LoD is 0.23 ose, LoQ is 0.77 ose, and the precision is 1.635%.

Kata Kunci: *silver nanoparticles, polyethylene glycol, chitosan, L-methionine, sensor, E. coli*