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Antibacterial Properties of *Clitoria ternatea* Silver Nanoparticles

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Structured Abstract

Background: The emergence of antibacterial resistance among common human pathogens has become a major issue among the healthcare community. A report from the World Health Organisation (WHO) in 2018 stated that bacteria such as *Escherichia coli, Salmonella typhi, Staphylococcus aureus,* and *Streptococcus pneumoniae* have developed resistance against widely used antibiotics namely Fluoroquinolones and Cephalosporins. On top of that, commercialised antibiotics are known to give side effects on immunocompromised patients. Hence, scientists are working on the development on natural antibiotics to combat the emergence of antibacterial resistance, as well as reducing unwanted side effects on the consumers. Recent studies have proven that a common herbaceous plant in Southeast Asia identified as *Clitoria ternatea* or butterfly pea, has the antibacterial properties that has been proven to fight off urinary tract infection pathogen, *Proteus mirabilis*. *C. ternatea* has also been utilised in traditional medicine to treats various diseases ranging from minor injuries such as headaches and inflammations to major diseases such as leprosy and pulmonary tuberculosis. The phytochemical compounds of this plant are the main key property that make *C. ternatea* harbours antibacterial properties to inhibit growth of common human pathogens.

Methods: Antibacterial activity of *C. ternatea* plant extract was compared with *C. ternatea* silver nanoparticles. Conventional plant extraction method was conducted by immersing the powdered form of the plant leaves in distilled water. Silver nanoparticles was then synthesised from the *C. ternatea* leaf extract in a 1:1 volume ratio. The Antibacterial susceptibility testing was then conducted using agar well diffusion method. The zones of inhibition are measure before proceeding with Minimal Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC).

Results: Plant extract exhibit no zone of inhibition while Ct-AgNPs exhibit highest mean zone of diameter of 13.66±1.2mm. Results showed that all tested bacteria inhibit the same MIC value of 2.3438mM and the mean MBC of all tested bacteria is 2.5391mM. Detection of silver nanoparticles was confirmed by using Optical Density (OD) Spectrophotometer and the estimated size of the nanoparticles is 94.2417nm in diameter.

Conclusion: In conclusion, the results of this experiment suggested that silver nanoparticles are able to enhance the antibacterial activity of *C. ternatea* plant extract and results showed that *E. coli* is the most sensitive to silver nanoparticles as it exhibited the largest zone of inhibition.

Keywords: Leaf extract, Silver Nanoparticles, *Clitoria ternatea*, Human pathogens

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