UNIVERSITI TEKNOLOGI MARA

EFFECTS OF ETHANOLIC EXTRACT OF *Centella asiatica* ON THE EXPRESSION OF SUPEROXIDE DISMUTASE (SODs) IN *Staphylococcus aureus* (ATCC 25923)

By

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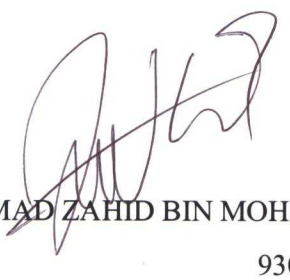
DECLARATION

I hereby declare that this thesis is my original work and has not been submitted previously or currently for any other degree at UiTM or any other institutions.



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ABSTRACT

EFFECT OF ETHANOLIC EXTRACT OF *Centella asiatica* ON THE EXPRESSION OF SUPEROXIDE DISMUTASE (SODs) IN *Staphylococcus aureus* (ATCC 25923)

Centella asiatica (*C. asiatica*) plant is known to possess antimicrobial properties and is widely used in traditional medicine in Asian country. The objectives of this study are to determine the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of ethanolic extract of *C. asiatica* against *Staphylococcus aureus* (*S. aureus*) through broth microdilution method. Further, killing potential of ethanolic extract of *C. asiatica* was also determined by performing liquid killing assay of extract against *S. aureus* in reference to 10 mM methyl viologen (paraquat). Further, the effect of ethanolic extract of *C. asiatica* on expression of superoxide dismutases (SODs) encoding SodA and SodM in *S. aureus* were also investigated through SDS-PAGE analysis. The results showed that MIC and MBC of ethanolic extract of *C. asiatica* are 16 mg/mL and 32 mg/mL respectively. 10 mM methyl viologen does not significantly ($p>0.05$) affect the killing potential of ethanolic extract of *C. asiatica* against *S. aureus* although it reduced percent survival of *S. aureus* to 2.8% compared to *C. asiatica* extract alone that reduced cell survival to 4.1% in 30 minutes. Expression of SodA and SodM may possibly be slightly inhibited as evident by reduction of density of the 23 kDa and 22.7 kDa protein band (comigration) is reduced after being treated with MIC of ethanolic extract of *C. asiatica* compared to untreated *S. aureus*. Total protein between untreated and treated *S. aureus* also showed reduction from 2.62 mg/mL to 2.31 mg/mL (1 hour) and 1.88 mg/mL (2 hours) indicating effective treatment with *C. asiatica* extract. Mechanism of antimicrobial activity of ethanolic extract of *C. asiatica* against *S. aureus* is suggested through inhibition of SodA and SodM expression to eliminate its protective role against superoxide radical generated to kill it.