UNIVERSITI TEKNOLOGI MARA

ANTIMICROBIAL PROPERTIES OF *Strobilanthes crispus* LEAVES AQUEOUS EXTRACT AND IRON OXIDE NANOPARTICLES AGAINST SELECTED HUMAN PATHOGENS

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ABSTRACT

Strobilanthes crispus is plant species from the family of Acanthaceae, known as 'pecah kaca' or 'jin batu' among Malaysian. *Strobilanthes crispus* is bush-like plants that is geographically distributed from Madagascar to Malay Archipelago. The *S. crispus* leaves are claimed to have anti-diabetic, diuretic, laxative, antimicrobial and wound healing properties which are usually used as traditional medicine by old folk. The study aimed to investigate the antimicrobial activity of *S. crispus* leaves aqueous extract and green biosynthesis Iron Oxide Nanoparticles (IONP) against tested human pathogens namely *Staphylococcus aureus, Escherichia coli, Bacillus cereus, Salmonella typhi, Candida albicans* and *Aspergillus niger*. The antimicrobial properties of *S. crispus* leaves aqueous extract and IONP was measured through the disc diffusion test. The inhibitory action of *S. crispus* leaves aqueous extract was only visible against *E. coli;* at 25 mg/ml with the mean diameter of zone inhibition was 7.3 ± 0.0167 mm and at 50 mg/ml with the mean diameter of inhibition zone of 8.7 ± 0.0167 mm. However, IONP was able to show better antimicrobial activity against all tested human pathogens compared to *S. crispus* leaves aqueous extract. The largest mean diameter zone of inhibition exhibited is 11.50 ± 0.288 mm and 9.00 ± 0.577 mm against *S. aureus* at concentration of 0.2 M and 0.3 M IONP. Protein leakage analysis assessed that IONP killing mechanism against tested human pathogens is by attacking the cell wall and membrane of bacterial and fungal cells. Then, the properties and structural of IONP was investigated through UV-Vis, SEM, XRD and FTIR method. Thus, from XRD analysis showed that IONP at concentration of 0.2 M and 0.3 M is orthorhombic and cubic shaped with chemical formula Fe304. The crystal shape of IONP was observed through SEM. Also, FTIR method proved the formation of IONP as transmittance band was observed between 410 to 683 cm^{-1} that indicate the presence of metal-oxygen bond. In addition, absorption peak was observed between 280-400 nm that showed the presence of IONP through UV-Vis method. Hence, these data concluded that *S. crispus* leaves aqueous extract and IONP have antimicrobial properties against tested human pathogens to act as new potential antimicrobial agent in pharmaceutical industry.

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