

**UNIVERSITI TEKNOLOGI MARA**

**PHYTOCHEMICAL PROFILES AND  
ANTIMICROBIAL ACTIVITY OF  
*Citrus hystrix* DC. (KAFFIR LIME)  
LEAVES EXTRACT AGAINST  
SELECTED BACTERIAL  
GASTROENTERITIS**

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Thesis submitted in fulfillment of the requirements for  
the degree of

**Bachelor of Medical Laboratory Technology  
(Hons.)**

**Faculty of Health Sciences**

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## DECLARATION BY STUDENT

Project entitled “Phytochemical Profiles and Antimicrobial Activity of *Citrus hystrix* DC. (Kaffir Lime) Leaves Extract against Selected Bacterial Gastroenteritis” is a presentation of my original research work. Whenever contributions of others are involved, every effort is made to indicate this clearly, with due reference to literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Project Supervisor, Madam Hartini Yusof and Dr. Nurul ‘Izzah Mohd Sarmin. It has been submitted to the Faculty of Health Sciences in partial fulfillment of the requirement for the Degree of Bachelor in Medical Laboratory Technology (Hons).

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*In the name of Allah, The Most Gracious, Most Merciful.*

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## ABSTRACT

In the recent decade, search of complementary and alternative plant derived medicine has gained gradually interest among researchers due to side effects of the chemically synthesized drugs and antibiotic resistant bacteria. This study was carried out to determine the phytochemical compounds and antibacterial activity of methanolic leaves extract of *Citrus hystrix* (*C. hystrix*) on selected gastrointestinal pathogens (*Staphylococcus aureus*, *Bacillus cereus*, *Salmonella typhimurium* and *Shigella flexneri*) using the agar well diffusion method. The extract exhibited broad spectrum antimicrobial activity against the tested bacteria ranging from 11 to 18 mm. Predominantly, the maximum inhibition zone was observed against *B. cereus* ( $17.33 \pm 0.58$  mm) followed by *S. aureus* ( $15.67 \pm 0.58$  mm). The extract showed moderate antibacterial activity against *S. flexneri* ( $11.67 \pm 0.58$  mm) followed by *S. typhimurium* ( $11.33 \pm 0.58$  mm). The strongest minimum inhibitory concentration (MIC) value was observed against *B. cereus* with concentration 31.25 mg/ml. The extract also showed good patterns of inhibition against *S. aureus* and *S. typhimurium* with concentration 125 mg/ml. MIC values were maximized against *S. flexneri* with concentration 250 mg/ml. The most effective bactericidal activity of the extract was observed against *B. cereus* with minimum bactericidal concentration (MBC) at 125 mg/ml followed by *S. aureus* and *S. flexneri* with MBC at 250 mg/ml. *S. typhimurium* was the least sensitive to the extract with the MBC value at 500 mg/ml. Phytochemical screenings revealed the presence of alkaloid, flavonoid, terpenoid and tannin compounds. The results of the present study suggest this extract exhibited the strongest antibacterial activity against *B. cereus* with maximum inhibition zone and least MIC and MBC values.

Keywords: *Citrus hystrix*, gastrointestinal pathogens, MIC, MBC, phytochemical.