

A Formulation of Creams Incorporated with *Aloe vera* and *Cassia alata* Extract and Evaluation of Its Antimicrobial Activity

Nurahwani Jauhari Mohd Musa, Mohd Taufiq Mat Jalil*

Structured Abstract

Background: Growing awareness of the side effects associated with synthetic skin creams has led to increased interest in plant-based alternatives that are both safe and effective against skin pathogenic microorganisms. *Aloe vera* and *Cassia alata* have long been used in traditional medicine to treat various ailments. *A. vera* contains numerous bioactive compounds with antibacterial properties, while *C. alata* is rich in phytochemicals known for their antimicrobial effects. This study aimed to formulate topical creams incorporating extracts from *A. vera* and *C. alata* and evaluate their antimicrobial activity against skin pathogens.

Methods: This study utilised an ethanolic extraction method to obtain the *C. alata* leaves crude extract, yielding 22.34% of extraction. Ethanolic extracts that were prepared from *C. alata* leaves and *A. vera* gel were used to develop four different cream formulations. Antimicrobial activity was initially assessed using the agar well diffusion assay against *Staphylococcus aureus*, methicillin-resistant *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa*, *Serratia marcescens*, and *Candida albicans*. Further evaluation of the *C. alata* extract included determination of minimum inhibitory concentration (MIC), minimum bactericidal concentration (MBC), and minimum fungicidal concentration (MFC) to assess its efficacy against skin pathogens. Bacterial growth reduction assay was done to measure the effectiveness of the formulated cream in reducing the bacterial population over 48 hours.

Results: Among the four formulations, Cream Formulation C (FC) demonstrated clear inhibitory activity against Gram-positive bacteria, with zones of inhibition ranging from 13 mm to 21 mm. In contrast, *A. vera* extract alone showed no significant antimicrobial effect against the tested microorganisms. The bacterial growth reduction assay further revealed that FC exhibited a time-dependent increase in antibacterial activity against Gram-positive bacteria.

Conclusion: In conclusion, the cream formulation containing both *A. vera* and *C. alata* extracts (FC) showed promising antimicrobial activity against Gram-positive skin pathogens, suggesting its potential as an effective plant-based alternative for managing skin-related infections.

Keywords: *Cassia alata*, *Aloe vera*, Skin Pathogens, Cream, Antimicrobial

*Correspondence: taufiqjalil@uitm.edu.my

School of Biology, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia