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Evaluation of *in vitro* antibacterial activity of two blue flower forms of *Clitoria ternatea* L. against selected strains of human pathogenic bacteria

B.T.S.K.K. Bandara¹, P.D. Abeysinghe^{1*}, N.P. Weerasinghe² and A.P. Attanayake³

¹Department of Botany, Faculty of Science, University of Ruhuna, Sri Lanka

²Department of Microbiology, Faculty of Medicine, University of Ruhuna, Sri Lanka

³Department of Biochemistry, Faculty of Medicine, University of Ruhuna, Sri Lanka

Abstract

In recent years, infectious diseases have risen dramatically in prevalence, becoming a major worldwide health concern. The advent of antibiotic-resistant bacterial strains, as well as the associated side effects and toxicities, has challenged the efficiency of many antibiotics, resulting in inefficient therapy. Thus, discovering alternative antimicrobial agents with higher efficacy and lesser toxicity is of utmost importance. In this context, the utilization of natural herbs used in traditional medicine for identifying potential antimicrobial agents has attracted the interest of many researchers and practitioners. Despite the wide variety of therapeutic capabilities, *Clitoria ternatea* L. is an underutilized medicinal plant. In this study, the antibacterial potential of *C. ternatea* L. blue paired flowers (corolla with standard five petals) and blue solitary (corolla with one large standard petal, two wrinkled wings, and two white keels) flowers were evaluated against the selected control strains of human pathogenic bacteria, *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa*. The Soxhlet extraction technique was used to prepare the solvent extracts (ethanol, ethyl acetate, dichloromethane, chloroform, petroleum ether, and hexane) of each flower form. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were determined using a broth microdilution assay in Mueller-Hinton broth in 96-well microtiter plates. The highest extraction yield percentages (W/V) were obtained from the ethanol extracts of blue paired (21.02%) and blue solitary (10.06%) flowers. The results of broth microdilution assay revealed that all the *C. ternatea* blue paired and blue solitary solvent extracts were effective against strains of *S. aureus* and *E. coli*, whereas *P. aeruginosa* was resistant to all the tested petroleum ether and hexane extracts. The dichloromethane and chloroform (MIC and MBC values ranged from 0.13 mg/mL to 2 mg/mL) extracted blue paired and blue solitary flower forms have shown significant antibacterial activity ($p < 0.05$). Further, the study showed that different solvent extracts from the same plant flowers had varying degrees of inhibition when tested against different bacteria. Thus, the current investigation verifies the therapeutic use of *C. ternatea* blue flowers in traditional medicine and demonstrates their potential to be exploited in the discovery of novel antimicrobial agents, which is an important step forward.

Keywords: Antibacterial activity, Antibiotic resistance, Antimicrobial agents, *Clitoria ternatea* L., Solvent extraction

***Corresponding Author:** pushpa@bot.ruh.ac.lk