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Antibiofilm Activity of Semipurified Anthocyanin extract of Blue Ternate (*Clitoria ternatea*) on Hospital-acquired Infection: An Invitro and Insilico Study

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Abstract

Clitoria ternatea is a plant highly valued in the community because of its antibacterial, antioxidant, and anti-inflammatory properties, with bioactive compounds that comprise flavonoids, anthocyanins, and terpenoids. *C. ternatea* extracts have antimicrobial and antibiofilm activity against a variety of bacteria that are common causes of hospital-acquired infections. The study assessed a specific antibacterial property of the plant by comparing the effectiveness of the anthocyanin plant extract in counteracting new biofilm formation both in vitro and in silico. The study design tested the anthocyanin plant extract on biofilms formed on both glass and polystyrene surfaces. The anthocyanin extract derived from the plant has a good ability to prevent biofilm formation of *Staphylococcus aureus* and *Escherichia coli*, and the cell density of bacteria on both glass and polystyrene media is significantly less than that of the untreated control groups ($p < 0.001$). Accordingly, the treatment of *S. aureus* with C. ternatea resulted in a significant reduction of the microbial cell counts on its surface, suggesting antibiofilm activity. Similarly, for *E. coli*, cell count reduction was reported in media made from glass and plastic ($p < 0.001$), in which the count decreased from 134 to 38.3 in glass and from 142 to 22 in polyester. These outcomes demonstrated the effectiveness of anthocyanin-rich fractions of *C. ternatea* in inhibiting *S. aureus* and *E. coli* biofilms associated with infection conditions; possible future applications are highlighted. It is highly recommended that future in vitro studies of *C. ternatea* aim to examine other bioactivities besides the anti-attachment effect. It would also be useful to identify the types of anthocyanin compounds present in the extract through the best available techniques, such as HPLC-MS. Further, more advanced in silico studies should be conducted to assess the binding affinity and specificity of various anthocyanin derivatives to other microbial proteins possibly relevant to therapeutic applications.