

Antibacterial Effects of Selected Ayurvedic Plants and Selected Cosmetic Products Used by KIU Undergraduates, against Acne-inducing Bacteria *Staphylococcus aureus*

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Background: Acne is one of the most prevalent dermatologic diseases in the world. The development of resistance to antibiotics provides for further attempts to search for new antimicrobial agents to combat infections and overcome the resistance and side effects of the currently available antimicrobial agents. Therefore, this study was aimed at screening selected Ayurvedic medicinal plants for their antimicrobial activity against *Staphylococcus aureus* (*S. aureus*).

Objectives: To determine the antibacterial activity of selected seven medicinal plants (MPs) and five cosmetic products against *S. aureus*, that causes acnes

Methods: Antibacterial activities of methanolic extracts of seven MPs, against *S. aureus* were assessed by agar well diffusion assay and MIC. Antibacterial activities of five cosmetic products which are used to treat acnes, were assessed by well diffusion assay. Vancomycin was used as the positive control and 10% DMSO was used as the negative control. Five cosmetic products were selected from KIU undergraduates based an online survey.

Results: Methanolic extracts of *Phyllanthus emblica L.* exhibited potent antibacterial activity against *S. aureus*, with an average zone of inhibition of ≈ 20.66 mm. The MIC was detected as 100mg/mL. Positive control, *Senna auriculata L.*, *Rubia cordifolia Linn*, *Hemidesmus indicus*, *Cassia alata L.*, *Curcuma Zedoaria*, *Acalypha indica L.* showed average of inhibition zones (IZs) of ≈ 22.1 mm ≈ 17 mm, ≈ 16.6 mm, ≈ 16 mm, ≈ 13.3 mm, ≈ 12 mm and ≈ 11 mm, respectively. IZs of cosmetic products were detected as ≈ 44 mm, ≈ 32.5 mm, ≈ 18 mm, ≈ 15 mm and ≈ 13 mm.

Conclusion: *Phyllanthus emblica L.* displayed the most potent antibacterial activity against *S. aureus*, that causes acnes, and all seven medicinal plants showed antibacterial activity. Active ingredients of cosmetic products are clindamycin antibiotic, tea tree extraction, rose extraction, golden jojoba oil and neem extraction respectively. Clindamycin antibiotic included product and tea tree extraction included product displayed the most potent antibacterial activity. Other three products showed minimum size of IZs.

Keywords: Antibacterial activity, MIC, *Phyllanthus emblica L.*, *Staphylococcus aureus*, Well diffusion assay

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