

## ANTIBACTERIAL ACTIVITY OF A HERBAL DEODORANT FORMULATED WITH *Nymphaea pubescens* FLOWER PETALS AGAINST ISOLATED HUMAN SKIN MICROFLORA

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### Introduction

Deodorants are personal hygienic products that are used to avoid distinctive malodorous scents, simple “body odour” of an axillary area of the human body. The body odour is caused by the interaction of the resident bacteria with the apocrine sweat and armpit microbial communities are mainly dominated by Staphylococcaceae [1]. Therefore, deodorants and antiperspirants are basically formulated with antibacterial activity against pungent odour causing bacteria and with synthetic fragrances such as acetyl cedrene and lylal (3- and 4-(4-hydroxy-4-methylpentyl)-3-cyclohexene-1-aldehyde). However, certain individuals can develop allergic contact dermatitis and some other adverse effects on skin by application of chemical- based deodorants [2]. For that problem, herbal deodorants with no added synthetic antimicrobials and fragrances would be a great alternative. In the present study, we investigated the *in vitro* effect of a newly formulated *Nymphaea pubescence* flower petal extract-based deodorant on *Staphylococcus aureus* and a coagulase-negative *Staphylococcus* sp. isolated from human skin microbiota.

### Materials and Methods

#### *Identification of isolated bacteria*

Skin microflora obtained from skin swabs and cultured on Mannitol Salt Agar (Oxoid, UK) was available at the Faculty of Medicine, University of Ruhuna and was employed for this study. The isolates were subcultured separately on Mannitol Salt Agar according to the colour of the colonies to obtain purified bacteria. After incubation, each purified isolate was inoculated on Nutrient Agar (Oxoid, UK) and incubated at 37 °C for 24 hours. Then isolates were observed after Gram staining using a microscope. Confirmed colonies of *S. aureus* and coagulase-negative *Staphylococcus* sp. were selected.

*Evaluation of the antibacterial activity of the herbal formulation*

The antibacterial activity of *N. pubescens*-based formulation was assessed using a modified broth micro-dilution method [3] against both *S. aureus* and coagulase-negative *Staphylococcus* sp. isolated from the human skin. Four concentrations of the formulation (0.5%, 1.0%, 2.0%, 2.5% and 5.0%) diluted with sterile distilled water were initially tested for antibacterial activity. After the incubation at 37 °C for 24 hours, a loopful of each well was sub-cultured on Nutrient Agar medium for screening for viability. Standard ciprofloxacin was used as the positive control and sterile distilled water was used as the negative control. The experiment was performed in duplicate.

**Results and Discussion**

The initial screening revealed potent antibacterial properties in all four concentrations of the deodorant formulation against both *S. aureus* and coagulase-negative *Staphylococcus* sp. Thereafter minimum inhibitory concentration (MIC) of this *N. pubescens*-based deodorant formulation was determined and the results are summarized in Table 1

**Table 1.** Minimum Inhibitory Concentrations (MICs) obtained for isolated bacterial strains

Bacterial Strain	Minimum Inhibitory Concentration (MIC) (mg/mL)	
	Formulation	Positive Control
<i>S. aureus</i>	0.08	0.032
Coagulase- negative <i>Staphylococcus</i> sp.	0.032	0.013

No inhibition was observed in negative controls.

The obtained results revealed that the formulation is capable of inhibiting the growth of skin inhabiting bacteria. *N. pubescens* leaf and flower extracts have been reported to possess antibacterial potential against several bacterial species including *Staphylococcus aureus* [4]. However, to the best of our knowledge, this is the first report on the antibacterial potential in a deodorant formulated from the hydroalcoholic extract prepared from flowers of *N. pubescens* against skin microbiota.

**Conclusions and Recommendations**

*N. pubescens* flower-based deodorant has the potential to inhibit the growth of *S. aureus* and coagulase-negative *Staphylococcus* sp. isolated from human skin. Therefore, it has a great potential to be developed into an herbal-based deodorant in commercial scale.

## References

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