PROCEEDINGS OF 43RD ANNUAL SESSIONS 2023

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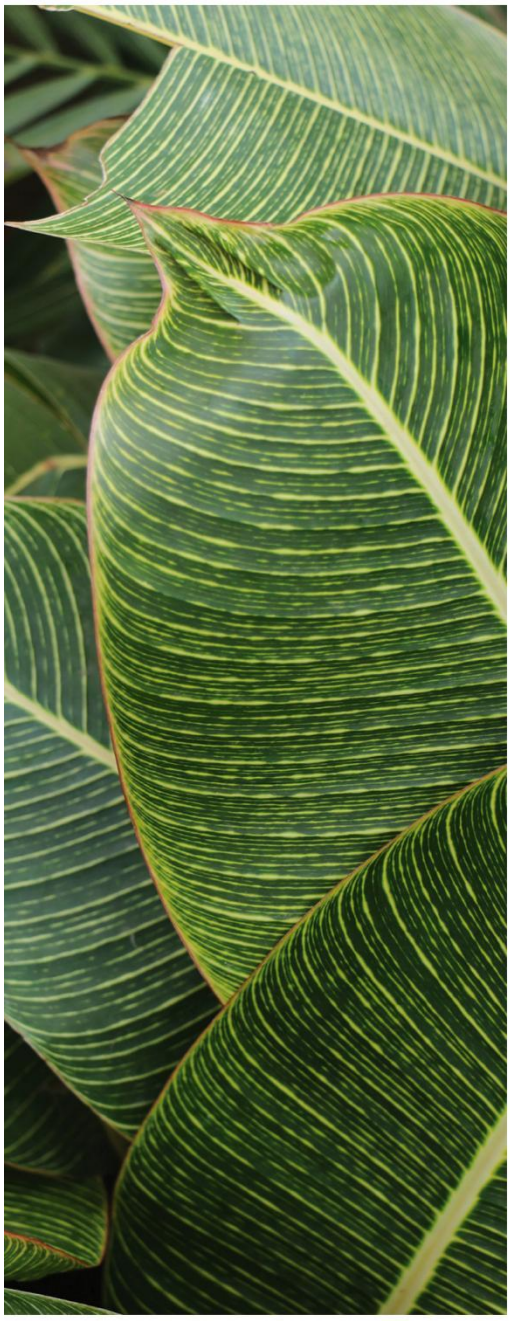

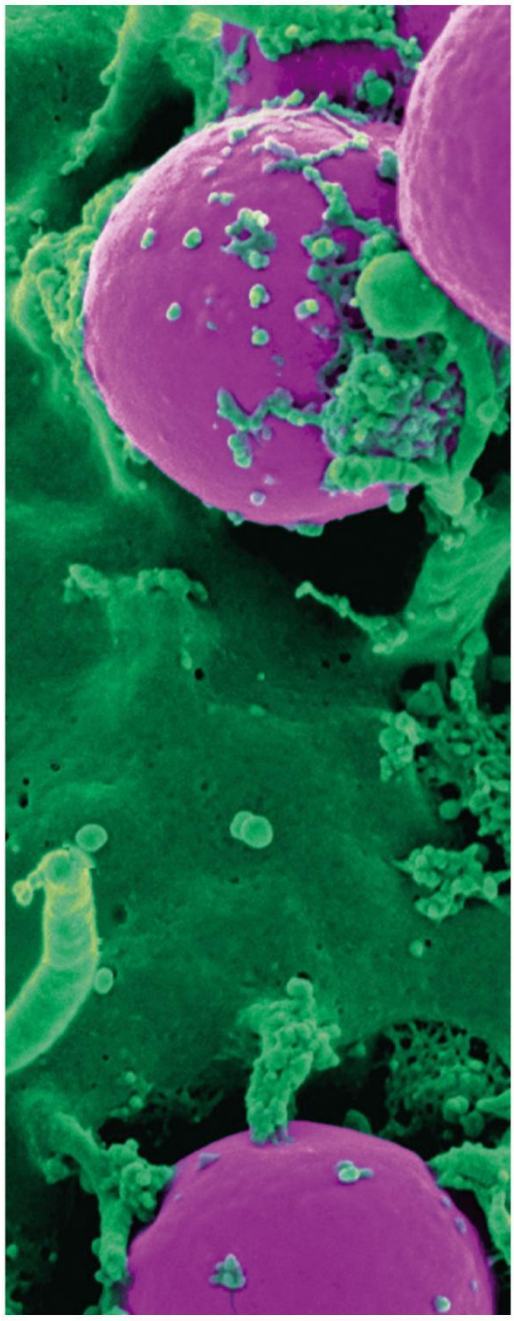

BIOLOGICAL WEALTH FOR ECONOMIC PROSPERITY

INSTITUTE OF BIOLOGY

SRI LANKA

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Theme

Biological Wealth for Economic Prosperity

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Antibacterial and anti-inflammatory activities of a polyherbal formulation based on traditional Sri Lankan medicine for diabetic wound healing

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Diabetic wounds are a global health issue that has affected many populations worldwide owing to its severity, slow recovery, and economic burden. Despite the considerable efforts made in its treatment, they remain a challenge in many nations partly due to its last-resort treatment of lower-leg amputations, which is burdensome to patients in the long-term. Therefore, the rationale of this study was to explore a topical application prepared in traditional Sri Lankan medicine as a natural and more cost-effective alternative treatment for diabetic wounds. The topical application (TA) was prepared into two extracts, TA water and TA oil, and this study aimed to analyse the wound healing potential of the extracts by means of their antibacterial and anti-inflammatory activities. The antibacterial activity of both extracts was determined by performing a disk diffusion assay against four skin pathogens that inhabit diabetic foot, namely *Staphylococcus aureus, Pseudomonas aeruginosa, Streptococcus spp.,* and *Escherichia coli* with tetracycline antibiotic as the positive control to obtain the diameter of the zones of inhibition. The anti-inflammatory activity of TA water was determined using the albumin denaturation method with reference to the known NSAID, Ibuprofen to obtain the percentage inhibition of protein denaturation, which was further assessed using IC^{50} values (GraphPad Prism 9.5.1). The findings indicated that both extracts possessed sufficient antibacterial potential against all four bacteria. However, in comparison to tetracycline, the antibacterial activity of the extracts against *Pseudomonas aeruginosa* was greater than that of *Staphylococcus aureus, Streptococcus spp.,* and *Escherichia coli*. Moreover, TA water possessed the highest anti-inflammatory activity at a 0.1 dilution (143.75 mg/ml) of the concentrated extract (1437.5 mg/ml), which was comparable to that of Ibuprofen (40 mg/ml), and its effectiveness was further confirmed by its IC^{50} value (5.14 mg/ml). Therefore, the study concluded that the topical application prepared possesses substantial antibacterial activity and anti-inflammatory activity validating its potential use in diabetic wound healing.

Keywords: Traditional Sri Lankan medicine, Diabetic wounds, Topical application, Antibacterial activity, Anti-inflammatory activity