

***In Vitro* Antimicrobial Activity of Psidium Guajava Leaf Extract against Acne-developing Organisms and Formulation of an Anti-acne Topical Hydrogel**

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Increased production of sebum, hyperproliferation of keratinocytes, and activation of *Propionibacterium acne*, *Staphylococcus aureus* (*S. aureus*), and *Staphylococcus epidermidis* (*S. epidermidis*) cause the formation of acne. It is important to discover new natural substances to overcome treatment failures due to antibiotic resistance and side effects. Therefore, this study was aimed to formulate an herbal anti-acne gel using *Psidium guajava* leaves. Methanolic leaf extract of *P. guajava* was used. The antibacterial activity of leaves of *P. guajava* was investigated using the Agar well diffusion method. A stable gel base was developed following the method of Nawarathne et al., 2019. Three types of gels (G96000, G48000 and G24000) were prepared by incorporating the leaf extract into the gel base based on the suitable concentrations of leaf extract. The antibacterial activity of the herbal gels was evaluated using the Agar well diffusion method. Stability tests and characteristic features of gel preparations were tested over three months. As per the results, leaves of *P. guajava* exhibited a significant positive correlation between log concentrations and inhibition zone diameters of leaf extract ($p < 0.05$) against *S. aureus* and *S. epidermidis*. G48000 mono herbal gel was stable throughout three months among the above three mono gels. G48000 mono herbal gel showed excellent physicochemical properties, stability, and antibacterial effects compared to the G96000 and G24000 mono herbal gels. These findings may create a new dimension for treating acne using Sri Lankan traditional medicine.

Keywords: *Psidium guajava*, anti-microbial activity, gel