

RESEARCH ARTICLE

***In vitro* Inhibitory effects of Polyherbal Formulation on Biofilm-forming bacteria in Chronic wounds**

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ABSTRACT:

Biofilm is a complex microbial community highly resistant to antimicrobials. The formation of biofilms in biotic and abiotic surfaces is associated with high rates of morbidity and mortality in hospitalized patients. The aim of the present study was to develop a polyherbal formulation for antibacterial activity and inhibition of biofilm formation. *Andrographis paniculata* (leaves), *Cassia fistula* (flower), *Gymnema sylvestre* (leaves), *Ocimum tenuiflorum* (leaves), *Cinnamomum verum* (bark) were the herbs chosen for the study. The extraction of the herbal samples was carried out using the cold extraction method and their phytochemical characterization was carried out by GC-MS analysis. The anti-microbial activity and antibiofilm activity of polyherbal formulation was carried out using the agar well diffusion method and microtitre plate assay. The phytochemical results showed the presence of resins, carbohydrates, proteins, saponin and phenol. The agar well diffusion assay results and microtitre plate assay showed the highest activity exhibited with 500µg/ml of polyherbal extract against *Pseudomonas aeruginosa* and lowest against *Escherichia coli*. The results confirm the differences in antibacterial and antibiofilm activity of polyherbal formulation of various concentration. Larger concentration of formulation showed to be more effective against biofilm cells. The purpose of this study was to investigate the anti-biofilm properties and inhibitory impact of ACGOC extracts against the most prevalent clinical isolates such as *S. aureus*, *B.pumilus* and *P. aeruginosa* and so the hypothesis of synergistic interaction of biologically active compounds from five different herbal extracts was proved for its antibiofilm assays.

KEYWORDS: *Andrographis paniculata*, biofilm, *Cinnamomum verum*, *Escherichia coli*, *Gymnema sylvestre*, *Ocimum tenuiflorum*, *Pseudomonas aeruginosa*.

INTRODUCTION:

In human, skin is the protective barrier against various environmental factors and any damage to the skin exposes the body to stressors resulting in wounds. These wounds cause serious infections and illness. Chronic wounds are more significant in ageing population, diabetes and obesity. Statistical ratio explored the growing demand in the treatment of chronic wounds resulting from accidents/trauma or medical illnesses, surgical wounds and burns.

When the wound fail to progress through normal stages of healing such as inflammation, proliferation and remodeling, then its chronic¹.

The inflammatory phase started with vascular response through the coagulation process, where the platelet aggregation and polymerization of fibrinogen initiated the formation of fibrin plug. Platelet released growth factors with cytokines and chemokines are responsible for the immune cell recruitment at the site. Interleukin-8 (IL-8) is one of the most important cytokines involved in the migration of polymorphonucleocytes (PMNs). PMNs are involved in phagocytosis of bacteria by its proteolytic action. Later, PMNs activated macrophages are regulatory in their function with release of growth factors and cytokines that stimulate the migration of cells is more important for the next stage of wound