

The Healing Properties of *Woodfordia Uniflora* (A.Rich.) Koehne from the Dhofar Region of Oman Against Ulcers and *Clostridium Perfringens* Infections

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ABSTRACT

Gangrene is a serious condition, which is characterised by tissue death. It results from restricted blood flow and anoxic conditions and is frequently caused by atherosclerosis, tissue damage, diabetes mellitus and some pathogen infections. Gas gangrene (clostridial myonecrosis), a common class of gangrene, results from bacterial (particularly *Clostridium perfringens*) infections following tissue injury. *Woodfordia uniflora* is used in traditional Arabian healing systems to treat gangrene ulcers and skin sores. However, despite its well-documented uses, *W. uniflora* has not yet been rigorously tested against bacterial causes of gangrene ulcers and skin sores. Additionally, *W. uniflora* extracts are yet to be tested for therapeutic potential against other aspects of ulcer/wound healing, including inflammation and tissue regeneration. Solvent extracts prepared from *W. uniflora* leaves were tested against *C. perfringens* as well as a panel of epidermal bacteria. Antimicrobial activity was quantified by MIC determination. The anti-inflammatory activity of the extracts was evaluated using COX-2 and PGE2 ELISA assays. Toxicity was evaluated using ALA and HDF cell viability bioassays. The methanolic, ethanolic and aqueous extracts displayed noteworthy inhibitory activity ($\leq 875\mu\text{g/mL}$) against *C. perfringens*. The ethanol extract was particularly good, with an MIC of $250\mu\text{g/mL}$. The extracts also had noteworthy inhibitory activity against several antibiotic-resistant epidermal bacteria, including MRSA (MICs 250-650 $\mu\text{g/mL}$). Additionally, the *W. uniflora* extracts (1.25mg/mL) significantly inhibited COX-2 activity and PGE2 secretion. The ethanol extract was particularly promising, decreasing COX-2 enzymatic activity and PGE2 secretion by approximately 60% and 73% respectively. All *W. uniflora* extracts were non-toxic in the ALA and HDF cell viability assays, indicating their safety for therapeutic use. Taken together, these results indicate that *W. uniflora* extracts have therapeutic potential in the treatment of gas gangrene by inhibiting *C. perfringens* (and several skin bacteria), as well as inhibiting COX-2 mediated inflammation. Further studies are required to determine whether the extracts also affect extracellular matrix formation and tissue remodeling, and to identify the extract components responsible for those activities.

