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Anti-quorum sensing and antibiofilm activities of South African medicinal plants against uropathogens

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Urinary tract infections (UTIs) primarily affect women and have increasingly become a serious health problem globally. These infections are largely attributed to the quorum sensing (QS)-dependent ability of pathogens to form biofilms in the urinary tract. Microbial pathogenicity can be attenuated by disturbing the QS system of bacteria. The aim of the study was to document the antibacterial and anti-quorum sensing (AQS) potential of medicinal plants that are used as traditional medicine in South Africa to treat UTIs. Plant extracts were prepared from six medicinal plants using solvents of different polarities. When plant extracts were screened for their ability to inhibit the QS-controlled violacein production by *Chromobacterium violaceum*, only two species (*H. africana* and *C. latifolia*) exhibited AQS activity in the qualitative agar well diffusion assay. However, eight extracts inhibited violacein production by 57-71% in the quantitative dilution assay. The ability of uropathogens to form biofilms upon exposure to the plant extracts was subsequently investigated using the crystal violet assay. It was found that the polar extracts of *Cenchrus ciliaris* and *Eucomis autumnalis*, *Cryptocarya latifolia, Hydnora africana* and *Rhoicissus tridentata,* as well as non-polar extract of *Hypoxis hemerocallidea* were able to reduce initial cell attachment of *S. aureus*, *P. mirabilis* and *S. marcescens* by approximately 50%. However, the preformed biofilm was inhibited less than 30% by the extracts. The study revealed that several South African medicinal plants have antibacterial and AQS properties, validating their use in traditional medicines to treat UTIs to some degree, and indicating that they may be a suitable source of anti-pathogenic drugs to treat urinary infections.

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