

Anti-quorum sensing activity of six South Florida medicinal plants and their ability to inhibit *Pseudomonas aeruginosa* pathogenicity. (Oral Presentation)

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Introduction

Plants have evolved numerous chemical strategies for deterring pathogen attack, including the production of bactericidal compounds. However there are other mechanisms by which plants control bacterial infection. The inhibition of quorum sensing (QS), or bacterial cell-to-cell communication, is known to attenuate bacterial pathogenicity, and reduce infection in both plant and animal hosts. This is achieved without killing the bacteria, thus reducing the chance to evolve resistance. *Pseudomonas aeruginosa* is an opportunistic pathogen responsible for a variety of severe and occasionally lethal infections in cystic fibrosis patients and immunocompromised individuals. Expression of toxic virulence factors and its ability to form biofilms enables this organism to create intractable infections where established. Both of these phenomena are under QS control and a novel target for natural products.

Objectives

In our previous research, 50 South Florida medicinal plants were screened for anti-QS activity using bacterial biomonitor strains (Adonizio *et al* 2006). Of these, six plants showed QS inhibition. We take this work a step further by exploring the effect of these plants on virulence factors and biofilm formation in *Pseudomonas aeruginosa*.

Methods

Crude aqueous extracts of six plants: *Conocarpus erectus* (Combretaceae), *Chamaecybe hypericifolia* (Euphorbiaceae), *Callistemon viminalis* (Myrtaceae), *Bucida burceras* (Combretaceae), *Tetrazygia bicolor* (Melastomataceae), and *Quercus virginiana* (Fagaceae) were tested for their ability to inhibit biofilm growth, and virulence factors LasA elastase, LasB protease, and pyoverdine in *P. aeruginosa*.

Results

Extracts of these plants cause differential inhibition of QS-controlled factors without a significant decrease in cell density; suggesting quorum quenching rather than bactericidal effect. The most efficient inhibition was seen with *C. erectus*, *P. nervosa*, and *C. viminalis*.

Conclusion

This work substantiates our previous assertion that QS-interruption serves as a mode of action and use-validation for these plants. Since quorum sensing mediates the pathogenicity of many organisms, the therapeutic potential of these plants may be far-reaching.

Keywords: antipathogenic, quorum quenching plants

Reference

1. Adonizio, A. L., K. Downum, B. C. Bennett, and K. Mathee. 2006. Anti-quorum sensing activity of medicinal plants in southern Florida. *Journal of Ethnopharmacology*. In Press; Corrected Proof, Available online 6 January 2006.

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