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### **Disrupting quorum sensing: *Acalypha communis* extract inhibits *Pseudomonas aeruginosa* virulence**

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*Pseudomonas aeruginosa* is a Gram-negative opportunistic pathogen notorious for its ability to cause multi-drug resistant infections, particularly in immunocompromised individuals and those with cystic fibrosis. The virulence of *P. aeruginosa* is largely orchestrated by quorum sensing (QS), a sophisticated cell-to-cell communication system that allows bacteria to coordinate gene expression in a population density-dependent manner. One of the key QS systems in *P. aeruginosa* is the Rhl system, which regulates the production of various virulence factors. Given the increasing prevalence of antibiotic resistance and the limited therapeutic options for *P. aeruginosa* infections, there is an urgent need to identify alternative strategies to combat this pathogen. Antivirulence agents, which disarm bacteria of their virulence factors without affecting essential survival functions, have emerged as a promising alternative to traditional antibiotics. In this study, we screened 42 extracts obtained from mostly native plants from Argentina for their antivirulence activity against *P. aeruginosa*. *Acalypha communis* extract demonstrated the most potent activity, inhibiting pyocyanin production with a minimum inhibitory concentration (MIC) of 50 µg/mL. Further characterization revealed that the extract also inhibited exoprotease production and swarming motility at levels comparable to a *P. aeruginosa* RhlR mutant. Analysis of homoserine lactone (HSL) production showed that the extract inhibited C4-HSL but not C12-HSL, indicating its action on the Rhl QS system. The findings of this study highlight the potential of *A. communis* as a source of novel antivirulence compounds against *P. aeruginosa*. This research underscores the importance of exploring microbial ecology and natural products as a valuable source of innovative solutions to combat infectious diseases.

Palabras clave: *Pseudomonas aeruginosa* - quorum sensing - antivirulence - plant extracts - *Acalypha communis*