Mind Your Language: A Host Produced AI-2 Mimic Mediated Communication to Inhibit Bacterial Pathogenesis

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The plant kingdom is an implicit gold mine which continues to play an important role in the discovery of new treatment and preventive therapies. Ethnobotanical plants have been used for centuries by different ethnicities worldwide, owing to numerous healing properties beneficial to humans. But lack of conclusive studies and scientific evidence gap between current practices and age old beliefs lead to ambiguity regarding their potential use in contemporary medicines. While most of the research focuses on convention classification of ethnobotanical plants according to their antimicrobial properties, the evidences point towards development of better insights into cross kingdom signaling including plant, host and microbes. One such plant, Aporosa octandra despite having weak antimicrobial property as checked against E.coli and P.aeruginosa, potentially mediated bacterial quorum sensing signals. The current study shows that, through unknown mechanism it stimulates host cells (CACO-2 AND HIEC-6 cells) to produce autoinducer-2 activity as confirmed by bioluminescence assay. Further the study focused on determining the effect of AI-2 mimics on biofilm formation and virulence genes expression in P.aeruginosa. The results showed a significant lowering in bacterial biofilm, as well as reduced virulence genes expression. To further test if AI-2 mimics directly affects the virulence of P. aeruginosa, the study used the Caenorhabiditis elegans-P.aeruginosa infection model. The addition of cell supernatant containing AI-2 mimics to P. aeruginosa lawns significantly diminished the bacterium's ability to kill the worms, suggesting that host produced AI-2 mimics negatively affects pathogenesis of P.aeruginosa.