

ANTI-QUORUM SENSING POTENTIAL OF *CARUM COPTICUM* EXTRACTAli mohammadrezaei^{*}, Saghar ketabchi

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INTRODUCTION

Quorum sensing (QS) is a communication system that allows bacteria to monitor their population density through the production and sensing of small signal molecules called autoinducers. Many Gram-negative bacteria use N-acyl homoserine lactone (AHL) signal molecules as autoinducer to monitor their own population density and coordinate gene regulation in a process. It regulates a variety of bacterial physiological functions such as biofilm formation, bioluminescence, virulence factors and swarming which has been shown to contribute to bacterial pathogenesis. Quorum sensing inhibition is usually monitored using the Tn-5 mutant, *Chromobacterium violaceum* CV026. *Carum copticum* (L.) C. B. Clarke or ajowan caraway from Apiaceae family is a worldwide used plant growing in different parts of Middle East, Indian subcontinent and Iran. In this study, we tested *C. copticum* seeds' extract as quorum sensing inhibitor by using *C. violaceum* CV026 as a biosensor.

MATERIALS AND METHODS: *C. copticum* was obtained from a local market located in Isfahan (Iran) and identified by Agriculture Scientific and Research Institute of Isfahan, Iran. *C. violaceum* CV026 were grown on LB agar plates and were added AHL (C6HSL) on the bacteria. Blank discs were impregnated with 4 mg/mL of grinded *C. copticum* methanol extracts and fixed on the plates. Testing was done in duplicate and tetracycline (TE30) disc were used as standard antimicrobial agent control. Plates were then incubated for 12 h at 30 °C.

RESULTS AND DISCUSSION: The methanolic extract of *C. copticum* seeds exhibited anti-quorum sensing activity, whereby it interrupted the ability of *C. violaceum* CV026 to response towards exogenously supplied N-acyl homoserine lactone. In fact, the methanolic soluble compounds extracted from *C. copticum* were found to inhibit violacein production, a QS-regulated behavior in *C. violaceum* CV026. Because the regulation of many bacterial processes is controlled by QS systems, the finding of natural compounds acting as QS inhibitors suggests an attractive tool to control and handle detrimental infections caused by humans, animals, and plants pathogens.

Keywords: Autoinducers; Quorum Sensing (QS); *Carum copticum* Extract; *Chromobacterium violaceum* CV026; N-acyl-L-homoserine lactones (AHL)

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