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Grapefruit juice and its furocoumarins inhibits autoinducer signaling and biofilm formation in bacteria.

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Abstract

Cell-to-cell communications in bacteria mediated by small diffusible molecules termed as autoinducers (AI) are known to influence gene expression and pathogenicity. Oligopeptides and N-acylhomoserine lactones (AHL) are major AI molecules involved in intra-specific communication in gram-positive and gram-negative bacteria respectively, whereas boronated-diester molecules (AI-2) are involved in inter-specific communication among both gram-positive and gram-negative bacteria. Naturally occurring furocoumarins from grapefruit showed >95% inhibition of AI-1 and AI-2 activities based on the Vibrio harveyi based autoinducer bioassay. Grapefruit juice and furocoumarins also inhibited biofilm formation by Escherichia coli O157:H7, Salmonella typhimurium and Pseudomonas aeruginosa. These results suggest that grape fruit juice and furocoumarins could serve as a source to develop bacterial intervention strategies targeting microbial cell signaling processes.

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