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Article Title

Honey modulates biofilms of *Pseudomonas aeruginosa* in a time and dose dependent manner.

Author(s)

O A Okhiria, A F M Henriques, N F Burton,
A Peters, R A Cooper.

Abstract

Biofilms are complex microbial communities associated with persistent infections that demonstrate increased resistance to immunological and antimicrobial challenges. *Pseudomonas aeruginosa* has been associated with biofilms in chronic wounds. When this opportunist pathogen is grown in suspension culture in the laboratory it is susceptible to manuka honey at concentrations below 10 % (v/v), but its susceptibility as a biofilm has not previously been reported. The effect of two concentrations of manuka honey dissolved in Luria broth (LB) on biofilms of six cultures of *Pseudomonas aeruginosa* were tested over 24 hours. One type culture (ATCC 27853) and five clinical isolates derived from five different patients with infected wounds were each incubated at 37 °C for 24 hours in LB in microtitre plates to establish biofilms. Medium was then replaced with LB, or LB containing 20 % (w/v) manuka honey or LB containing 40 % (w/v) manuka honey and plates were incubated at 37 °C for 24 hours. Biofilm biomass was monitored at known intervals by fixing adherent cells with 2.5 % (w/v) glutaraldehyde and staining with 0.25 % (w/v) crystal violet. Exposure of *Pseudomonas aeruginosa* biofilms to 40 % (w/v) manuka honey in LB resulted in significantly reduced biofilm biomass for all cultures ($p > 0.05$) compared to LB alone and 20 % (w/v) manuka honey in LB. Differences in biofilm biomass were most noticeable after 9 to 11 hour exposure times. This preliminary investigation suggests that manuka honey has potential in the control of biofilms in chronic wounds and justifies further study of this subject.

Keywords

manuka honey, biofilms, *Pseudomonas aeruginosa*, wounds

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