

Enhanced Antibacterial Activity of MGO™ Manuka Honey complexed with α -cyclodextrin (Manuka Honey with CycloPower™)

Simon Swift,¹ Lynne M. Chepulis^{2*}, Benedict Uy,¹ Fiona J. Radcliff¹

¹Department of Molecular Medicine and Pathology, Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand; ²Faculty of Health, Education and Humanities, Waiariki Institute of Technology, Rotorua, New Zealand

Running Title: Manuka honey complexed with α -cyclodextrin

*Corresponding author: Dr Lynne Chepulis, Faculty of Health, Education and Humanities, Waiariki Institute of Technology, Rotorua, New Zealand

Submission date: March 03, 2014; Acceptance date: May 13, 2014; Publication date: May 16, 2014

ABSTRACT

Background: Manuka honey is recognized for its health-promoting properties and its use in medicine is well documented. However, the actions of Manuka honey are limited by rapid digestion and the inactivation of bioactive components such as methylglyoxal. Cyclodextrins are naturally occurring glucose rings that improve stability and bioactivity of products. This study investigates the tolerability and bioactivity of α -cyclodextrin-complexed Manuka honey called Manuka Honey with CycloPower™.

Methods: The antibacterial properties of Manuka honey complexed with α -cyclodextrin (Manuka honey with CycloPower™) were compared to uncomplexed Manuka honey against a range of common organisms using standard measurements of minimum inhibitory (MIC) and bactericidal (MBC) concentrations. Time course growth measurements were determined using a sublethal concentration of 2% w (honey solids)/v and measuring the area under the growth curve.

Results: In tube MIC assays, Manuka honey completely inhibited *Staphylococcus aureus* (MSSA and MRSA), *Streptococcus pyogenes*, *Helicobacter pylori* and *Moraxella catarrhalis* at concentrations of 10% w/v or less, with MIC values decreasing as the methylglyoxal content of the honeys increased from 100 to 550 mg/kg. MIC values at a given methylglyoxal level were also decreased for *S. pyogenes*, *M. catarrhalis* and *H. pylori* by complexing the Manuka honey with α -cyclodextrin. *Pseudomonas aeruginosa* was not inhibited by any of the Manuka honey or CycloPower™ treatments at the concentrations tested (2-10% w/v). Manuka honey with CycloPower™ had an increased bacteriostatic action against *S. aureus*, MRSA and *P. aeruginosa* compared with Manuka honey.

Conclusions: This study concludes that Manuka honey is an effective antibacterial agent that can be enhanced by complexing with α -cyclodextrin.

Keywords: Manuka honey, methylglyoxal, α -cyclodextrin, antimicrobial