Antibacterial activity of medical-grade manuka honey against oral bacteria in vitro

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INTRODUCTION

Manuka honey (MH), derived from manuka shrub Leptospermum scoparium, native to New Zealand and Australia, contains elevated amounts of antimicrobial methylglyoxal 1,2. Topical application of MH is effective in the treatment of burn and surgical wound infections 3. Our aim was to assess the antibacterial effect of MH against oral microorganisms in order to explore its potential use in periodontal treatment.

MATERIALS & METHODS

► Manuka (Comvita®, New Zealand) and white clover (Trifolium repens) honey (Hollands®, New Zealand) were compared for their minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) against Staphylococcus oxford, Escherichia coli and four representative oral bacterial species: Streptococcus mutans, Streptococcus sanguinis, Streptococcus gordonii and Fusobacterium nucleatum ATCC: 10953 (a), 25586 (b), 33568 (c) and 44256 (d).

► Honey was added to either tryptic soy broth or brain heart infusion (two-fold serial dilutions), inoculated with the test microorganisms and incubated at 37°C for 18 hours.

► MIC was determined by measuring optical density (A600) and MBC by spot-plating samples on appropriate agar and incubating either aerobically (S. oxford, E. coli) or anaerobically (S. mutans, S. sanguinis, S. gordonii and F. nucleatum).

RESULTS

► Both honeys were bacteriostatic against all microorganisms tested (Figure 1). MH was more effective than clover honey (CH).

► Both honeys were bactericidal against all microorganisms tested except S. mutans (Table 1).

► Most microorganisms were more sensitive to MH than CH except S. gordonii and F. nucleatum ATCC 44256.

CONCLUSIONS

► MH was more effective than clover honey against three of the tested plaque-associated species.

► Subgingival application of manuka honey as an adjunct to periodontal treatment merits further investigation. However, since S. mutans was relatively resistant and pH of honey is below 5.5 this may predispose root surfaces to caries and erosion.

REFERENCES


Table 1. MBCs of manuka and clover honey against nine bacterial strains after 18 hours of incubation. The highest concentration tested was 50 (% w/v).

<table>
<thead>
<tr>
<th>Bacterial strains</th>
<th>MBC (% w/v)</th>
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<tbody>
<tr>
<td>S. oxford</td>
<td>12.5</td>
</tr>
<tr>
<td>E. coli</td>
<td>12.5</td>
</tr>
<tr>
<td>S. mutans</td>
<td>&gt;50</td>
</tr>
<tr>
<td>S. sanguinis</td>
<td>25</td>
</tr>
<tr>
<td>S. gordonii</td>
<td>25</td>
</tr>
<tr>
<td>F. nucleatum a</td>
<td>25</td>
</tr>
<tr>
<td>F. nucleatum b</td>
<td>25</td>
</tr>
<tr>
<td>F. nucleatum c</td>
<td>25</td>
</tr>
<tr>
<td>F. nucleatum d</td>
<td>50</td>
</tr>
</tbody>
</table>

Figure 1. MICs (columns) and pH (●) of manuka and clover honey against (a) S. oxford, (b) E. coli, (c) S. mutans (d) S. sanguinis and (e) F. nucleatum ATCC 25586 after 18 hours of incubation.

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