

***In vitro* antimicrobial activity of Sri Lankan raw bee honey with turmeric**

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Introduction

Bee honey and turmeric have been acknowledged as good sources of natural antibacterial agents since ancient times. This study aims to determine the antibacterial activity of Sri Lankan raw honey samples from *Apis cerana* and *Apis dorsata* separately and with turmeric against selected bacterial species.

Methods

A total of six Sri Lankan raw honey samples of two honey bee species and crude turmeric extract (900 µg/mL against *S. aureus* and 5 mg/mL against *E. coli*) were screened for antibacterial activity against two clinically significant bacteria namely, *Staphylococcus aureus* and *Escherichia coli* separately and as a mixture. The Minimum Inhibitory Concentration (MIC) of the most potent honey was determined using the agar dilution method. Finally, statistical analysis of MIC results for all six honey samples was carried out.

Results

The MIC of the six honey samples ranged from 0.125 to 0.25 g/mL against both *S. aureus* and *E. coli* (Table 1). Honey sample A, (*Apis dorsata*, 0.125 g/mL) against *S. aureus* and honey sample C, (*Apis cerana*, 0.125 g/mL) against *E. coli* were found to be more effective since they had the lowest MICs than the other honey samples. All the honey samples expressed statistically significant difference ($P < 0.05$) against *E. coli*.

Table 1: MIC values of honey with turmeric against *S. aureus* and *E. coli*

Honey sample	Minimum Inhibitory Concentration (g/mL)			
	<i>S. aureus</i>		<i>E. coli</i>	
	Honey alone	With turmeric	Honey alone	With turmeric
<i>A. dorsata</i>				
A	0.125	0.120	0.25	0.20
B	0.25	0.20	0.25	0.20
E	0.25	0.20	0.25	0.20
N	0.25	0.20	0.25	0.15
<i>A. cerana</i>				
C	0.25	0.10	0.125	0.120
I	0.25	0.20	0.25	0.20

All six honey samples exhibited enhanced antibacterial activity with turmeric against *S. aureus* at concentrations ranging from 0.10 to 0.20 g/mL and 0.12 to 0.20 g/mL for *E. coli*. Honey C possessed the most potent antibacterial property with turmeric against *S. aureus* and *E. coli* (Table 1).

Conclusion

It is concluded that Sri Lankan honey from both *A. cerana* and *A. dorsata* express enhanced activity in combination with turmeric. Furthermore, statistically significant potent antibacterial activity ($P < 0.05$) was observed against *E. coli*. *Apis cerana* honey (C) revealed the highest antibacterial activity in combination with turmeric against both selected species of bacteria.

Keywords: Antibacterial, Minimum Inhibitory Concentration, Bee honey, Statistically significant