

Antimicrobial Activity of *Apis Cerana* Bee Honey and Beeswax from Dry and Wet Zones of Sri Lanka

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Antimicrobial resistance is a current global health crisis, urging the need for novel antimicrobials. *Apis cerana* bee honey and beeswax are natural substances rich in bioactive compounds. The objectives of the current study were to investigate the antibacterial and anti-candidal activity of *A. cerana* bee honey and beeswax. Twelve samples of honeybee colonies were collected; six from dry zone and six from wet zone. Honey and wax were separated and tested against 11 clinically important microorganisms; three Gram-positive bacteria, three Gram-negative bacteria and five *Candida* species (standard cultures). Dilutions of bee honey from 5% to 30% (v/v) were tested in Mueller Hinton Agar using the agar dilution method, to determine the Minimum Inhibitory Concentrations (MICs). The sugar content, density, pH, colour intensity and odour of honey were measured and correlated with the MIC (%). Antimicrobial activity of ethanolic extracts of beeswax was investigated using the well diffusion bioassay. Honey samples from the dry zone exhibited higher antibacterial activity against *Escherichia coli*, and higher anti-candidal activity against *Candida albicans*, *C. parapsilosis* and *C. tropicalis* compared to the wet zone samples. Lower activity was observed against the other test organisms. The sugar content and density of honey showed a weak correlation, pH and odour a positive and colour intensity a negative correlation with MIC (%). There was no significant difference ($p > 0.05$) between inhibition zone diameters obtained for wax samples from dry and wet zones. The highest diameter (25 mm) was produced by beeswax against Methicillin resistant *Staphylococcus aureus* (MRSA) and lower diameters for *Candida* species. High sugar content and acidic pH may be responsible for the antimicrobial activity, particularly in bee honey. Detailed investigations are needed to identify the chemical compounds responsible for the activity. *Apis cerana* bee honey is a promising antimicrobial while the ethanolic extract of *A. cerana* beeswax is a promising antibacterial agent, particularly against MRSA.

Keywords: *Apis Cerana*, Antibacterial, Anti-Candidal, Physico-Chemical, Correlation