Evaluating the Antibiotic Properties of Bee Honey as Against Common Pathogenic and Antibiotic Resistant Bacteria Found in Wound Infections

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Introduction: Antibiotics have largely been effective in treating bacterial infections. However, inappropriate use of antibiotics has led to extensive antibiotic resistance globally. In addition, no new classes of antibiotics are available to counter the dramatic rise of antibiotic resistance. This has led to unorthodox methods in treating antibiotic-resistant bacterial infections. One of these methods is the use of bee honey, which has been used since ancient times.

Objective: The objective of the present study was to determine the effectiveness of bee honey against common pathogenic bacteria in wound infections

Methodology: Common bacterial wound pathogens viz. *Streptococcus pyogenes, Streptococcus agalactiae*, methicillin resistant *Staphylococcus aureus* (MRSA), *Escherichia coli* (extended-spectrum beta-lactamases producing), *Klebsiella pneumoniae*, *Acinetobacter* spp, and *Enterococcus* spp were selected for the study. Suspensions of 0.5 McFarland strength of *S. pyogenes* was streaked on blood agar and the others were streaked on Muller Hinton agar. Sterile, 1"x1" size, single gauze layer, soaked with commercially available pure Bee honey (100%) was placed on the center of each inoculated plate and incubated overnight at 37 ºC. On following day, each piece of gauze was removed aseptically. Presence of live bacteria from the site where gauze was removed from each plate was checked by streaking on blood agar. The same place where gauze was removed was repositioned with new, sterile gauze layer soaked with bee honey. All plates were incubated at 37 ºC. Same procedure was continued until no growth was observed. Control tests were done in parallel using same sized gauze without bee honey. Sterility of bee honey was previously confirmed by inoculation on blood agar. The experiment was repeated two times.

Results: Following repeat applications of bee honey, there was no bacterial growth from plates inoculated with *S. pyogenes* and *S. agalactiae* after two applications, *Acinetobacter* spp - three, MRSA – four, *K. pneumoniae*, *E.coli* and *Enterococcus* spp - five and *Pseudomonas* spp – six applications. There was no inhibition of bacterial growth in the control plates.

Conclusion: Antibacterial effect of bee honey against *S. pyogenes* and *S. agalactiae* was highly satisfactory with clearance of the organisms with only two applications whereas it was satisfactory against MRSA, *Acinetobacter* spp. *Klebsiella* spp, *E.coli* and *Enterococcus* spp and longest duration of application was needed for *Pseudomonas* spp. These in vitro anti-bacterial test results suggest that bee honey has effective antibacterial property against common wound pathogens with varying duration of application.

Keywords: “Antibacterial effect; Bee honey”

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