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Recovery and Identification of Phenolic Acids in Honey Samples from Different Floral Sources of Pakistan Having Antimicrobial Activity

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Abstract : The objective of the present study was: a) to investigate the antimicrobial activity of honey samples of different floral sources of Pakistan, b) to recover the phenolic acids in them as a possible contributing factor of antimicrobial activity. Six honey samples from different floral sources, namely: Trachysperm copticum, Acacia species, Helianthus annuus, Carissa opaca, Zizyphus and Magnifera indica were used. The antimicrobial activity was investigated by the disc diffusion method against eight freshly isolated clinical isolates (Staphylococci aureus, Staphylococci epidermidis, Streptococcus faecalis, Pseudomonas aeruginosa, Klebsiella pneumonia, Escherichia coli, Proteus vulgaris and Candida albicans). Antimicrobial activity of honey was compared with five commercial antibiotics, namely: doxycycline (DO-30ug/mL), oxytetracycline (OT-30ug/mL), clarithromycin (CLR–15ug/mL), moxifloxacin (MXF-5ug/mL) and nystatin (NT – 100 UT). The fractions responsible for antimicrobial activity were extracted using ethyl acetate. Solid phase extraction (SPE) was used to recover the phenolic acids of honey samples. Identification was carried out via High-Performance Liquid Chromatography (HPLC). The results indicated that antimicrobial activity was present in all honey samples and found comparable to the antibiotics used in the study. In the microbiological assay, the ethyl acetate honey extract was found to exhibit a very promising antimicrobial activity against all the microorganisms tested, indicating the existence of phenolic compounds. Six phenolic acids, namely: gallic, caffeic, ferulic, vanillic, benzoic and cinnamic acids were identified besides some unknown substance by HPLC. In conclusion, Pakistani honey samples showed a broad spectrum antibacterial and promising antifungal activity. Identification of six different phenolic acids showed that Pakistani honey samples are rich sources of phenolic compounds that could be the contributing factor of antimicrobial activity.

Keywords : Pakistani honey, antimicrobial activity, Phenolic acids eg.gallic, caffeic, ferulic, vanillic, benzoic and cinnamic acids
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