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Susceptibility of chronic wound bacterial infectious agents to honey of various origins

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Background: Venous ulcers, bed sores, or pilonidal sinus belong to chronic wounds, which are very frequently colonized or infected by bacterial agents interfering with the wound healing. In their treatment, non-antibiotic therapies are preferred. Various natural products have outstanding antimicrobial potential. The aim of the study was to evaluate the antibacterial activity of various kinds of honey, tested in natural state and after sterilization by filtration or by gamma-irradiation.

Material/methods: The tested honeys – ecologically produced honeydew honey and honey from mixed flower sources, Manuka honey, and commercial honeydew honey - were geometrically diluted 1:1 in Mueller-Hinton broth in the range from 50 % to 3 % and their minimal inhibitory (MIC) and minimal bactericidal (MBC) concentrations were detected against collection strains of *Staphylococcus aureus, Enterococcus faecalis, Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis, and Pseudomonas aeruginosa*, using broth dilution assay according to EUCAST.

Results: The most potent bactericidal activity was detected in ecologically produced honeydew honey, which inactivated the tested *S. aureus* strains at the 6.3 % concentration, *E. faecalis, P. aeruginosa* and *P. mirabilis* at 12.5 %, and *E. coli* and *K. pneumoniae* at 25 % concentration. Ecologically produced honey from mixed flower sources followed, with 12.5 to 50 % concentrations, and the less potent were Manuka honey and commercial honeydew honey, with MBCs equal to 50% honey concentration. Gamma irradiation had no effect on antibacterial activity of the tested honeys. Filtration decreased the MICs and the MBCs by one dilution, in general.

Conclusions: All tested honeys had bactericidal activity against the common gram-positive, as well as gram-negative bacterial agents colonizing and infecting chronic wounds. Honeydew honey from ecological beekeeping revealed the greatest therapeutic potential.