بسم الله الرحمن الرحيم

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ISOLATION AND IDENTIFICATION OF ANTIMICROBIAL AGENTS FROM EGYPTIAN BEE GLUE (PROPOLIS)

BY

AHMED HOSNY AHMED EL-SAID HAMMAD

B. Sc. High Institute for Agricultural Cooperation, 1995
M. Sc. Agric. Sc. (Economic Entomology), Fac. of Agric., Benha Univ., 2008

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ABSTRACT

Ahmed Hosny Ahmed: Isolation and Identification of Antimicrobial Agents from Egyptian Bee Glue (Propolis). Unpublished Ph.D. Thesis, Department of Plant Protection, Faculty of Agriculture, Ain Shams University, 2022.

This study aimed to determine the best methods for the production of propolis in the New Valley and Qalyubia governorates. In this regard, the bee propolis trap type, 2 (Hand-cut fiber screens with circular holes in a diameter of 1 mm.) outperformed the other tested methods, the superiority of the three traps without significant differences among them over the traditional method in regard to the % yield of ethanolic extract propolis (EEP). In addition to evaluating the effect of the three different extraction methods (maceration (ME), microwave-assisted (MAE) and ultrasonic-assisted (UAE) extraction) on the yield of the extract of the used propolis samples (New Valley, Qalyubia, Sohag, Gharbia and imported propolis), as well as contents of total phenolic and flavonoid compounds, furthermore the antimicrobial properties of extracts on pathogenic bacterial strains, in terms of yield of the extract highest percentage of extraction yield (%) was recorded in (ME), followed by (UAE), while the lowest by (ME) method with an average 22.75, 19.44 and 14.85% for (MAE), (UAE) and (ME) method respectively, the highest yield of total phenolic and total flavonoid content (regardless of the type of propolis sample) was obtained with (UAE) , followed (ME), while the lowest yield was recorded with (MAE). Ultrasonic-assisted (UAE) was shown to be the most efficient method based on yield, extraction time and selectivity. Screening for antibacterial activity of EEP showed that, New Valley and Gharbia EEP which extracted by (UAE) were given the highest significant inhibition against *Paenibacillus larvae* (25.84 and 22.10 mm), *Escherichia coli* (23.41 and 20.22 mm) and *Salmonella typhimurium* (with diameter zone of 21.24 and 17.53 mm). Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC)

values by New Valley EEP was lowest than values by Gharbia EEP for *Escherichia coli, Salmonella typhimurium* and *Paenibacillus larvae*. New Valley and Gharbia EEP had bactericidal effect against 3 the tested pathogenic bacterial strains. GC-MS Chromatogram of the New Valley and Gharbia propolis samples extracted by (UAE) were identification of chemical composition of EEP was assessed by mass spectral analysis and the retention time RT of each compound.

Key words: Propolis, Propolis traps, Extraction, Antibacterial Activities, *Paenibacillus larvae, Salmonella typhimurium, Escherichia coli* and GC-MS.

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