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Chemical composition and antioxidant/antibacterial depictions of Zahidi date palm (*Phoenix dactylifera*) kernel Oil (2023) *Journal of King Saud University - Science*, 35 (7), art. no. 102817, .

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Abstract

Date palm "Phoenix dactylifera" variety Zahidi is a unique well-known cultivar. Mature fruits are semi-dry, medium size, cylindrically shaped and golden brown. However, there are three stages to harvesting the dates soft, hard or semi-soft. In this research, the oil processed from the seed/kernel of the date palm Zahidi is chemically analysed for its composition, antioxidant capacity and its antibacterial properties were investigated. Date seeds were ground and extracted for the oil. Wet chemical analyses were implemented on the extracted oil via various analytical techniques such as high-performance liquid chromatography (HPLC) and gas chromatography-mass spectrometry (GC-MS). Oil fractions of ethanol, methanol and acetone were tested for antibacterial activity, which was evaluated employing the Kirby-Bauer disc-diffusion method. Antibacterial action was examined for four bacterial strains; two of them representing Gram-positive such as *Bacillus subtilis*, and *Staphylococcus aureus*, and the other two for Gram-negative such as *Pseudomonas aeruginosa* and *Escherichia coli*. The antibiotics tetracycline, chloramphenicol, streptomycin, gentamycin and vancomycin were used as positive standards. The Minimum Bactericidal Concentration (MBC) and Minimum Inhibitory Concentration (MIC) of the bacterial strains were tested and evaluated. The antioxidant activity was evaluated as free-radical scavenging capacity (RSC) towards 2,2 - diphenyl -1-picrylhydrazyl (DPPH[rad]) radicals for the methanol fraction (MF), remaining lipid fraction (LF) and non-fractionated oil, i.e., the total fraction (TF). The RSCs for the MF, LF and TF were 42.5, 9.1 and 68.3, respectively. Zahidi seed/kernel oil extract inhibited all of the test microorganisms, with MICs that ranged from 10 to 42 mg/mL and MBCs were found to be ranged between 21 and 167 mg/mL. These outcomes suggest that the extracts could be developed as a foundation of expected antimicrobial complexes to fight unwanted bacteria in foods. Overall, the results showed that the oil is suitable for food, cosmetics, personal care products and pharmaceuticals. © 2023 The Authors

Author Keywords

Antibacterial; Antioxidant; date palm (*Phoenix dactylifera*); DPPH[rad]; GC-MS; Lipid fraction; Seed oil

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