CHEMICAL COMPOSITION, ANTIOXIDANT AND ANTIBACTERIAL PROPERTIES OF THE OIL EXTRACTED FROM THE SEEDS OF ZAHIDI DATE PALM (PHOENIX DACTYLIFERA)

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Abstract- Date palm "Phoenix dactylifera" (Zahidi) is one of the oldest-known cultivars, it is of medium size, cylindrical, light golden-brown; semi-dry but harvested and sold in 3 stages: soft, medium-hard, and hard. In this research, the chemical composition of the oil processed from the seed of the date palm Zahidi, its antioxidant capacity, and antibacterial properties were investigated. Date seeds were ground and extracted for the oil. Qualitative and quantitative analysis of the oil was carried out using wet chemical analysis as well as a GC-MS technique. Extracted **oil was** tested for possessing antimicrobial activity, which has been evaluated using Petri dish technique using the Kirby-Bauer Disk Diffusion method. Antibacterial activity was examined on four (4) bacterial strains that include (Bacillus subtilis, Staphylococcus aureus, Pseudomonas aeruginosa, and Escherichia coli). Ampicillin and azithromycin were used as positive standards. The minimum inhibitory concentration (MIC) and the minimum bactericidal concentrations (MBC) of the extracted oil were determined. Antioxidant activity was assessed as free radical scavenging capacity (RSC) towards 2,2- diphenyl-1-picrylhydrazyl ($DPPH^{\bullet}$) radicals for methanol fraction (MF) and the remaining lipid fraction (LF) as well as for non-fractioned oil i.e. total fraction (TF). Phenolic compounds in date seed oil were determined according to the high-performance liquid chromatographic (HPLC). The results showed that the oil is edible, suitable for cosmetic, soap and personal care products. This study also showed that Zahidi seed oil extract inhibited all test microorganisms with MIC ranging from 10 to 42 mg/mL and with MBC ranging from 21 to 167 mg/mL. Results revealed that the extracts can be used as a source of natural antimicrobial compounds which can be applied to foods to prevent the growth of undesirable microorganisms. The results also showed the high potential of antioxidant activity since the RSC towards DPPH radical for MF, LF and TF were 42.5, 9.1 and 68.3, respectively. That prevents lipid oxidation that was tested showing low peroxide value of preheated oil.

Keywords- Date Palm (Phoenix dactylifera), Antioxidant, Antibacterial properties, $DPPH^{\bullet}$, GC-MS, Ampicillin, Azithromycin, and Lipid fraction, RSC.