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Antibacterial activities, phytochemical analysis and chemical composition Makhlaseh extracts against the growth of some pathogenic strain causing poisoning and infection

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1 **Antibacterial activities, phytochemical analysis and chemical composition Makhleseh**
2 **extracts against the growth of some pathogenic strain causing poisoning and infection**

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10
11 **Abstract**

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13 The aim of this study was to investigate the antibacterial activities and phytochemical
14 analysis of extracts against the growth of some pathogenic strain causing poisoning and infection
15 (*Staphylococcus aureus*, *Streptococcus pyogenes*, *Staphylococcus epidermidis*, *Enterobacter*
16 *aerogenes*, *Escherichia coli* and *Shigella flexneri*). Makhleseh components were identified via
17 gas chromatography/mass spectrometry (GC/MS). Total phenolic content (TPC), alkaloids,
18 tannins and saponins were determined. Antioxidant activity was determined calorimetrically for
19 2,2-diphenyl-1-picrylhydrazyl (DPPH) scavenging activity. Antimicrobial effect of extracts was
20 evaluated by five methods, pour plate, well diffusion, disk diffusion, minimum inhibitory
21 concentration (MIC), and minimum bactericidal concentration (MBC). Camphor was the major
22 compound of Makhleseh. The TPC of aqueous and ethanolic Makhleseh extracts was equal to
23 79.45 ± 1.15 and 115.26 ± 1.23 $\mu\text{g GAE/mg}$, respectively. The antioxidant activity (IC_{50}) test of
24 aqueous and ethanolic Makhleseh extracts showed 315.50 ± 1.12 and 118.35 ± 1.08 $\mu\text{g/ml}$,
25 respectively. MIC of the aqueous extract of Makhleseh for *Enterobacter aerogenes*, *Escherichia*
26 *coli*, *Shigella flexneri*, *Staphylococcus aureus*, *Staphylococcus epidermidis* and *Streptococcus*
27 *pyogenes* were 32, 32, 16, 16, 8 and 8 mg/ml, respectively, and the MIC of the ethanolic extract
28 were 16, 16, 16, 8, 4, and 4 mg/ml, respectively. The MBCs of the Makhleseh extracts varied
29 from 4 mg/ml to 128 mg/ml. Increasing concentration of Makhleseh extracts had a significant
30 effect ($p \leq 0.05$) on inhibition zone diameter. In conclusion, using Makhleseh extracts as a natural
31 antibacterial composite *in vitro* have significant antibacterial ability over the studied strains.

32 **Keywords:** Makhleseh, Extracts, Antimicrobial effect, Phytochemical analysis.

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