

UNIVERSITI TEKNOLOGI MARA

**ANTIOXIDANT, ANTIBACTERIAL
ACTIVITY AND PHYTOCHEMICAL
SCREENING OF ETHANOLIC
SEEDS EXTRACT OF LIBYAN
Peganum Harmala AND
*Cuminum Cyminum***

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MSc

June 2021

AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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Dissertation Title : Antioxidant, Antibacterial Activity And
Phytochemical Screening of Ethanolic Seeds Extract
of Libyan Peganum Harmala and Cuminum
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ABSTRACT

Self-medication using medicinal plants for prevention and treatment purposes is very common in Libya due to its rich biodiversity. Therefore present study was carried out to assess the antioxidant and antimicrobial activities as well as the phytochemical screening of ethanol extracts of Libyan *Peganum harmala* and *Cuminum cyminum* seeds. The antioxidant activity of extracts was determined by free radical scavenging activity using DPPH. The antimicrobial activity against two Gram-negative (*S. typhi* ATCC 14028 and *E. coli* ATCC 25922) and two Gram-positive bacteria (*B. subtilis* ATCC 6633 and *S. aureus* ATCC 33591) was determined using the broth dilution method. The minimum inhibitory concentration (MIC) and minimum bactericidal concentrations (MBC) of the crude extracts were determined using a resazurin assay. The phytochemical screening was done using Gas Chromatography-Mass Spectrometry. The IC₅₀ value of the ethanol extract of *P. harmala* was 179.62 µg/mL while that of *C. cyminum* was 70.02 µg/mL. The MIC result for ethanolic extract of Libyan *C. cyminum* against *S. typhi* ATCC 14028, *E. coli* ATCC 25922, *B. subtilis* ATCC 6633 and *S. aureus* ATCC 3359 were 31.25 mg/mL, 31.25 mg/mL, 1.95 mg/mL, and 15.62 mg/mL, respectively. Meanwhile, MIC values for ethanolic extract of Libyan *P. harmala* against *S. typh*, *E. coli* ATCC 25922, *B. subtilis* ATCC 6633 and *S. aureus* ATCC 3359 were 1.95 mg/mL, 15.62 mg/mL, 3.9 mg/mL, and 3.9 mg/mL, respectively. In the GCMS analysis of Libyan *P. harmala*, eight different compounds were identified. The highest compounds in the seed ethanolic extract of Libyan *P. harmala* were harmine and harmaline with high peak areas of 51.98 and 42.93%, respectively. On the other hand, nine different compounds were identified in the ethanolic extract of *C. cyminum*, with the most abundant being 9-octadecanoic acid, oleic acids, and 5-hydroxymethylfurfural with peak areas of 32.65, 32.65, and 10.31%, respectively. The results indicated that the ethanolic extracts of these seeds have antioxidant and antimicrobial activities against the tested bacteria possibly due to the presence of phytochemicals compounds. The Libyan seeds, tested in this study, may be potential sources for the isolation of natural antioxidant and antimicrobial compounds.

ACKNOWLEDGEMENT

Firstly and foremost, all praise and gratitude be to Allah for making everything possible for me throughout this journey and showering his blessings upon me. Secondly, I would like to express my deep and sincere gratitude and appreciation to my supervisor Assoc. Prof Dr. Norrizah Jaafar Sidik for her endless support and invaluable guidance throughout this research. I would also like to extend my appreciation to my co-supervisor Dr. Aziyah Abdul Aziz. Thank you to all my family members and friends for your continuous support. Finally, this thesis is dedicated to my parents for their continuous love, support, and encouragement. Alhamdulillah.

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