

Phytochemical Composition, Antimicrobial Potential and Antioxidant Activity of Peganum harmala L. Extracts

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Abstract : The aim of this study was to assess the antimicrobial and antioxidant potential and phytochemical composition of Peganum harmala L. For this purpose, powdered shoot, root, and seed samples were extracted in an accelerated solvent extractor (ASE) with methanol, ethanol, acetone, and dichloromethane. The residues were reconstituted in the above solvents and 10% dimethyl sulphoxide (DMSO). The antimicrobial activity of these extracts was tested against two bacterial (Escherichia coli E49 and Staphylococcus aureus CCUG 43507) and two fungi Candida albicans ATCC 24433, Candida glabrata ATCC 15545) strains using the well-diffusion method. The minimum inhibitory concentration (MIC) and growth pattern of these test strains were determined using microbroth dilution method, and the phospholipase assay was performed to detect tissue damage in the host cells. Results revealed that ethanolic, methanolic, and dichloromethane extracts of seeds exhibited significant antimicrobial activities against all tested strains, whereas the acetone extract of seeds was effective against E. coli only. Similarly, ethanolic and methanolic extracts of roots were effective against two bacterial strains only. One sixth of percent (0.6%) yield of methanol extract of seeds was found to be the MIC for Escherichia coli E49, Staphylococcus aureus CCUG 43507, and Candida glabrata ATCC 15545. Overall, seed extracts had greater antimicrobial activities compared to roots and shoot extracts. The original plant extract and MIC dilutions prevented phospholipase secretion in Staphylococcus aureus CCUG 43507 and Candida albicans ATCC 24433. The 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging assay revealed radical scavenging activities ranging from $71.80 \pm 4.36\%$ to $87.75 \pm 1.70\%$. The main compound present in the root extract was 1-methyl-7-methoxy-beta-carboline (RT: 44.171), followed by norlapachol (3.62%), benzopyrazine (2.20%), palmitic acid (2.12%) and vasicinone (1.96%). In contrast, phenol,4-ethenyl-2-methoxy was in abundance in the methanolic extract of the shoot, whereas 1-methyl-7-methoxy-beta-carboline (79.59%), linoleic acid (9.05%), delta-tocopherol (5.02%), 9,12-octadecadienoic acid, methyl ester (2.65%), benzene, 1,1-1,2 ethanediyl bis 3,4dimethyl (1.15%), anthraquinone (0.58%), hexadecanoic acid, methyl ester (0.54%), palmitic acid (0.35%) and methyl stearate (0.18%) were present in the methanol extract of seeds. Major findings of this study, along with their relevance to developing effective, safe drugs, will be discussed in this presentation.

Keywords : medicinal plants, secondary metabolites, phytochemical screening, bioprospecting, radical scavenging

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