

Analysis of phenolic contents and biological activities of wild mint, *Mentha longifolia* (L.) L.

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In alternative and complementary medicine, plant-based remedies have prominent roles. Here, we analysed the wild mint, *Mentha longifolia* (L.) L. collected from Mangesh/Duhok (Iraq) for its phenolic and essential oil content, total antioxidant status (TAS) and total oxidant status (TOS), DPPH free radical scavenging activity, antibacterial, antiproliferative, and DNA protecting activities. Specifically, a Soxhlet apparatus was used to extract the aerial portions of the plant with methanol as well as dichloromethane. The GC-MS instrument measured the amount of essential oils present. A high-performance liquid chromatography (HPLC) was used to analyse the phenolic composition. A Rel Assay kit was used to determine the TAS and TOS levels. Further, DPPH assay was used to quantify antioxidant capacity; MTT assay for antiproliferative efficacy against A549 cancer cell line; and the ability to shield pBR322 supercoiled DNA was tested. Standard bacteria and fungus strains were used in an agar dilution assay to measure antimicrobial activity. The results demonstrated the plant's capacity to inhibit cell proliferation, low DPPH activity, and significant antimicrobial activity. The plant was found to have TAS value of 2.860 mmol/L, TOS value of 14.858 $\mu\text{mol/L}$, and an OSI (oxidative stress index) value of 0.522. At 200 $\mu\text{g/mL}$, the plant extract exhibited DNA-protective effect. The GC-MS study also found the presence of four different chemicals [1-isopropyl-4-methyl-1,4-cyclohexadiene ($\text{C}_{10}\text{H}_{16}$), pulegone ($\text{C}_{10}\text{H}_{16}\text{O}$), phenol, 2-methyl-5-(1-methylethyl) ($\text{C}_{10}\text{H}_{14}\text{O}$) and caryophyllene ($\text{C}_{15}\text{H}_{24}$)]. Further, we identified the following phenolic acids: gallic acid, catechin, cinnamaldehyde, chlorogenic acid, coumaric acid, benzoic acid and hydroxy-benzoic acid.

Keywords: Antimicrobial, Antioxidant, Antiproliferative, DNA protective, Horse mint, Silver mint, Spearmint