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Chemical Composition, in vitro Antioxidant Activity and Gas Chromatography–Mass Spectrometry Analysis of Essential Oil and Extracts of Ruta chalpensis aerial Parts Growing in Tunisian Sahara

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Abstract : Ruta chalpensis L. is a medicinal plant in the family of Rutaceae, has been used as an important traditional in the Mediterranean basin in the treatment of many diseases. The current study was devoted to investigate and evaluate the chemical composition, total phenolic, flavonoid and tannin contents, and in vitro antioxidant activities of ethyl acetate, ethanol and hydroalcoholic extracts and essential oil from the aerial parts of Ruta chalpensis from Tunisian Sahara. Total phenolic, flavonoid and tannin contents of extracts ranged from 40.39 ± 1.87 to 75.13 ± 1.22 mg of GAE/g, from 22.62 ± 1.55 to 27.51 ± 1.04 mg of QE/g, and from 5.56 ± 1.32 to 10.89 ± 1.10 mg of CE/g respectively. Results showed that the highest antioxidant activities was determined for ethanol extract with IC50 value of 26.23 ± 0.91 µg/mL for 2,2-diphenyl-1-picrylhydrazyl assay, and for hydroalcoholic extract with EC50 value of 412.95±6.57 µg/mL and 105.52±2.45 mg of α-tocopherol/g for ferric reducing antioxidant power and total antioxidant capacity assays, respectively. Furthermore, Gas Chromatography–Mass Spectrometry (GC-MS) analysis of essential oil led to identification of 20 compounds representing 98.96 % of the total composition. The major components of essential oil were 2-undecanone (39.13%), 2-nonanone (25.04), 1-nonene (13.81), and α-limonene (7.72). Spectral data of Fourier-transform infrared spectroscopy analysis (FT-IR) of extracts revealed the presence of functional groups such as C= O, C−O, −OH, and C−H, which confirmed its richness on polyphenols and biological active functional groups. These results showed that Ruta chalpensis could be a potential natural source of antioxidants that can be used in food and nutraceutical applications.

Keywords : antioxidant, FT-IR analysis, GC-MS analysis, phytochemicals contents, Ruta chalpensis
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