

Chemical Composition and Biological Investigation of *Halpophyllum tuberculatum* A. Juss (Rutaceae) Essential Oils Growing in Libya

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Abstract : The essential oils from the aerial parts and flowers of *Haplophyllum tuberculatum* (Forsskal) A. Juss (Rutaceae) growing in Libya were obtained separately by hydro-distillation using a Clevenger-type apparatus. The essential oils yield were (0.4, 1.5w/w%) respectively based on the dry weight of the plant. The oils were analyzed by GC-MS. Twenty four constituents, amounting to 96.6%, were identified in the oil of the aerial parts. The predominant compounds were among the non oxygenated terpenoids (82.4%) as monoterpene hydrocarbons, represented by sabinen (26.4 %), δ -terpinen (26 %), β -phellandrene (10.4%) and 3-carene (3.86%). Zingiberine (0.4%) and β -sesquiphellandrene (0.12%) were the major sesquiterpene hydrocarbons identified. Oxygenated monoterpenes were represented by eucalyptol (5.5%) and piperitone (5.55%). Twenty six constituents, equivalent to 99.5%, were identified in the oil of the flowers. The dominance of monoterpene hydrocarbons in the flowers oil can be attributed to the high percentage of γ -terpinen (38.44%), β -phellandrene (10.0%), α - phellandrene (2.33%), 3,4-dimethyl-1,5-cyclooctadiene (6.67%), β -myrecene (6.04%), 3-carene (5.43%) and α -pinene (1.3%). While the oxygenated monoterpenes can be contributed to the trans-piperitol (4.67%) and piperitone (2.07%). Sesquiterpene hydrocarbons were not identified in the oil of the flower of *H. tuberculatum*. Variation in constitution between oils of Libyan *H. tuberculatum* and that obtained from other countries can be due to both environmental and genetic factors. The essential oils have demonstrated variable antimicrobial activities against certain micro-organisms. Also have revealed marked in vitro cytotoxicity against lung (H1299), liver (HEPG2) carcinoma cell line and variably effective as anti-inflammatory and antioxidant.

Keywords : *Halpophyllum tuberculatum*, rutaceae, essential oil, antimicrobial, anti-inflammatory, antitumor, antioxidant, Libya

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