

## Chemical Composition and Antioxidant Activity of Essential Oils, Supercritical CO<sub>2</sub> Extracts and their Solide Residue of *Teucrium Polium* L. Growing in Algeria

Hamdi Bendif<sup>1,2\*</sup>, Mohamed Harir<sup>2</sup>, Mohamed Djamel MIARA<sup>3</sup>, Venskutonis Petras Rimantad<sup>4</sup> and Filippo Maggi<sup>5</sup>

<sup>1</sup>Department of Natural Sciences, Ecole Normale Supérieure (ENS), Algeria

<sup>2</sup>Natural and Life Sciences Department, University Mohamed Boudiaf - M'sila, Algeria

<sup>3</sup>Department of Biology, University Ibn Khaldoun, Tunisia

<sup>4</sup>Department of Food Science and Technology, Kaunas University of Technology, Lithuania

<sup>5</sup>School of Pharmacy, University of Camerino, Italy

To contribute to the valorisation of local medicinal plants, we studied the very common plant in traditional medicine, known as *Teucrium Polium* (Lamiaceae). Extraction of essential oil by hydrodistillation and lipophilic fractions using the supercritical fluid extraction (SFE) from *T. polium* L., collected in Algeria were performed. The extracts were analyzed by GC-MS. SFE method, showing higher extraction yields (0.86%) than hydrodistillation (0.66%). Quantitative and qualitative analysis showed that essential oils (114 compounds) and SFE-CO<sub>2</sub> (51 compounds) revealed a polymorphism and hence the oils are characterized by a high content of sesquiterpene (germacrene D, 13.8%), also the SFE-CO<sub>2</sub> extract are characterized by sesquiterpene (germacrene D, 7.8%). Marked qualitative and quantitative differences could be used as chemotaxonomic markers. Quantitative analysis showed that plant material before SFE-CO<sub>2</sub> was the most active and possessed TEAC<sub>DPPH•</sub> (64.32 mg TE/g DWP) and TEAC<sub>FRAP</sub> (67.75 mg TE/g DWP), as well as it was the strongest followed by plant material after SFE-CO<sub>2</sub> (59.08 mg TE/g DWP) and (56.81 mg TE/g DWP). At the end a very low activity for essential oils (19.14mg TE/g DWP) and (20.21mg TE/g Ex), followed by SFE-CO<sub>2</sub> extracts (0.24mg ET/gEx and 1.55mg ET/g Ex) for TEAC<sub>DPPH•</sub> and TEAC<sub>FRAP</sub> respectively.

**Keywords:** Antioxidant activity, Quencher Approach, GC-MS, Essential oil, SFE-CO<sub>2</sub>, *Teucrium polium*.