



DETERMINATION OF ESSENTIAL OIL COMPOSITION, PHENOLIC CONTENT, AND ANTIOXIDANT, ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF MARIGOLD (*CALENDULA OFFICINALIS* L.) CULTIVATED IN ALGERIA

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ABSTRACT

Microwave-assisted hydrodistillation (MAHD) was used as an ecofriendly method to extract the essential oils from flowers and leaves of *Calendula officinalis* L. cultivated in Algeria. The results obtained were compared with the conventional extraction method, hydrodistillation (HD), and analyzed by gas chromatography-flame ionization detector (GC-FID) and GC-MS. For flowers oils, 33 compounds were identified with HD method vs 20 compounds with MAHD method. For leaves, 26 compounds were identified with HD method vs 19 compounds identified with MAHD method. It is interesting to note, furthermore, that the use of MAHD method during 90 min allowed us to obtain relatively similar yields than HD method during 180 min. The main abundant volatile constituent was α -cadinol with 31.9±0.71% for HD vs 39.7±0.26% for MAHD in leaves oils and 32.3±0.26% for HD vs 37.1±0.30% for MAHD in flowers oils. The oxygenated sesquiterpens was the most represented group of natural compounds contributing to the chemical composition in all oils. In the other hand, extraction of total phenolic compounds (TPC) and total flavonoids (TFC) was affected by the solvent type and, thus, 100% methanol was the better extraction solvent for both leaves and flowers. Highest levels were obtained from leaves. The highest antioxidant activity was recorded for leaves extract with 100% methanol. These values indicated a weak antioxidant activity compared to antioxidant standards. A correlation was established between the phenolic and flavonoids contents and the antioxidant activity of the crude extracts. A moderate to great antibacterial activity was observed against Gram⁺ bacteria. Any antibacterial activity was detected against fungi strains and Gram⁻ bacteria.
