Chemical composition and antioxidant activity of *Tagetes caracasana* essential oil

Gustavo A. Rodríguez, Jairo R. Martínez, Elena E. Stashenko*

Research Center for Biomolecules-CIBIMOL, Chromatography and Mass Spectrometry Research Center CROM-MASS, Research Center of Excellence CENIVAM, Universidad Industrial de Santander, Carrera 27, Calle 9, Edificio 45, Bucaramanga, Colombia
*elena@tucan.uis.edu.co

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Plants of the genus *Tagetes* (Asteraceae family), commonly known as marigolds are grown as ornamental plants and can be grown in a variety of climates. The *Tagetes* genus comprises about 30 species, distributed in South America, Central America and Mexico. Bioactive extracts from different parts of the plants belonging to this genus exhibit nematicide, fungicide and insecticide activity (1). Two specimens of *Tagetes caracasana* were collected in the municipalities of Aratoca and Zapatoca, Santander, Colombia. These were identified in the National Herbarium of Colombia, with Voucher N° 560984 (T1, Aratoca) and 579244 (T2, Zapatoca). The essential oil (EO) extraction was performed by microwave radiation-assisted hydrodistillation. Characterization of essential oils was performed with an Agilent Technologies 6890 gas chromatograph (GC) coupled to a mass selective detector MSD 5973 Plus Network. Polar [DB-WAX, 60 m × 0.25 mm × 0.25 µm with stationary phase of poly (ethylene glycol)] and nonpolar [DB-5MS, 60 m × 0.25 mm × 0,25 µm stationary phase with 5% phenyl-poly(methylsiloxane] capillary chromatographic columns were used. Oven temperature was programmed from 45°C to 150°C at 4°C/min, was maintained for 7 min, and then from 150°C to 230°C at 4°C/min and held for 40 min. The oxygen radical absorption capacity (ORAC) assay was performed in a multiplate reader (Turner Biosystems). Essential oil extraction yields of 0.1% (T1) and 1.49% (T2) were obtained. The chemical characterization was based on mass spectra (EI, 70eV) and retention indices. The major components for the Aratoca collected species were: limonene (14%), diosphenol (13.5%), terpinolene (7.1%), piperitone (5.7%), *p*-cimen-8-ol (5.2%) and a not identified sesquiterpenoid ($C_{10}H_{14}O_2$, 9.3%). The major components for the Zapatoca collected species were, *trans*-ocimenone (16.9%), dihydrotagetone (7.4%), *cis*-tagetone (7.2%), and *cis*-ocimenone (7.1%). Armas *et al*. (2), studied the chemical composition of plants that belong to this genus, the main components were: *T. caracasana*, *trans*-ocimene (64%) and *cis*-tagetone (14%); *T. erecta*, piperitenone (36%) and terpinolene (22%); *T. subulata*, terpinolene (26%), piperitenone (13%), limonene (11%). The ORAC antioxidant activity values of the studied EO were 1930 ± 15 µmol Trolox®/g sample (T1) and 1120 ± 67 µmol Trolox®/ g sample (T2), which were superior to those of the reference substances, α-tocopherol (550 ± 13 µmol Trolox® / g sample) and BHT (457 ± 9 µmol Trolox®/g sample).

1. Xu, L.W.; Chen, J.; Qi, H.Y.; Shi, Y.P. Chinese Herbal Medicines, 2012, **4**, 103-117.
2. Armas, K.; Rojas, J.; Rojas, L.; Morales, A. Nat Prod Commun., 2012, **7**, 1225-1226.

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