Antioxidant effect of essential oil of the flowers and leaves of *Tagetes minuta*

**Castro, M. 1,2; Oliveira, D.H.1; Martinez, D.1,2; Schiedeck, G.; Alves, D.1; Savegnago, L. 2; Jacob, R.G.1;**

1Centro de Ciências Químicas, Farmacêuticas e de Alimentos - Laboratório de Sintese Orgânica Limpa - LASOL - UFPel - Brazil. 2Centro de Desenvolvimento Tecnológico - CDTec, Unidade Biotecnologia, Grupo de Pesquisa em Neurobiotecnologia (GPN) - UFPel - Brazil. 3EMBRAPA - Clima Temperado. *(micheli.castro@gmail.com)*

**Keywords: essential oil, Tagetes minuta, antioxidant**

**Introduction**

Reactive oxygen species (ROS) are an inevitable product of cellular respiration, the cells have sophisticated antioxidant systems to maintain the balance of ROS. However, disruption in homeostasis cellular can result in oxidative stress and tissue injury.

Thus, it is believed that exogenous antioxidant compounds could be employed to improve situations in which oxidative damage is implicated. In fact, intensive research has been performed for the extraction, characterization and utilization of natural antioxidants, which may serve as candidates in combating the aging process. Essential oils (EO) are volatile, natural, complex mixtures composed of secondary metabolites that are concentrated in the leaves, bark, flowers or fruits of aromatic plants. Therefore this study sought to evaluate the antioxidant effect of essential oil from flowers and leaves of *T. minuta* by neutralization DPPH and ABTS radical's assays. This plant native to South America, which is widely known in Argentina, and it is vulgarly called “chinchilla”. This essential oil (EO) has wide applications as flavoring and in perfume.

**Results and Discussion**

The plant *T. minuta* were collected from a research orchard (germplasm collection of Embrapa Clima Temperado, Pelotas, RS, Brazil). This essential oil was extracted by hydro-distillation, of the flowers and leaves, and analyzed by GC/MS. So the major components identified in essential oil of flowers and leaves were (Z)-Tagetone (71.5%) and dihydrotagetone (58.1%), respectively.

![Figure 1. Major compounds presents in essential oil of flowers and leaves.](image)

Assays based upon the use of DPPH and ABTS radicals are among the most popular spectrophotometric methods for determination of antioxidant capacity. The figure 2a and b, showed the significant increase in the percentage of inhibition of the DPPH radicals caused by flowers and leaves EO of *T. minuta*. The figure 2c and d demonstrated an ability scavenge ABTS radicals of the flowers and leaves EO from the 10 and 50 µg/mL concentrations, respectively.

![Figure 2: Antioxidant activity of EO Tagetes minuta: DPPH radical-scavenging activity of flowers (a) and leaves (b); ABTS radical-scavenging activity of flowers (c) and leaves (d). Values are expressed in percentage of inhibition in relation to a control group without essential oil. Each value is expressed as a mean ± standard deviations (n = 3). *p < 0.05, **p < 0.01 and ***p < 0.001 when compared with respective control group without essential oil (one-way ANOVA followed by Newman-Keuls multiple comparison test).](image)

Regarding the major compound of the flowers and leaves EO *Tagetes minuta*, the literature revealed that terpenes are strong antioxidants. However, the antioxidant effect of EO cannot be attributed to their major components because minor compounds are likely play a significant role in the observed activity and synergistic effects also been reported.

**Conclusions**

The essential oils are a source of natural components with promising pharmacological properties. The EO of the flowers and leaves of *T. minuta* showed antioxidant activity in neutralization DPPH and ABTS radical’s assay.

**Acknowledgements**

The financial support by FAPERGS, CAPES, CNPq, UFPEL, PPGQ, EMBRAPA.

---

2 Ozum et al.; Food Chem. 2011, 124, 48-64.