

Composition and Biological Activities of *Thymus kotschyanus* Essential Oil

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Abstract

Essential oils (EOs) are some of the outstanding compounds found in *Thymus* that can exert antifungal, phytotoxic, and insecticidal activities, which encourage their exploration and potential use for agricultural and food purposes. The essential oils (EO) obtained from *Thymus kotschyanus* collected in the East Azerbaijan Province (Iran) were characterized using a gas chromatography-mass spectrometry (GC-MS) analysis. Thymol was the most important compound (60.48%), although 35 other active compounds were identified in the EO. Significant amounts of carvacrol (3.08%), p-cymene (5.56%), and γ-terpinene (6.67%) were found in the EO. The *T.kotschyanus* EO was tested against important phytopathogenic fungi (*Botrytis cinerea*, *Aspergillus niger*, and *Penicillium expansum*). The antifungal assay showed that the use of ≥500 ppm of EO resulted in a fungicidal effect against all funguses tested. In a similar way, the use of ≥500 ppm of EO inhibited the germination of all crop weed seeds (*Amaranthus retroflexus* L. and *Panicum miliaceum* L.) and their subsequent growth, which demonstrated its herbicidal effect. Finally, the insecticidal capacity of *T. kotschyanus* EO was also observed against selected insects (*Oryzaephilus surinamensis* and *Sitophilus oryzae*). *O. surinamensis* was more susceptible to the effect of EO (LC50 = 4.78 μL/L air) than *S. oryzae* (LC50 = 13.20 μL/L air). The obtained results of the present study can provide new safe resources to the development of new products for the food, agriculture, and pharmaceutical industries.



Biography

Ghasemi G is the faculty of the agricultural department in Tarbiat Modares University. He has several ISI articles and the editor of a reputable journal.

Publications

1. Phytochemical properties of essential oil from *Artemisia sieberi* Besser (Iranian accession) and its antioxidant and antifungal activities
2. Composition, Antifungal, Phytotoxic, and Insecticidal Activities of *Thymus kotschyanus* Essential Oil
3. Lemon verbena (*Lippia citrodora*) essential oil effects on antioxidant capacity and phytochemical content of raspberry (*Rubus ulmifolius* subsp. *sanctus*)
4. A new source of oxygenated monoterpenes with phytotoxic activity: essential oil of *Cuminum Cyminum* L. from Iran
5. Antioxidant and antifungal activities of a new chemovar of cumin (*Cuminum cyminum* L.)

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