

Herbicide effect of Greek oregano essential oil on metabolite profiles of target plants



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Target Plant Species

Dasypyrum villosum (L.) Borbás
Matricaria chamomilla L.
Sinapis arvensis L.
Lolium perenne L.
Trifolium repens L.
Trifolium pratense L.

In the present study herbicidal potential of Greek oregano essential oil was assessed by *in vivo* experiment treating seedlings of six plant species with an aqueous solution of the essential oil. In addition, aerial parts of surviving individuals were analyzed for content of main metabolites by GC/MS. Data on metabolic changes complement the assessment of the phytotoxic potential of the essential oil.

Herbicide effect of *O. vulgare* ssp *hirtum* on *T. pratense* seedling. A - plants treated with 10 µg/mL essential oil solution; B - plants treated with 5 µg/mL; C - controls, untreated individuals



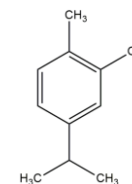
The essential oil was applied on target plants at post-emergence state at 5 and 10 µg/mL concentrations by spraying. The effect was reported on the seventh day after treatment and expressed as lethality percentage.

Phytotoxic effect of the essential oil on all studied plants was established. Poaceae species were found to be the most resistant. Strong impact was found at the highest applied concentration (10 µg/mL) furthermore complete destruction was observed for *M. chamomilla*, *S. arvensis*, *T. repens* and *T. pratense*.

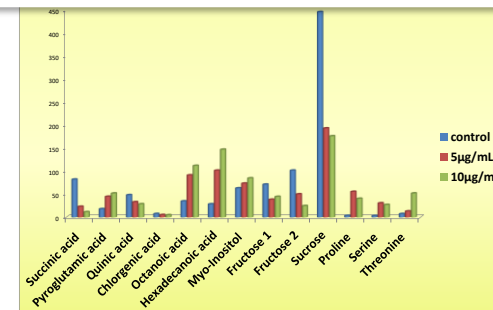
The noted metabolic changes in the treated plants with oregano essential oil show that it has a phototoxic activity comparable to the effects of abiotic stress factors.

Donor species *O. vulgare* ssp. *hirtum*

Carvacrol – main component of the essential oil of the species



Methabbolite changes in *Lolium perenne* plants after treatment of essential oil solutions at 5 and 10 µg/mL concentration



The results obtained clearly characterize Greek oregano essential oil as a potent bio-herbicide for organic farming