

Allelopathic effects of *Satureja hortensis* and its essential oil on the germination of selected species



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The genus *Satureja* includes about 800 species (Siedelmann, 2005). Two species, winter savory (*Satureja montana* L.) and summer savory (*Satureja hortensis* L.) are grown in the Czech Republic. The flowering stem of savory contains mainly thymol, cymene, carvacrol, terpinene, triterpenes and flavonoids. Most essential oils and aromatic substances are contained in young leaves or flowers at stage of flowering. In addition to the known use in the food industry, savory can also be used in the plant protection. Savory essential oil has been effective against pests or phytopathogenic fungi such as peach aphid (*Myzus persicae*), potato beetle (*Leptinotarsa decemlineata*) (Navarro-Rocha et al., 2019) or fungus *Botrytis cinerea* (Boyras and Özcan,

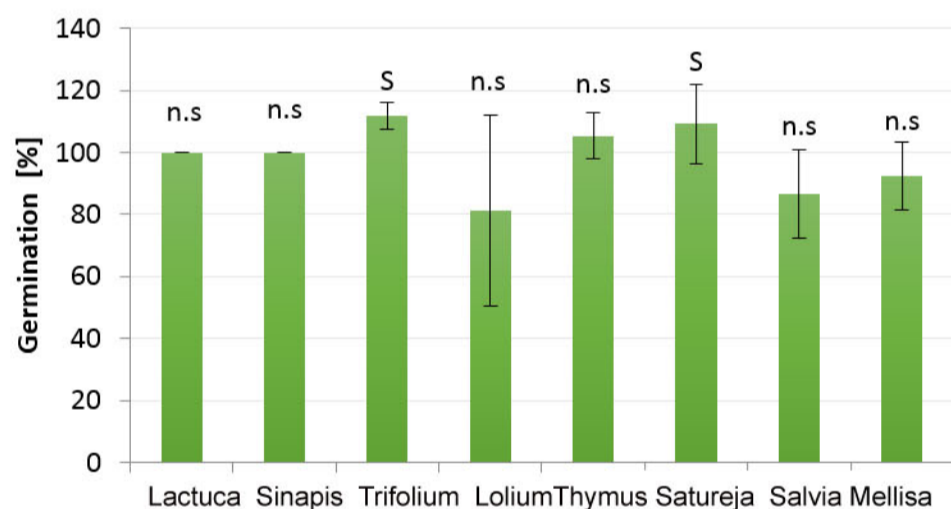


Methods

Allelopathic effects of winter savory (seeds, flowers and essential oils) were investigated against 8 species (*Sinapis alba* L., *Lactuca sativa* L., *Trifolium repens* L., *Lolium multiflorum* Lam., *Satureja hortensis* L., *Thymus vulgaris* L., *Melissa officinalis* L. and *Salvia officinalis* L.). The effect of different concentrations (10, 50 and 100 μl) of the essential oil (company Salus) or fresh flowers (0, 500 and 1000 mg) on germination, the root and shoot length and the dry weight selected species was determined ($25\pm 1^\circ\text{C}$) after 6 days cultivation. The essential oil or flowers was applied to the source well in a tissue culture experiment plate, the seeds were put on the filter paper with 0.5 ml of distilled water in a well. Each well contained 6 seeds of the tested species. In the seed test, 30 seeds of savory were placed on filter paper with 3 ml of distilled water in a Petri dish alternately with 30 seeds of the test plant species. Only savory seeds were used as control.



The influence of savory seeds on germination tested species

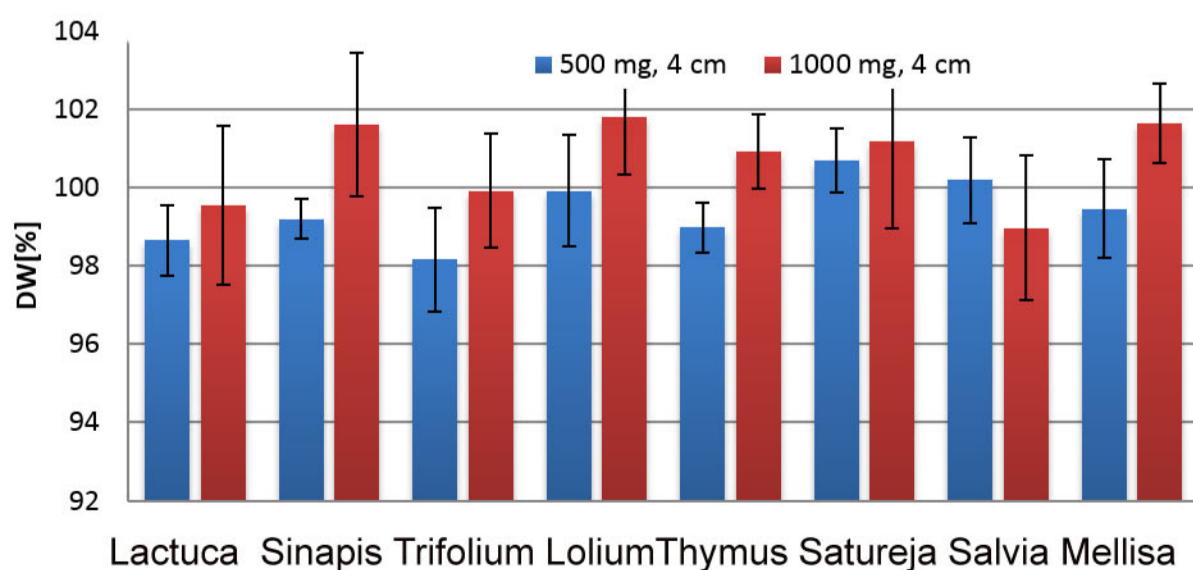


Results

The influence of savory essential oil on the sprout length (average of four replicates) of selected species.

Dose [μl]	Distance [cm]	<i>Lactuca</i>	<i>Sinapis</i>	<i>Trifolium</i>	<i>Lolium</i>	<i>Satureja</i>	<i>Thymus</i>	<i>Salvia</i>	<i>Mellisa</i>
0		1,71	2,53	1,96	1,55	1,17	0,79	0,32	0,64
100	4	0,6	1,5	0,3	0	0,2	0	0	0
	8	1,1	2,1	1,2	0,3	0,7	0,2	0,1	0,1
50	4	0,6	1,5	0,5	0,7	0,2	0,03	0,3	0
	8	1,6	2,0	1,4	0,8	0,7	0,3	0,4	0,2
10	4	0,6	2,3	0,5	0	0,2	0	0	0
	8	1,7	2,6	1,7	0,7	0,5	0	0	0

The influence of satureja flowers on dry weight of selected species



The insignificant effect of germinating seeds of winter savory on the growth and germination of most of the tested species suggests that winter savory uses as allelopathics mainly volatile substances that are formed in the plant during the growth. The presence of winter savory flowers had a positive effect on germination in *S. alba*, *L. multiflorum*, *M. officinalis*, and *S. officinalis*. The highest inhibition of germination and seed growth of most tested plants had essential oil. This proves the strong effect of savory essential oil and its possible use as a bioherbicide.

ACKNOWLEDGMENT

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