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Evaluation of Allelopathic Effects of Fenugreek Extract on Germination and Growth of Some Crop and Weed Species

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Abstract

Allelopathy refers to the beneficial or harmful effects of one plant on another plant through the release of chemicals from plant parts by leaching, root exudation, volatilisation, residue decomposition and other processes in both natural and agricultural systems. Allelochemical concentrations in the producer plant may also vary over time and is produced in the plant tissue.

In order to study the effects of different organ extracts of fenugreek (*Trigonella gracum*) on germination of some crops and weeds an experiment was conducted as a completely randomised design with 3 replications at the Ferdowsi University of Mashhad, Iran. Factors included 4 crops: soybean (*Glycine max*), sesame (*Sesamum indicum*), pigweed (*Amaranthus retroflexus*) and velvetleaf (*Abutilon theophrasti*) and the extract of different Fenugreek organs (leaf, stem, seed, pod and total organs) were applied at 4 levels: check, 4, 8, 32 and 64 g powder l⁻¹ distilled water.

The results showed that the reactions of the crops and the weeds depended on the concentrations of the different organ extracts. Fenugreek extract not only reduced seedling growth of different species, but also inhibited seed germination. Negative and significant correlation was observed between the germination percentage and different concentrations of Fenugreek organs. A minimum regression slope could be obtained for the stem extract. Root and shoot length showed also a negative and significant correlation with the Fenugreek extract concentrations for all crops except for soybean. In general, velvetleaf was the most sensitive for fenugreek allelochemical. Alternatively, application of allelopathic compounds before, together, or after the application of synthetic herbicides could increase the overall effect of both materials. In this way, application rates of synthetic herbicides could be reduced.

Keywords: Allelopathy, fenugreek, *Trigonella gracum*, soybean, *Glycine max*, pigweed, *Amaranthus retroflexus*, sesame, *Sesamus indicum*, velvetleaf, *Abutilon theophrasti*