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Allelopathy as an Alternative Method for Weed Control in Saffron Fields: A Suitable Approach to Sustainable Agriculture

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Abstract

Allelopathy, the chemical mechanism of plant interference, can affect many aspects of plant ecology including plant occurrence, growth, succession, structure plant community, dominance, diversity, and plant productivity. An allelopathic plant can potentially be used to control weeds. In a rotational sequence, when an allelopathic plant is left as a residue or mulch, especially in low-till systems, could control subsequent weed growth. Allelopathy is characterised by a reduction in plant emergence or growth, reducing their performance in the association. To study the effect of saffron (*Crocus sativus* L.) extract on germination of *Rapistrum rogosum* and *Gypsophilla pillosa*, an experiment was conducted in a completely randomised design with 3 replications at Ferdowsi University of Mashhad, Iran. Treatments included the extract of saffron seeds and leaves at 5 levels (check, 0.5, 1, 1.5, and 2%). Results indicated that seed extract did not affect germination percentage significantly, but seed germination was affected by different concentrations of leaf extract. With increasing concentration of leaf and seed extract decreased the rate of germination, shoot length, root length and seedling dry weight of *Rapistrum rogosum* and *Gypsophilla pillosa*. On the whole, *Rapistrum rogosum* was more tolerance than *Gypsophilla pillosa* and root length was more sensitive then shoots length to saffron extract. From a holistic poit of view, research potential and use of allelopathy in an agroecosystem is very wide. The richness of agricultural techniques, crop rotation, cover cropping, and related practices allow researchers to evaluate and make use of allelopathic chemicals for weed management in agricultural systems.

Keywords: Allelopathy, biological control, saffron, weeds