Effects of savory essential oil on germination parameters of Fusarium infected-seeds of wheat (*Triticum aestivum* L.)

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Abstract

High use of synthetic pesticides has detrimental effects on the environment. An alternative option is application of natural pesticide compounds. The aim of this study was to evaluate the possibility of replacing Vitavax with savory essential oil to inhibit physiological damages to wheat (*Triticum aestivum* L.) seeds caused by *Fusarium oxysprum.* A pot experiment was carried out on wheat seeds as factorial on the basis of completely randomized design with three replications. Factors were fungal infection (*Fusarium oxysprum* infection and non-infection), and fungicide (control, savory essential oil at 10 and 20 ppm and Vitavax 2 g per kg). Fusarium infection decreased seed physiological quality. Using savory essential oil could not inhibit fungal infection in seeds and seedling but Vitavax could. In addition, the savory essential oil decreased somewhat germination percentage and its inhibitory effect on germination increased with concentration. Although there are some reports about anti-fungal effects of savory essential oil under *in vitro* conditions, such effect was not observed under this pot experiment. This may be due to application of low concentration in this experiment; however high concentration will kill the seeds.

Keywords: fungicide; savory essential oil; seed; organic agriculture

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Introduction

Wheat is the most important plant in the world that has an important role for supplying human food. This plant is propagated by seeds; therefore, seed quality is one of the factors that affects the yield (Ghorbani et al., 2008). Germination rate and vigor index are two important characteristics that represent seed physiological quality of wheat.

Root and crown rots are diseases that can damage wheat (Wiese, 1987). A set of fungi (*Fusarium oxysporum, F. eguisstei F. acuminatum*, and *Bipolaris sorokiniana)* are causative pathogens for such diseases (Fedel-Moen and Harris, 2010).

Treatment of the seeds with a suitable and effective fungicide is one of the ways for controlling fungal diseases. Nowadays, many synthetic fungicides are used in agriculture. Application of Vitavax as seed treatment is common in many regions of Iran for controlling root rot in wheat and barley. As use of synthetic pesticides has unpleasant consequences in the environment, there is a strong tendency to replace these ingredients with natural ones.

Savory plant belongs to the mint family, which grows in some parts of Iran. This plant has antimicrobial properties (Azaz et al., 2002). Flavonoids and terpenoids are the important

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