

THE EFFECT OF STRATIFICATION WITH DIFFERENT TREATMENTS ON SEED DORMANCY AND PROVOCATIVE BIOTIC OF TWO SPECIES IN FENEL

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ABSTRACT

In order to evaluate the effect of stratification and dormancy breaking treatments on stimulation of germination and seedling growth of two fennel cultivars a study was conducted as split factorial in completely randomized design with four replication in seed technology laboratory of Isfahan branch of Islamic Azad University (2012). Stratification levels were located in main plots and factorial of cultivars and dormancy breaking treatments were subplots. Stratification levels were control (lack of stratification) and 15, 30, and 45 days of stratification. Dormancy breaking treatments were Gibberellic acid (100mg/lit), Benzyladenine (10^{-5} M), Chitin (10^{-5} M), Gibberellic acid + Benzyladenine, Gibberellic acid + Chitin, Benzyl adenine + Chitin, Gibberellic acid + Benzyladenine + Chitin (with the same concentrations), sulfuric acid (90%) percent for 15 seconds, potassium nitrate (0.4%), distilled water, Amino forte (0.4%), Kadostim (0.4%), Phosphothreonine (0.4%) and Humiforte (0.4%). Studied traits were germination percentage and germination rate. Results showed that stratification treatments increased mentioned traits highly significantly. The highest germination percentage was occurred in 15 days treatment whereas 45 days treatment had the least percentage. Among dormancy breaking treatments, amino forte had the highest germination percentage which was not different statically from Benzyl adenine + Chitin or distilled water, but was different from others. The least germination percentage was belonging to sulfuric acid which was different significantly from other treatments. The highest germination percentage of cultivars was obtained from Malayer cultivar. Interaction of three experimental factors affected germination percentage very significantly ($p < 0.01$) and the highest amount was obtained from combination of distilled water, 15 days stratification and Malayer cultivar which was different from other treatments except Amino forte, Potassium nitrate and Benzyl adenine + Chitin. The least percentage was obtained from sulfuric acid plus 15 and 30 days stratification and Nahavand cultivar which was different significantly from other treatments except Kadostim plus 45 days stratification and Nahavand cultivar. Germination rate was affected by stratification treatment highly significantly ($p < 0.01$) and the highest rate was belonging to 45 days treatment whereas 15 days treatment had the least radicle length which was not significantly different from other treatments. Therefore, results show that by increasing stratification from control to 45 days stratification, germination rate was increased, so that 45 days treatment was significantly different from others. Cultivars didn't affect this trait significantly, however, Malayer had higher germination rate. Dormancy breaking treatments affected germination rate very significantly ($p < 0.01$) and Gibberellic acid + Benzyl adenine showed the highest rate but it was not statistically different from other treatments except Gibberellic acid + Chitin, Gibberellic acid + Benzyl adenine + Chitin, and sulfuric acid. The least germination rate was belonging to sulfuric acid which was significantly different from Gibberellic acid, Benzyl adenine, Chitin, Phosphothreonine and Humiforte. Interaction of experimental factors had significant effect ($p < 0.01$) on germination rate and the highest rate was obtained from Gibberellic acid plus 45 days stratification and Nahavand cultivar which was different from other treatments except Benzyl adenine plus 45 days stratification and Nahavand. The least germination rate was belonging to sulfuric plus 15 days stratification and Nahavand cultivar, sulfuric acid plus 30 days stratification and both cultivars, and Kadostim plus 45 days stratification and Nahavand cultivar which were significantly different from other treatments. Benzyl adenine + Chitin, Gibberellic acid + Chitin, Amino forte and distilled water treatments increased germination related traits of fennel significantly in proportion to other dormancy breaking treatments. Interaction of cultivar and dormancy breaking treatments, interaction of stratification and dormancy breaking treatments and also interaction of stratification, dormancy breaking treatments and cultivars were significant. According to results, 15 days



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of stratification plus Chitin, Benzyl adenine + Chitin, and amino forte seem to be appropriate for breaking dormancy of fennel seeds.

Key words: seed dormancy, fennel seeds, stratification treatments, dormancy breaking treatments, germination percentage, germination rate



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