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Effect of nano packing and aluminium on deterioration of soybean and corn seed in different storage conditions

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The main goal of seed storage is to maintain the quality of seed from the harvesting time till sowing it the next year. And, among all factors, storage temperature and moisture content are the most important factors affecting seed longevity and vigor and by controlling these factors, we could decrease the deterioration of seeds during storage. Using appropriate packaging is a good and easy way for controlling storage conditions. In this study, we investigated the effect of using different packages on the amount of deterioration in two seeds, soybean JK and maize 704 varieties, kept in different moistures and temperatures conditions, and also we determined seed viability constants for them. Treatments were two types of package (nano and aluminium), three levels of moisture content (8, 12 and 16%), three temperatures (5, 20 and 35) and six storage periods (1, 2, 3, 4, 5 and 6 months). The quality of stored seeds was tested by measuring different seed viability and vigor indices in each period. The results showed that with the increase in storage time, both seed viability and vigor decreased and it was more severe in high moisture and temperature treatments and in most indices the decreased was seen in the first month of storage in 16% seed water content and 10°C temperature treatment and not in other ones, which shows that storage condition is more important in storage than other factors. For all indices, germination rate and percentage, mean germination time (MGT), percentage of normal seedlings, seedling dry weight, vigor index and electrical conductivity. In both soybean and maize seeds, there were significant differences in main and quadratic interaction (time*package*moisture*temperature) at 1% probability level. The effect of package material was different in different moisture and temperature treatments, as seeds stored at nano packages showed less deterioration only in high moisture and temperatures, while, in low level moisture and temperature no significant difference was seen between aluminium and nano packages. Also, in most cases seeds stored in aluminium packages lost viability and vigor in the first month of storage in 16% WC and 10°C, while the last happened in the fifth and sixth month (four months delay) for seeds in nano packages. So, nano packages keep the quality of seeds in improper storage conditions and therefore are recommended as good materials for seeds storage. Measuring the activity of antioxidant enzymes (superoxide dismutase, catalase, polyphenol oxidase and peroxidase guaiacol) and malondialdehyde and hydrogen peroxide showed that antioxidant system is generally more active in nano seed packaging and the amount of malondialdehyde and peroxides hydrogen was observed more in aluminum seed packaging. Finally, by comparing the effects of different factors, seed water content and temperatures are reported the most important factors in preserving seed quality and inhibiting seed aging during storage for soybean and maize seeds and nano seed packaging is better for storing seeds in higher temperature and humidity.

Biography

Farhad Barazandeh Gholdareh has his expertise in Seed Science and Technology. He has experiences in research, evaluation, teaching and administration both in seed laboratory and education institutions.

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