Tanta University

Faculty of Agriculture

Department of Agronomy

Effect of Some Treatments on Onion Seed Viability during Storage

By

Shimaa Ezzat Abd Allah Ez-Elregal

B. Sc. in Science (Biochemistry and Nutrition)-

Fac. of Women- Ain-Shams University, 2001

Thesis Is

Submitted in Partial Fulfillment ofthe Requirements for the Degree ofMaster inAgricultural Science(Agronomy)

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Summary

Laboratory experiments were conducted under conditions of the Seed Technology Research Department Laboratories, El-Mansoura, Dakahlia Governorate and field experiment was carried out at the Experimental Farm of, Tag El-Eizz, Agricultural Research Station, Agricultural Research Center, Egypt.

A- Laboratory experiments:

The experiments were conducted at the laboratory of Seed Technology Research Department, El-Mansoura, Dakhlia Governorate from November 2015 to November 2016 year to study the effect of treating onion seed (c.v. improved Giza 6) with salicylic acid priming , fungicide Vitavax , salicylic acid priming + fungicide Vitavax and packing materials on seed quality after different storage periods (0,3, 6, 9 and 12 months).

The studied factors were:

1- Seed treatments: The studied seed treatments were: control, salicylic acid priming, fungicide Vitavax, salicylic acid priming + fungicide Vitavax.

2- Seed packing materials: The studied seed packing materials were: cloth bags, Aluminum bags and polyethylene bags.

3- Storage periods: Treated onion seed were stored for 0, 3, 6, 9 and 12 month after treatment.

Studied characters:

1. Germination percentages.
2. Tetrazolium test (TZ%).
3. Seed moisture content %.
4. Accelerated aging test %.
5. Germination rate.
6. Mean germination time (day).
7. Electrical conductivity (*mmhos/gm seed*) .
8. Seedling length (cm).
9. Seedling dry weight (gm).
10. Seedling vigor index
11. Seed oil percentage %.
12. Fungi infection %.

B- Field experiment:

The fieldexperiment was conducted at the Experimental Farm, Tag El-Eizz, Agriculture Research Station, ARC, Egypt from November 2015 and 2016 year to study the effect of the seed treatments and packing materials on field emergence percentage of onion seed directly after treatment(0 month) and 12 month **.** Field emergencewas recorded asthe number of emerged seedlings after 12 days from sowing.

The most important results can be summarized as follows:-

A-Laboratory experiment:

1-Effect of seed treatments:

Seed treatments caused highly significant effects on onion seed germination percentage, tetrazolium test %, seed moisture content, germination % after accelerated aging test, germination rate, mean germination rate, electrical conductivity, seedling length, seedling dry weight, seedling vigor index, oil% and fungal infection %. Treated seed by Vitavax gave the highest means of seed quality traits where it gave the highest means of germination % (74%), tetrazolium test% (79%), accelerated aging test % (72%), seed oil % (20.46%) and lowest means of seed moisture content% (8.48%), electrical conductivity (3.78 *mmhos/gm seed*) and fungi infection% (4.18%). However treated seed with both of priming plus Vitavax ranked after former treatment and followed by seed priming treatment concerning these characters. On contrast, untreated seed (control) gave the lowest readings of germination % (69%), tetrazolium test% (73%), accelerated aging test % (60%), seedling length (11.4cm), seedling dry weight (13.64 mg), seedling vigor index (810.2), oil% (20.35%) and highest readings of seed moisture content% (8.62%), mean germination time (3.39 day) and electrical conductivity of leached seed (0.383 *mmhos/gm seed*).

2-Effect of packing materials:

High significant differences among the tested seed packing materials. Stored onion seed in aluminum bags maintained seed

quality and gave the highest means of germination % (75%), tetrazolium test% (79%), accelerated aging test % (67%), germination rate (0.716), seedling length (11.7 cm), seedling dry weight (14.39 mg), seedling vigor index (877.8) and seed oil % (20.52%) and lowest means of seed moisture content% (8.10%), mean germination time (3.19 day), electrical conductivity (3.74 *mmhos/gm seed*) and fungi infection% (9.59%). Stored seed in polyethylene bags ranked second after aluminum bags. Whereas, stored seed in cloth bags recorded the minimum means of germination % (67%), tetrazolium test% (73%), accelerated aging test % (65%), seedling length (11.3cm), seedling dry weight (13.83 mg), seedling vigor index (766.8), oil% (20.32%) and highest readings of seed moisture content% (8.39%), mean germination time (3.35 day), electrical conductivity of leached seed (0.388 *mmhos/gm seed*) and fungi infection % (14.88%).

3-Effect of storage periods:

Increasing storage periods had high significant effects on all the studied traits where, germination % was decreased from 95% at the first storage period to 85%, 72%, 56% and 49% after 3, 6, 9 and 12 months, respectively. Tetrazolium test % was decreased from 97% to 54% after 12 month from storage. Germination after accelerated aging was decreased from 84% to 34%. Germination rate was decreased from 0,852 to o.449. Mean germination time was decreased from 2.90 day to 3.68 days. Electrical conductivity was decreased from 0.383 *mmhos/gm seed* to 0.680 *mmhos/gm seed.* Seedling length was decreased from 12.7cm to 9.3 cm. Seedling dry weight was decreased from 18.85 mg to 9.24 mg. Seedling vigor

index was decreased from 1147.3 to 456.1. Seed oil percentage was decreased from 20.85% to 19.99%. Fungi infection % was decreased from 17.13% to 8.86%.

Effect of interaction between seed treatments and packing materials:

High significant effect for the interaction between seed treatments and packing materials on germination percentage, tetrazolium test, germination rate, mean germination time, electrical conductivity, seedlings dry weight and fungi infection %. Whereas, seed moisture content, germination rate, seedling length, seedling vigor index and oil%insignificantly affected. Treated seed with Vitavax before storage in aluminum bags had the highest means of seed quality traits comparing untreated seed stored in cloth bags.

Effect of interaction between seed treatments and storage periods:

Interaction between seed treatments and storage periods had significant effects on all the studied traits except seedling length. Directly after treatment no harmful effects for the tested treatments on seed quality traits were noticed. After the different storage periods the best results concerning seed quality traits were resulted from treated seed with Vitavax, followed by salicylic acid priming+ Vitavax treatment, salicylic acid priming and finally untreated seed (control) where seed quality traits were deteriorated especially after 12 months from storage.

Effect of interaction between packing materials and storage periods:

Interaction between packing materials and storage periods had significant effects on all the studied traits. Seed quality traits were decreased with increasing storage period where seed germination percentage were decreased from 95% to 38%, TZ% decreased from 97% to 45%, accelerated aging test decreased from 845 to 32%, germination rate decreased from 0.852 to 0.417, seedling length decreased from 12.7 to 9 cm, seedling dry weight decreased from 18.85 to 9.03 mg, seedling vigor index decreased from 1148 to 342 and oil % decreased from 20.85 to 19.80% after 12 month from storage in cloth bags. Whereas, mean germination time was increased from 2.9 to 3.8 day, electrical conductivity increased from 0.183 to 0.685 *mmhos/gm seed.*

Effect of interaction among seed treatments, packing materials and storage periods:

Interaction among seed treatments, packing materials and storage periods had significant effects on germination%, tetrazolium test %, electrical conductivity, seedlings dry weight and fungi infection% whereas, the other traits insignificantly affected.

B-Field experiment:

Effect of seed treatments on field emergence:

Seed treatments had significant effects on field emergence where treated seed with Vitavax gave the highest % of field emergence (65%), followed by salicylic acid priming + Vitavax (64%), salicylic acid priming (60%) and finally untreated seed (57%).

Effect of packing materials on field emergence:

Type of seed packing materials had significant effect on field emergence of onion seed. Onion seed which stored in Aluminum bags gave the highest percentage of field emergence (63%), followed by polyethylene bags (62%) whereas, stored seed in cloth bags gave the lowest mean of field emergence (59%).

Effect of storage periods on field emergence:

Increasing storage periods significantly affected field emergence %. Field emergence decreased from 86% at the first storage period (0 month) to 37% after 12 month from storage.

Effect of interaction between seed treatments and storage periods:

Interaction between seed treatments and storage periods had significant effects on field emergence%. Directly after treatment, treated seed gave the highest percentage of field emergence whereas untreated seed gave the lowest percentage of field emergence (30%) after storage with 12 months.

Effect of interaction between packing materials and storage periods:

Interaction between packing materials and storage periods had significant effects on field emergence%. The highest percentage of field emergence (86%) was recorded directly after treatment (0 month) whereas stored seed in cloth bags gave the lowest percentage of field emergence (33%) after storage with 12 months.

Interaction between seed treatments and packing materials and interaction among seed treatments, packing materials and storage periods had insignificant effects on field emergence percentage.

Conclusion

This study suggested that treating onion seed (C.V. improved Giza 6) with fungicide Vitavax and storage in Aluminum foil bags to maintain seed quality during storage and get high field emergence.