Alex. J. Agric. Sci. *Vol. 65, No.6, pp. 371-377, 2020*

Effect of Package Material and Pre-Storage Treatments on Viabilty of wheat Seed

El Siedy, EL. H.[1]; E. A. Rashwan[1]; Amal H. Selim[2] and Esraa A. Hamad[2]
[1]Agronomy Dep., Faculty of Agriculture, Tanta University.
[2] Seed Tech. Res. Sec. Field Crops Res. Institute, A.R.C.

ABSTRACT

This research was conducted at Sakha Agric. Exp Station, Seed Technology Research Department, Field Crops Research Institute, ARC, Giza, Egypt, during the period between 2018 and 2019 seasons, to evaluate the effect of packaging materials and pre-storage treatments on viability of wheat seed. The experimental design was a split- plot design with four replications. Seed samples were treated with malathion, phosphine, ficus powder and extract, clove powder and extract, camphor powder and extract and cupper nano -particles powder. Treated seeds were stored under open storage conditions for six months in Jute, Plastic and Polyethylene packages. The results revealed that, the type of package and treatments could provide special protection against seed deterioration namely; seed germination and seedling characters. The malathion and phosphine treatments could save the stored seed from the damage caused by insects, while cupper nano- particles treatment had a positive effect of controlling seed deterioration (germination capacity and seedling vigor). On the other hand, an experiment including similar treatments of the current research might be done to examine deteriorations which might take place to seeds stored for longer time (18 month).

Key words: Packaging, Storage, Seed viability, Insect damage.

INTRODUCTION

The purpose of seed storage is to maintain the seed in a good physical and physiological condition from time of harvest until the time of planting. It is expected that most of seed produced in one season will be stored for planting in the following season. Therefore, it might be stored for short period under less ideal conditions, than those required for seeds that may be kept over a long time period.

Stores house, should be constructed in such a way that moisture is eliminated. Also, birds, insects and rodents are prevented. Furthermore, where seed storage conditions are less than ideal, packaging might be used effectively to protect seeds by choosing impermeable packaging material. So that, seed moisture remains constant might be controled, irrespective of the prevailing humidity of the store.

Seed treatment with protective chemicals prior to planting has become a standard proactive in agriculture. The ideal chemical treatment should be highly effective against pathogenic organism, non – toxic to plant and economically competitive. About 10 to 25% of the world's harvested food is destroyed annually by insects and rodents. Insects and pests cause damage to stored grains and processed by reducing dry weight and nutritional value. Zeinab Sh. (2015) cleared that, wheat suffere losse during storage due to insects and pests infection. Ramadan (2016) found that normal storage of wheat seeds in plastic and metal jars, significantly affected storage characters such as insect infestation and weight loss % and final germination %. Seadh *etal.* (2019) revealed that increasing storage periods of rice seeds from 3,6,9, and 12 months, increased insect infestation percentage, germination parameters (final germination, abnormal seedling, sold and rotten seed percentages) and seedling parameters (root and shoot length, seedling dry weight and seedling vigor index). Rahuma (2017) found that, studied traits, except for, infestation percent were significantly decreased with increasing storage period till six months. The low germination (65.14%), short roots and shoots (5.45 and 3.39 cm), shoot weight (0.030g) and high infestation percent (25.25%) resulted with storage for six month. Seeds stored in black polyethylene bags showed decrease, in germination percent, shoot dry weight, 100-grain weight, protein and ash content, along with the highest insect infestation percent. Badawi *et al.* (2017) found that the best results of storage efficacy, seed viability and quality were recorded with treating wheat seed with phosphine at the rate of 8 ppm, followed by, treating with neem oil at the rate of 20%, thyme oil at the rate of 15%, ascorbic acid at the rate of 500 ppm. Nyo (2020) reached an effect of storage environments, packaging materials and storage duration on germination percentage, germination index and seedling vigour. Gebeyaw (2020) revealed that germination %, speed of germination, seedling length, seedling dry weight and seedling vigor index, were decreased with increasing storage period. Hosny *et al.* (2007) determined that plant oils and plant dusts were used against Collosobruchus maculatus and T. granarium on (cow pea and wheat) seeds, respectively. They noticed increase in adult mortality and a reduction in progeny, and seed weight. Mersal *et al.* (2011) revealed that treating rice weevils with the recommended dose of Malathion resulted in 100%

mortality, meanwhile, treating rice weevils with half dose of malathion with scran or nerium ethanol extract, increased mortality percentage more than scran, nerium extracted or half dose of malathion. Abo El-Dahab *et al.* (2016) stated that, moringa plant extract at 25% concentration, showed the highest values of seed and seedling vigor characters and also reduced infected seeds, compared to other seed treatments. Khan *et al.* (2013) showed a positive potential of plant extracts similar to conventional synthetic insecticides for the management of insects attacking stored seeds.

The objective of the recent study was to evaluate the effect of some treatments and package materials on germination, and seedling parameters of wheat seed stored for a period of six month.

MATERIALS AND METHODS

This study was carried out at the laboratory of Seed Technology Sakha Agricultural Research Station, Kafr EL-Sheikh, Egypt. Seed of wheat variety (Giza 171) was obtained from Wheat Research Department, Sakha Agricultural Research Station, Agricultural Research Center.

Plant extracts were produced according to the procedures outlined by Freedman *et al.* (1979) with some modification. leaves of Ficus nitida, Eucaluptus sp. and flower of Eugenia aromatic were air dried in open-air for 10 days followed by further drying in air oven at 45°C for two days until constant weight. Plants were dried and grinded using laboratory grinder into fine powder and 250g of powder were three times extracted successively with ethanol. The homogenous extract was kept for three days before being filtered through Whatman No.1 filter paper over Anhydride Sodium Sulphate. After that, the extracts were evaporated by rotary evaporator (temperature not accessed 50 °C). The crude extract was then weighed and adjusted to 25 ml with the used solvent and kept in refrigerator (4 ˚C) until use.

Experimental treatments were arranged in split-plot design in randomized complete design (RCD) with four replications. The first factor was ten treatments i.e,: Treating seeds with the recommended dose of malathion (8%), recommended rate of phosphine (3tablets /m^3), Ficus powder (0.25%) ficus extract (4575.8 ppm), camphor powder (0.28%), camphor extract (141.9 ppm), clove powder (1.2%), clove extract (39.93 ppm), Cupper-Nano particles powder (0.215%.), and untreated seed as a control.The second factor was three types of packages, i.e; Jute, Plastic, and Polyethylene

Germination test was performed according to I.S.T.A, (1985), where 400 wheat seeds were divided to four replicates and sown in a sterilized sand culture at 20°C ±2 Germination percentage were defined as the total number of normal seedling at the end of the test, after eight days. Seedling dry weight was calculated by drying ten normal seedlings in a hot air oven at 85°C for 12 hours (Kirshnasamy and Seshu, 1990) and then weighted in (g). Root and shoot length of ten normal seedlings from each replication of the germination test were measured from collar region to the root tip and the mean was expressed in centimeter.

Germination Speed Index was calculated according to the Association of Official Seed Analysist (A.O.S.A., 1983) using the following formula:

$$\text{GSI}=\frac{\text{No.of germinated seed}}{\text{Days of first count}}+\frac{\text{No.of germinated seed}}{\text{Days of final count}}$$

Electrical conductivity was calculated according to Matthews and Alison (1987). Three replicates each of fifty seeds were weighted then placed in a 250 ml flask and 250 ml of distilled water was added. The flasks were covered and placed in an incubator at a constant temperature of 20°C for 24 hours, after which the contents of the flasks were gently stirred. The electrical conductivity was measured in the solution after removing the seeds. The HANNA conductivity meter (Hi 80333) was used. The results were reported as (mmhos/g/seed). The meaning of the 3rd readings was calculated as follow

$$\text{EC (electric conductivity)} = \frac{\text{Reading of EC}}{\text{Wt of 50 seeds}}$$

Seedling Vigor Index was computed by adopting the formula suggested by Abdul-Baki and Anderson (1973) and expressed in whole number.

Seedling vigor index-I = Germination (%) x seedling length (cm)

Seedling vigor index-II = Germination (%) x seedling dry weight(g)

After the six month storage period four replicates each of 100 seed were manually picked from each treatment's package representing different depths for insect inspection. Seeds having holes, infestation or showed signs of insect damage were considered as infested. The infestation level was expressed as number and percentage damaged seeds according to formula of Jood *et al.* (1996).

$$\text{Damage grains percent}=\frac{\text{Number of insect damaged seeds}}{\text{Total number of grins inspected}}$$

The dry weight losses caused by insect infestation were calculated as follows according to Dick (1987).

Dry weight loss% = (weight of undamaged grain) (total number of grains) - (weight of damaged grain) (total number of grains) / (weight of undamaged grain) (total number of grains) %

Numerical data were transfored before analysis. Data were statistically analyzed according to Gomez and Gomez (1984). Treatment means were compared using the least significant Differences (LSD) test.

RESULTS AND DISCUSSION

Data in Table (1) showed that a high value of germination % was obtained from seed stored in a polyethylene bag (94.6%), while the least value was recorded for seed stored in any of jute or plastic bag and showed that a high value of seedling dry weight was obtained from seed stored in a polyethylene bag (0.73g), while the least value was recorded for seed stored in any of jute or plastic bag. On the other hand there were insignificant differences in other measiured seed parameters whatever was the bag type. As for, the mean effect of seed treatments, high value of germination percentage were recorded when seed was treated by cupper Nano -particles particles and high value of seedling dry weight were recorded when seed was treated by cupper Nano – particles and clove (extract). There were significant differences in shoot and root lengths among different treatments. These results revealed that, the type of package and seed treatment might provide especial protection for seed viability, through moisture content control in seed bags. These results agreement with that obtained by Ramdan (2016) and Nyo (2020).

Data in Tables (2, and 3) showed the interaction between seed treatments and packages when the seed was treated with cupper particles and stored in polyethylene bag as compared with other treatments. The highest significant values of seed germination%, shoot length (cm), and root length (cm) were obtained when seeds were treated with cupper nanoparticles and stored in polyethyllen pages. (96.0%, 8.2 (cm) and 9.2 (cm) for the three characters, respectively, while there was no significant between packages and seed treatments in seedling dry weight.

Table 1: Means of germination percentage, seedling dry weight (g), shoot and root lengths (cm) of germinated wheat seeds as affected by packages and seed treatments after storage for six months.

Traits	Germination percentage (%)	Seedling dry weight(g)	Shoot length(cm)	Root length(cm)
Packages				
Jute	93.7	0.72	7.3	8.2
Plastic	92.3	0.71	7.0	7.4
Polyethylene	94.6	0.73	7.5	8.4
LSD at 5%	1.86	0.02	N.S.	N.S.
Treatments				
Malathion	93.3	0.70	6.8	7.43
Phosphine	94.0	0.70	7.0	7.7
Ficus(powder)	93.3	0.71	7.1	8.3
Ficus(extract)	93.7	0.72	7.3	8.6
Camphor(powder)	93.0	0.71	7.2	8.1
Camphor(extract)	93.7	0.72	7.5	8.4
Clove (powder)	93.3	0.73	7.3	8.2
Clove (extract)	94.0	0.75	7.6	8.6
Cupper-Nano particles	95.3	0.75	7.8	8.9
Control	91.7	0.67	6.7	7.5
L.S.D $_{0.05}$	0.010	0.01	0.01	0.03

Table 2: Means of seed germination (%) and seedling dry weight (g) of wheat seeds as affected by the interaction between packages and seed treatments after six months of storage.

Packages / Treatment	Seed germination (%)			Seedling dry weight(g)		
	jute	**Plastic**	**Polyethylene**	**jute**	**plastic**	**Polyethylene**
Malathion	93.0	93.0	94.0	0.70	0.69	0.71
Phosphine	94.0	93.0	95.0	0.70	0.69	0.71
Ficus(powder)	94.0	92.0	94.0	0.71	0.70	0.72
Ficus(extract)	94.0	92.0	95.0	0.72	0.71	0.73
Camphor(powder)	94.0	91.0	94.0	0.71	0.70	0.72
Camphor(extract)	94.0	92.0	95.0	0.72	0.71	0.73
Clove (powder)	93.0	92.0	95.0	0.73	0.72	0.74
Clove (extract)	94.0	93.0	95.0	0.74	0.73	0.77
Cupper-Nano particles	95.0	95.0	96.0	0.75	0.74	0.76
Control	92.0	90.0	93.0	0.68	0.66	0.67
L.S.D $_{interaction}$		0.02			n.S.	

Table 3: Means of shoot and root lengths (cm)of germinated wheat seeds as affected by the interaction between packages and treatments after six months of storage.

Packages / Treatment	Shoot length (cm)			Root length(cm)		
	Jute	**plastic**	**Polyethylene**	**jute**	**plastic**	**Polyethylene**
Malathion	6.8	6.6	7.0	7.4	7.1	7.8
Phosphine	6.9	6.7	7.5	7.5	7.7	7.8
Ficus(powder)	7.1	6.8	7.4	8.3	8.3	8.4
Ficus(extract)	7.4	7.1	7.5	8.6	8.6	8.6
Camphor(powder)	7.3	7.1	7.4	8.2	7.8	8.2
Camphor(extract)	7.5	7.4	7.5	8.4	8.2	8.5
Clove (powder)	7.4	7.3	7.6	8.4	7.9	8.4
Clove (extract)	7.8	7.2	7.9	8.6	8.3	8.8
Cupper-Nano particles	7.9	7.4	8.2	8.9	8.5	9.2
Control	6.5	6.5	7.2	7.40	7.0	8.2
L.S.D interaction		0.02			0.05	

Results in Table (4) showed that, the differences in germination speed index (GSI), electric conductivity and seedling vigor indices, failed to reach the level of significance with variable package materials. Whereas, treating seeds by cupper nano-particles significantly gave fast germination (high GSI= 18.7), low electric conductivity of seed extract (19.119.1 µ moh /g seed) and high seedling vigor indices (1592.9 and 72.2 for seedling vigor index (*I*) and (*II*), respectively). Low values of EC, reflects that seed maintained initial quality, irrespective of the storage period. It was valuable to notice that treating seed with clover extract, gave reseanable significant accepted values for the measured characters.

Table (5) showed, means of germination speed index and electric conductivity (µ mohs .g seed) of wheat seeds as affected by the interaction between package material and seed treatment. The highly significant value of germination speed index was recorded when seeds was treated with copper nano-particles and stored in polyethylene pages (18.8). Whereas, the second rank was presented by treating seeds before storage by *ficus* extract and using any of jute or polyethylene pages (18.7 for both types of pages). Also, the least significant electric conductivity obtained when seeds was treated by cupper nano-particles and stored in polyethylene pages (19.0 µ mohs/g seed). Treating seeds by clove extract and storage in polyethylene pages, maintained seeds viability in a significantly similar maner to that resulted with pre-treatment with cupper nano-particles and use of jute bags (19.1 µ mohs/g seed).

Table 4: Means of Germination speed index, electric conductivity, seedling vigor index (I) and seedling vigor index (II) of wheat seeds as affected by packages and seed treatments after six months from storage.

Traits	**Germination Speed Index**	**Electric conductivity (µmhos/g seed)**	**Seedling Vigor Index (I)**	**Seedling Vigor Index (II)**
Packages				
Jute	18.5	19.8	1446.9	67.9
Plastic	18.4	19.9	1380.9	66.8
Polyethylene	18.6	19.8	1506.1	70.1
L.S.D $_{0.05}$	N.S.	N.S.	N.S.	N.S.
Treatments				
Malathion	18.5	20.2	1329.1	66.0
Phosphine	18.4	20.2	1382.6	66.8
Ficus(powder)	18.4	20.8	1441.2	67.2
Ficus(extract)	18.6	20.1	1493.2	68.1
Camphor(powder)	18.5	20.0	1427.0	67.3
Camphor(extract)	18.5	19.1	1483.8	69.3
Clove (powder)	18.6	19.9	1463.1	69.4
Clove (extract)	18.6	19.2	1523.8	70.8
Cupper-Nano particles	18.7	19.1	1592.9	72.2
Control	18.1	20.2	1309.2	66.0
L.S.D $_{0.05}$	0.01	0.01	5.57	0.08

Table 5: Means of Germination speed index and electric conductivity (µ mohs. g seed) of wheat seeds as affected by the interaction between packages and seed treatments after six months of storage.

Packages / Treatment	Speed Germination Index			Electrical conductivity (µmhos/gm seed)		
	jute	**Plastic**	**Polyethylene**	**Jute**	**plastic**	**Polyethylene**
Malathion	18.5	18.3	18.7	20.2	20.2	20.1
Phosphine	18.4	18.2	18.5	20.2	20.2	20.1
Ficus(powder)	18.4	18.4	18.4	20.2	20.2	20.1
Ficus(extract)	18.7	18.6	18.7	20.1	20.2	20.1
Camphor(powder)	18.5	18.5	18.5	20.0	20.1	19.9
Camphor(extract)	18.5	18.5	18.6	19.13	19.2	19.1
Clove (powder)	18.6	18.6	18.6	19.9	20.2	19.9
Clove (extract)	18.6	18.6	18.6	19.3	19.2	19.1
Cupper-Nano particles	18.7	18.7	18.8	19.1	19.2	19.0
Control	18.1	18.0	18.2	20.2	20.3	20.2
F test		**			**	
L.S.D $_{0.05}$		0.02			0.02	

Significantly similar seed quality indicated by electric conductivity of seed extract, was indicated when seed was pre-treated by camphor extract and stored in polyethylene pages. Other seed treatment-package material combinations, gave significantly lower seed quality.

The results in Table 6, illustrated means of insect infestation and seed weight loss% of wheat seeds as affected by package type and seed-treatment before storage. The highest significant insect infestation resulted with storage in plastic pages (5.23%), followed by any of Jute or polyethylene pages (4.93 and 4.66%, respectively). Also, seed weight loss significantly reached 2.04% when seed was stored in plastic pages, significantly followed by 1.99 and 1.88% for Jute and polyethylene pages, respectively.

All studied seed – treatments significantly showed less values of insect infestation and seed weight loss than the untreated control. The least significant insect infestation along with grain weight loss were recorded when wheat seeds were treated with any of *malathion* or *phosphine* (0.001 and 0.001% for the two characters, respectively). Among the rest of used seed treatments, cupper nano-particles, showed the least significant values of insect infestation and seed weight loss (4.867 and 1.700%, respectively). In general the recent finding match true with those presented by Rahuma (2017).

Table (7) showed the effect of the interaction between packages and seed treatment prior to storage on insect infestation (%) and seed weight loss (%). The highest significant insect infestation was recorded when wheat seed was untreated before storage and kept in plastic package (7.90%).

Table 6: Mean of insect infestation and seed weight loss % of wheat seeds as affected by packages and treatments after six months of storage.

Traits	Insect infestation (%)	Weight loss (%)
Packages		
Jute	4.931	1.990
Plastic	5.230	2.040
Polyethylene	4.660	1.881
L.S.D $_{0.05}$	0.436	0.106
Treatments		
Malathion	0.001	0.001
Phosphine	0.001	0.001
Ficus(powder)	6.568	2.634
Ficus(extract)	6.333	2.533
Camphor(powder)	6.367	2.467
Camphor(extract)	6.233	2.467
Clove (powder)	6.167	2.367
Clove (extract)	5.833	2.267
Cupper-Nano particles	4.867	1.700
Control	7.033	3.267
L.S.D $_{0.05}$	0.118	0.029

Table 7: Insect infestation and weight loss percentage of wheat seeds as affected by the interaction between packages and treatments after storage for six months.

Treatment	Insect infestation %			Weight loss (%)		
	Packages			Packages		
	jute	Plastic	Polyethylene	jute	plastic	Polyethylene
Malathion	0.001	0.001	0.001	0.001	0.001	0.001
Phosphine	0.001	0.001	0.001	0.001	0.001	0.001
Ficus(powder)	6.503	6.800	6.400	2.700	2.700	2.503
Ficus(extract)	6.400	6.600	6.000	2.500	2.500	2.600
Camphor(powder)	6.400	6.700	6.000	2.500	2.500	2.400
Camphor(extract)	6.300	6.600	5.800	2.500	2.500	2.400
Clove (powder)	6.300	6.500	5.700	2.400	2.500	2.200
Clove (extract)	5.800	6.200	5.500	2.300	2.400	2.100
Cupper-Nano particles	4.800	5.000	4.800	1.600	1.900	1.600
Control	6.800	7.900	6.400	3.400	3.400	3.000
L.S.D $_{0.05}$		0.194			0.052	

Whereas, the least significant values resulted with pre-seed treatment with any of *malathion* or *phosphine*, irrespective of, the type of storage package (0.001% insect infestation). While, among the other used treatments, the least significant insect infestation were recorded with seed pre-treatment with cupper nano-particles with any of Jute or polyethylene pages (4.80%). Similar results were recorded for seed weight loss.

Finally, it was obvious that both seed treatments and packaging materials plaied a crucial role in keeping the quality of wheat seed stored for six months. While Malathion and phosphine treatments could save the stored seed from the damage caused by insects, Cupper-Nano particles had a positive effect for controlling seed deterioration in through maintaining physiological quality (germination capacity and seedling vigor). However if the seed stored for longer period than six months (i.e. 18 months in the case of carry over seed), the deterioration of stored seed might be increased. Therefor it is suggested to carry out further investigation including similar treatments as mentioned above to find out the changes which may affect quality of stored seed for eighteen months.

REFERRNCES

Abdul-baki, A.A. and J.D. Anderson (**1973**). Vigour determination in soyabean seed multiple criteria. Crop Science., **13**: 630-633.

Abo EL-Dahab, M.S.; Abeer El-Ward A. Ibrahim and F.I. Yousof. (**2016**). Effect of some plant extracts on seed viability and seed borne fungi of sorghum seed during storage periods. Research Journal of Seed Science., **9**: 5-13.

Abou-Elnaga, Zeinab Sh. (**2015**). Efficacy of extracts of some Egyptian plants against economically important stored grain pest *Sitophilus oryzae* L. Journal of Entomology and Zoology Studies., **3 (1)**: 87-91.

A.O.S.A. (**1983**). Seed Vigor Testing Handbook: Contribution No.32 to the Handbook on Seed Testing Association of Officinal Seed Analysis, Boise, Idaho, Pages: 93.

Badawi, M.A.; S.E. Seadh; W.A.E. Abido and R.M. Hasan. (**2017**). Effect of storage treatments on wheat storage. International Journal of Advanced Research in Biological Sciences, **4(1)**; 78-91.

Dick, K.M. (**1987**). Pest management in stored groundnuts. ICRISAT Information Bulletin No. **22**, Patancheru, Hyderabad, India.

Freedman, B.; J. Noak and W. F. Kwolek (**1979**). Abioassayforplant derived pest control agent using the European corn borer. J. Entomol., **72**: 45-54.

Gebeyaw, M. (**2020**). Effect of seed storage period and storage environment on seed quality. International Journal of plant breeding and Crop Science, **7 (1)**; 647-652.

Gomez, K.A. and A. A. Gomez (**1984**). Statistical Procedures for Agricultural Research.2nd ed. John Whley& Sons.

Hosny, A. H.; A. E. Salama; A. A. Ismail; R. Abo-Arab and S. I. A. Ibrahim. (**2007**). Botanical products as stored grain protectants. J. Agric Res. Kafer El-Sheikh, Univ., **33(4)**; 873-886.

I.S.T.A. (**1985**). International Rules for Seed Testing. Seed Science and Technol., **13(2);** 421-463.

Jood, S.; A.C. Kapoor and S. Ram (**1996**). Evaluation of some plant products against Trigoderma granarium everts in Sorghum and their effects on nutritional composition and oranoleptic characteristics. J. Strored Prod. Res., **32 (4)**; 345-352.

Khan,A. F.Z. ; M.Segheer; M.Ul-Hasan; S.Saeed; K.Ali; H.T. Gul; S.A. Bukhari and S.A. Manzoor (**2013**). Toxicological and repellent potential of some plant extracts against stored product insect pest, *Tribolium castaneum* (Herbst.) (Coleoptera Tenebrionidae). Intern. J. Biosci., **3 (9)**: 280-286.

Kirshnasamy, V. and D. V. Seshu. (**1990**). Phosphine fumigation influence on rice seed germination and vigor. Crop Sci., **30**; 28-35.

Matthews, S. and A.P. Alison (**1987**). Electrical Conductivity Test Methods (2nd edition), 37-43 published by ISTA.

Mersal, I. F.; Abeer El-Ward A. Ibrahim and A. A. M. El- Emam (**2011**). Effect of malathion and plant extracts on seed quality of some wheat varieties (*Triticum. aestivum*, L.) during storage. J. Plant Production, Mansoura Univ., **2 (8)**; 995 – 1007.

Nyo, H.T. (**2020**). Effect of different packaging materials and storage environments on seed quality of sesame (Sesamum Indicum, L.). Journal of biology and life science, **11 (1)**; 1-17.

Rahuma,M.A.A. (2017).Effect of storage duration and package materials on viability and grain chemical composition of two bread wheat cultivars. Alexandria science exchange journal, **38 (3)**; 377-383.

Ramadan, N.M.E. (**2016**). Methods of storage and their effect on seed of some filed crops. Ph D. Thesis, Fac. of Agric., Mansoura Univ., Egypt.

Seadh, S.E.; M. A. Badawi and Mai M. M. El-Denasory. (**2019**). Some factors affect storage efficacy and germination parameters of rice. Journal of Applied Sciences, **19 (5)**; 392-399.

الملخص العربى

تأثير العبوات ومعاملات قبل التخزين علي حيوية تقاوي القمح

السيد حامد الصعيدي[١]، عماد الدين أحمد رشوان[٢]، أمال حسن سليم[٢] وإسراء علي حماد[٢]

[١]قسم المحاصيل – كلية الزراعة – جامعة طنطا

[٢] قسم بحوث تكنولوجيا البذور– معهد بحوث المحاصيل الحقلية– مركز البحوث الزراعية

تم إجراء هذا البحث في محطة البحوث الزراعية بسخا، قسم بحوث تكنولوجيا البذور، معهد بحوث المحاصيل الحقلية، مركز البحوث الزراعية، الجيزة، مصر، خلال الفترة بين موسمي ٢٠١٨ و٢٠١٩ لتقييم تأثيرالعبوات ومعاملات ما قبل التخزين على حيوية بذور القمح. استخدم تصميم القطع المنشقة لمرة واحدة، وتمت معامله عينات البذور بالجرعات المقترحة من الملاثيون والفوسفين ومسحوق الفيكس ومستخلصه، مسحوق القرنفل ومستخلصه، مسحوق الكافور ومستخلصه ومسحوق جزيئات النانو– نحاس. البذور المعاملة تم تخزينها لمدة ٦ أشهر في عبوات من الجوت أو البلاستيك أو البولي إيثيلين في جو مفتوح. وبينت النتائج أن بعض العوامل مثل نوع العبوات والمعاملات يمكن أن توفر حماية للبذور من التدهور والحفاظ علي صفات الجودة الفسيولوجية خاصة الانبات وصفات البادرة. كذلك أوضحت الدراسة أن المعاملة بالمبيدات الحشرية مثل الملاثيون والفوسفين تحمي البذور المخزنة من الضرر الناتج بسبب الحشرات، بينما المعاملة بجزيئات النانو– نحاس كان له تأثير إيجابي في الحفاظ علي التقاوي من التدهور والذي كان واضحا في صفات الجودة الفسيولوجية. من ناحية أخري، يوصي بإجراء تجربة بنفس المعاملات ولكن لمدة تخزين أطول(١٨شهر) لتحديد مدي احتمالية التدهور في البذور.