Al-Muthanna J. For Agric Sci Print ISSN: 2226-4086 Online ISSN:2572-5149
Vol. 11 , Issue.Supplement 01. 2024
https://muthjas.mu.edu.iq/ http://doi.org/10.52113/mjas04/11.1/16

Chemical Analogues of extracted Apple Peel effect on nutritional crops

Noor A. M. Ajeel[1] and Laith M. J. Al-Shamma[2]

[1] Department of physiotherapy , College of Health and Medical Technologies, Middle Technical University. Baghdad. Iraq

[2] Biology Department, College of Science, University of Baghdad, Baghdad, Iraq.

[1]E-mail:noor-ajeel@mtu.edu.iq
[2]E-mail: laith.alshamma@sc.uobaghdad.edu.iq

Received on 2/01/2024 Accepted on 20/03/2024 Published on 1/4/2024

Abstract. Soaking in apple peel extract treated with sodium chloride $NaCl_2$., calcium chloride $CaCl_2$,potassium nitrate KNO_3 following by drying of seeds of wheat (*Triticum aestivum* L.) , barley (*Hordeum Vulgar* L.). The treatments had significant effects on germination, shoot length, root length, shoot dry weight, root dry weight .Maximum germination (98%). shoot length, (16cm), root length (16.2cm), shoot length (40mg) ,root dry weight (28.3mg) occurred in seeds treated with peel extract combined in KNO_3, when treat combined with KNO_3 (67%) , $CaCl_2$ (63%) were used. Wheat showed a significant increase in the length of root 12.8 cm ,vigour index 2166 over barley. While barley was superior in the dry weight of root 21.3 mg may be due to the genetic differences between the species. Maximum mobilization efficiency 70% dry weight of shoot , root 43.3, 33.3, respectively were recorded when wheat seeds treated with treat of KNO_3 ,compared with untreated seeds, on the other hand., treated barley seeds with KNO_3 gave highest vigour index ,compared with untreated seeds.

Keywords. Apple Peel, Wheat, Food.

1. Introduction

Wheat and barley are main food that feed worldwide. , the most consumed by humans are cereal , protein, cereal grains are rich chemical compounds .like fat and composition of fatty acids [1,2]. Many of vitamins and organic compounds like fe,ca,p [3]. Polysacchrides and poly phenolic substances a seed property defines the conditions makes a germinate [4]. Dormancy is overcomed by targeting the tegument by making water pass so germination start. Consisting of imbibing seeds in water or a solution of chemicals also subsequently air drying has been found to increase drought tolerance in plants. Often resulting in higher yields under normal or stress.

This occur by seed digestion by acid action of dispersing animals [5]. The H2so4 conc.(chemical solutions) used for seed germination of a hard seed coat plants [6,7], the high-yielding cultivars combine high contents of correlations among other grain

quality,soaking techniques used often to accelerate the cultivars enriched of useful grain component [8,9].

Evidence also suggests that thistechnique may induce earlier germination ., emergence of seed extend viability of stored seed in different cultivars of wheat., tomato ., peas ., sunflower

This finding could be particularly relevant to germ plasm collections Soaking. The objective of determining the effect of many methods for soaking in chemical solutions and mention which one is the best to break seed dormancy , growth ,some physiological processes of wheat ,barley seeds [10].

2. Materials and Methods

The commercially available apple varieties apples extraction started up with peeling apple ,the peels was frosen in -80 °C for 2 hours, freeze dried peel at −30 °C with a vacuum of 6.67 Pa. Then smashed into a fine poweder. The extraction were by acidified water. Acidic solution formed by mixing a citric acid in deionized distilled water measured for a pH of 3, mixing 1 g of freeze-dried apple peel powder with 20 mL of acidified solution before vortexing (2min). Then centrifugation ny centrifuge for180 s twice at 20 °C. The supernatant collected then., dried ,stored in 8 c refrigerator [11].

Total phenolic content were measured of absorbance read at 765 nm with a spectrophotometer A standard curve of aqueous solutions of gallic acid (1–10 ppm). The total flavonoid content (1 mL)and polyphenol measured by aluminium chlorid colorimetric. A quercetin (1-60 ppm) calibration curve used in calculation [12].

2.1. Seed Treatment with Chemical Solutions

After surface sterilization with o.1% $HgCl_2$ solution, seeds of wheat, barley were separately treated by soaking for 24 hours in 100% conc. Apple peel extract treated with chemical solution in the ratio 1 gram seed: 2 ml solution dried in room temperature until they regained their original weight. The solutions with apple peel used were treatedas follow: Sodium chloride (NaCl O.1%), Calcium Chloride ($CaCl_2$ 1%) ,potassium nitrate (KNO_3 o.5 %). A control treatment is un soaked.

2.2. Studied Parameter

Germination (%)., velocity of germination(%)**.,**shoot length(c m**).,** root length(cm). Shoot weight (mg)., Vigor index ,Mobilization efficiency (%).

2.3. The Germination Test

The germination tests of variously treated seeds were performed on glass plates according to laboratory germination tests were made at $26 \overline{+} C^{o}$ germination percentage(%), number of seedling were recorded every day for a total period of 14 day. Shoot root length (cm),short ,vort dry weight (mg) were calculated with 14-day germinated seeds.

2.4. Coefficient of Velocity of Germination (C.V.)

The velocity of germination (%) was determined with 14 day germinated seed using the formula:

$$\text{C.V.}=\frac{A_1 + A_2 + ...A_x}{A_1T_1 + A_2T_2 + ... + A_xT_x} \times 100$$

Where C.V.=Coefficient of velocity of germination. A=Number of seedlings in any day. T=Number of days.

2.5. Vigour Index (V.I)

The root shoot length of normal seedlings were measured in centimetre scale. The vigour index (V.I) was calculated using the formula:

VI= (Mean root length +mean shoot length)x parentage of germination

2.6. The Mobilization Efficiency (M.E)

Within 7-day germinated seeds using the formula efficiency of mobilization nutrients from cotyledons to the embryonic axis

M.E(%)=100xincrease in dry weight of embryonic weight/decrease in dry weight of cotyledons

2.7. Statistical Analysis

The data is based on four replications of 100 seeds each. The data was subjected to least significant differences test(L.S.D). Each mean value in the tables was computed from about 400 seeds of wheat barley.

3. Result and Discussion

The treatments had significant effects on germination shoot length root length shoot dry weight root dry weight (Table1). Maximum germination (98%) shoot length (16cm) root length (16.2cm) shoot dry weight (40mg) root dry weight (28.3mg) in seeds treated with KNO_3 similar beneficial effect of KNO_3 were reported of tomato, eggplant, sunflower KNO_3 is used in the breaking pre harvesting dormancy Cereal crop grain had high nutritive value ,contain diverse chemical compounds with antioxidant properties. Big efforts have been for the studying the content antioxidants in grain cultivated cereals [13-15].

Table 1. Effect of pre sowing seed treatments on some physiological processes of germination early performance of seedlings.

Seed treatment	Germination (%)	Velocity of germination (%)	Shoot length (c m)	Root length (cm)	Shoot weight (mg)	Root weight (mg)	Vigor index	Mobilization efficiency (%)
Control (untreated)	73	24	9.7	8.2	21.7	13.3	1611	44
Water	76	26	12.7	9.4	25.0	18.4	1874	49
Extracted with NaCl	82	27	1407	9.9	26.7	20.0	1888	57
Extract with CaCl2	91	27	15.4	10.5	30.0	21.7	2241	63
Extract with KNO_3	98	27	16.0	16.2	40.0	28.3	2452	67
L.S.D0.05	3.49	N.S	2.69	2038	2050	2.90	5.27	404

Treatment with different solutions increased the vigour index of all crops over control., maximum vigour index was recorded when seeds were treated with KNO_3 solution (table1). Earlier studies indicated that beneficial effects of such a treatment were not because of embryo enlargement., advancement of germination leaehing of toxic metabolites from seed .differential moisture absorption by treated ,untreated seeds or antifungal effeets of treatment is observed significant reduction in lipid peroxidation in treated seeds.

According to them a counteraction of lipid peroxidation associated free radical reactions would account., at least in part., for better membrane functions ,consequent improved vigour ,viability of treated sunflower. Mobilization effceincy was significantly greater in all the pre -treated seeds especially when KNO_3(67%),$CaCl_2$ (63%)were used (table 1).

Wheat showed a significant increase in the length of root 12.8 cm ,vigor index 2166 over barley. While barley was superior in the dry weight of root 21.3 mg (table 2) may be due to the genetic differences between the species.

Maximum mobilization efficiency 70% dry weight of shoot ,root 43.3, 33.3respectively were recorded when wheat seeds treated with kNO_3 compared with untreated seeds (table 3) .on the other hand., treated barley seeds with kNO3 gave highest vigour index compared with untreated seeds.

Results show a considerable evidence of the influence of seed pre sowing with apple peel extract treated that chemically treated on some physiological processes. However., it's important to realize that our results were obtained in a controlled environment be the responded in a normal field condition where competition for light nutrients ,other environmental factors can play an important role changing the plant behaviour imbibition's parameters followed soaking measures ,diversity of profiles lost in selection when singleline intensive cultivars are developed because decrease in genetic polymorphism compared with the metagenome of numerous ecotype Local varieties, [15] oat forms different in their metabolites. which is additional explanation of the differentiation between these subspecies of common oat [2], plant species grown by region the varities of

plant are a source of special genetic characters, local varieties resistant to biotic and abiotic stresses typical for their environment. Which is source for special phytochemicals as a health beneficial compound, while the content the targeted compounds is lower in commercial cultivar [16,17].

Table 2. Some physiological processes of germination ,early performance of seedlings of wheat barley influenced by chemical solutions.

Species	Germination%	Velocity of germination%	Shoot length (cm)	Root length (cm)	Short weight (mg)	Root weight (mg)	Vigr-index	Mobilization efficiency (%)
Wheat	83	26	13.6	8.8	28.0	21.3	1860	57
Barley	84	26	13.7	12.8	29.3	19.3	2166	55
L.S.D 0.05	N.S	N.S	N.S	1.50	N.S	1.8	5.87	N.S

Table 3. Effect of pre-sowing treatments on some physiological processes of germination early performance of seedlings of wheat barley.

Species	Seed treatment	Germination %	Velocity of germination (%)	Shoot length (cm)	Root length (cm)	Short weight (mg)	Root weight (mg)	Vigor-index	Mobilization efficiency (%)
Wheat	Control (untreated	73	24	9.0	6.5	20.0	13.3	1324	40
	Water	77	25	11.2	7.8	23.3	20.0	1833	48
	Treat.NaCl	81	26	15.0	8.2	26.7	20.0	1842	62
	Treat.CaCl2	88	26	16.0	9.2	26.7	20.0	2119	65
	Treat.KNO3	97	27	17.0	12.3	43.3	33.3	2180	70
Barley	Control (untreated	72	23	10.4	9.8	23.3	13.3	1898	47
	Water	75	26	14.0	11.0	26.7	16.7	1914	50
	Treat.NaCl	82	27	14.3	11.5	26.7	20.0	1933	52
	Treat.$CaCl_2$	93	27	1407	11.8	33.3	23.3	2363	61
	Treat.KNO_3	98	27	15.0	2.0	36.7	23.3	2724	63
	L.S.D0.05	N.S	N.S	N.S	N.S	3.23	4.10	13.11	6.24

Conclusion

Soaking in apple peel extract treated with sodium chloride $NaCl_2$., calcium chloride $CaCl_2$,potassium nitrate KNO_3 following by drying of seeds of wheat (*Triticum aestivum* L.) , barley (*Hordeum Vulgar* L.). The treatments had significant effects on physiological parameters of above mentioned plants

Acknowledgment

Thankful to each person and institution whom support this study with acknowledgements and patience

References

[1] **FAO** Save ,Grow. Available online: http://www.fao.org/ag/save-and-grow/MRW/index_en.html ,12 December 2020).

[2] **Loskutov**., I.G.; Shelenga., T.V.; Rodionov., A.V.; Khoreva., V.I.; Blinova., E.V.; Konarev., A.V.; Gnutikov., A.A.; Konarev., A.V.Application of metabolomic analysis in exploration of plant genetic resources. Proc. Latv. Acad. Sci. 2019., 73., 494–501.

[3] **Bityutskii**., N.; Loskutov., I.; Yakkonen., K.; Konarev., A.; Shelenga., T.; Khoreva., V.; Blinova., E.; Rymin., A. Screening of Avena sativa cultivars for iron., zinc., manganese., protein ,oil contents ,fatty acid composition in whole grains. Cereal Res. Commun. 2019., 48.

[4] **Gordeeva.,** E.; Shamanin., V.; Schoeva., O.; Khlestkina., E. The strategy for marker-assisted breeding of anthocyanin-rich spring bread wheat (Triticum

aestivum L.) cultivars in West Siberia. Agronomy 2020., 10., 1603.

[5] **Morgounov**., A.; Karaduman., Y.; Akin., B.; Aydogan., S.; Baenziger., S.; Bhatta., M.; Chudinov., V.; Dreisigacker., S.; Govindan., V.; Güler., S.; et al. Yield ,quality in purple grain wheat isogenic lines. Agronomy 2020., 10., 86.

[6] **Leonova.,** S.; Shelenga., T.; Hamberg., M.; Konarev., A.V.; Loskutov., I.; Carlsson., A.S. Analysis of oil composition in cultivars and wild species of oat (Avena sativa). J. Agric. Food Chem. 2008., 56., 7983–7991.

[7] **Marshall**., H.G. Oats Science ,Technology (Agronomy); Sorrells., M.E.., Ed.; American Society of Agronomy: Madison., WI., USA.,1992; p. 846.

[8] **Olson.,** R.A. Nutritional Quality of Cereals Grains: Genetic ,Agronomic Improvement; Frey., K.J.., Ed.; American Society of Agronomy:Madison., WI., USA., 1987.

[9] **Peterson**., D.M. Oat–a Multifunctional Grain. In Proceedings of the 7th International Oats Conference., Helsinki., Finland., 28 July 2004; pp. 21–26.

[10] **Rasmusson**., D.C. Nutritional Quality of Barley; American Society of Agronomy: Madison., WI., USA., 1985.

[11] **Khanahmadi** M.., Rezazadeh S.H.., Taran M. In vitro antimicrobial ,antioxidant properties of Smyrnium cordifolium boiss (Umberlliferae) extract. Asian J. Plant Sci. 2010;9:99–103

[12] **Moo-Huchin** V.M.., Estrada-Mota I.., Estrada-León R.., Cuevas-Glory L.., Ortiz-Vázquez E.., Vargas Mde L.., Betancur-Ancona D.., Sauri-Duch E. Determination of some physicochemical characteristics., bioactive compounds ,antioxidant activity of tropical fruits from Yucatan., Mexico. Food Chem. 2014;152:508–515.

[13] **Malaguti**., M.; Dinelli., G.; Leoncini., E.; Bregola., V.; Bosi., S.; Cicero., A.F.G.; Hrelia., S. Bioactive peptides in cereals ,legumes: Agronomical., biochemical ,clinical aspects. Int. J. Mol. Sci. 2014., 15., 21120–21135.

[14] **Zou.,** Y.; Liao., D.; Huang., H.; Li., T.; Chi., H. A systematic review ,meta-analysis of beta-glucan consumption on glycemic control in hypercholesterolemic individuals. Int. J. Food Sci. Nutr. 2015., 66., 355–362.

[15] **Yang**., J.; Wang., P.; Wu., W.; Zhao., Y.; Idehen., E.; Sang., S. Steroidal saponins in oat bran. J. Agric. Food Chem. 2016., 64., 1549–1556.

[16] **Sang**., S.; Chu., Y. Whole grain oats., more than just a fiber: Role of unique phytochemicals. Mol. Nutr. Food Res. 2017., 61., 1600715.

[17] **Kumar.,** K.; Chauhan., D.; Kumar., S. Barley: A potential source of functional food ingredients. In Proceedings of the Conference: National Seminar on Technological Interventions in Food Processing , Preservation., Jaipur., India., 17 November 2017.