Journal of Sohag Agriscience (JSAS) 2022, 7(1):100-107

Effect of some pre-sowing treatments on seed germination and seedling growth of *Melia azedarach l.* and *Tamarindus indica l.* trees

Ebeid A F A, Amr M M Mahmoud and Mona M A Mostafa

ISSN 2357-0725
https://jsasj.journals.ekb.eg
JSAS 2022; 7(1): 100-107

Received: 02-06-2022
Accepted: 02-07-2022

Ebeid A F A
Mona M A Mostafa
Timber trees Department
Horticulture Research Institute
Agricultural Research Center
Giza
12619
Egypt

Amr M M Mahmoud
Botanical Gardens Department
Horticulture Research Institute
Agricultural Research Center
Giza
12619
Egypt

Corresponding author:
Ebeid A F A
ahmedfakhry930@gmail.com

Abstract

The present study was conducted during two successive seasons of 2020 and 2021 to determine the effect of some pre-germination treatments on germination and seedling growth of *Tamarindus indica* and *Melia azedarach*. In this study, seeds of the two species were subjected to seven treatments i.e. soaking seeds in GA3 at 1000, 2000 and 3000 ppm for 24 h.; immersing seeds in concentrated sulphuric acid for 10 and 20 min.; seed scarification by steel file and untreated (control) seeds. Seeds were sown in poly ethylene pots (25 x 30 cm) under normal environmental condition for germination. The highest germination percentage was recorded in seeds of the two species treated by mechanical scarification, followed by immersion in concentrated sulphuric acid (98%) for 20 and 10 minutes. Meanwhile, the lowest values of germination percentage were obtained with the control, followed by soaking seeds in GA3 at 1000 ppm compared to other treatments. Mechanical scarification, followed by concentrated H_2SO_4 for 20 and 10 min. led to highly significant reduction in time to attain 50% germination as well as the highest values of vigor index for the tested species in the 1st and 2nd seasons compared to other treatments. Also, the results showed that the pre-germination treatments have a significant effect on the growth performance (shoot and root length, number of leaves, fresh and dry weight of shoots and roots as well as chlorophyll content) of *M. azedarach* and *T. indica*. The highest values of the growth parameters were obtained from applying scarification and concentrated sulphuric acid for 20 and 10 min., respectively. The study recommended mechanical scarification and sulphuric acid for 20 minutes for the best seed germination and seedling growth of these tree species.

Keywords: *Melia azedarach*, *Tamarindus indica*, pre- germination treatments, seedling characteristics.

INTRODUCTION

Melia azedarach L., belongs to Meliaceae family, it is highly valuable tree species due to its multipurpose importance and as a tree for agro forestry and urban forestry (Sujatha and Manjappa, 2015). The wood is extensively used for small boxes, sporting requisites, musical instruments, furniture, veneer and plywood. Also, It is a good fuel wood species and a profitable tree for saw and shuttle making (Salim Azad *et al*., 2010). However, a uniform germination of seed with good vigor is necessary for the production of seedlings for any successful domestication and large scale afforestation programme. Applying of different pre-germination treatments which are designed to reduce the dormancy related to hard seed coat has been found to be effective for many tree species (Murugesh, 2011; Anand *et al*., 2012). The main difficulty of establishing *M. azedarach* is its poor seed germination (Salim *et al.*, 2010). In addition, seeds of *M. azedarach* have hard seed coat and pre seed treatments helps in breaking the physical dormancy (Wulandini and Widyani, 2007; Sujatha and Manjappa, 2015). Tamarind tree (*Tamarindus indica* L.: Leguminosae) is a tropical fruit tree native to the tropical Africa and reported to be underutilized worldwide. It is an arboreal plant, diffused as an important food source, wood and medicinal values, today only few stands of the species remained due to over exploitation without proper management and effective forest laws (Maiguru *et al*., 2020). Previous studies have pointed out that the fruits of tamarind have pharmacological and nutraceutical properties, among these anti-inflammatory and analgesic actions, and they are effective in the treatment of headaches and stress symptoms (Souza *et al*., 2010; Suralkar, 2012). Also, tamarind tree is one of the ornamental trees that can be grown in neighboring roads in addition to protecting the environment. Tamarind has valuable wood that is used in the manufacture of furniture, various agricultural tools, hammers and others (Coates-Palgrave, 1988). Leguminosae is a well-known family for seeds in which dormancy is imposed by a seed coat which prevents imbibition (Rolston, 1978; El- Keltawy *et al*., 2010). In the majority of legume seeds: dormancy is overcoming by the chemical and mechanical scarification treatments (Nakamura, 1962; Rolston, 1978; El- Keltawy *et al*., 2010). On the other hand, various compounds which are known to stimulate seed germination had no effect on tamarind as NaOH and ethanol (El-Keltawy *et al*., 2010). Tamarind seeds begin to germinate about 13 days after sowing but may take a month to complete germination. The main disadvantage of seed propagation is that freshly harvested seeds of tamarind exhibit poor germination percentage even if exposed to favorable conditions of germination owing to seed dormancy. It may be due to morphological factor such as hard, thick testa or due to incorrect storage or handling (Vasantha *et al*., 2014). Thus, it is necessary to use efficient pre-germination treatments to overcome seed dormancy, in order to provide a high germination percentage (Baskin and Baskin, 2014). The overcoming of integumentary dormancy by physical and chemical methods has been evaluated in tamarind seeds. In a study by Maiguru *et al*. (2020) on tamarind seed, mechanical scarification showed complete germination after 8 days and resulted in highest germination percentage followed by concentrated H_2SO_4 which led to complete germination within 10 days and the least was soaking seeds in hot water. Therefore, the present study was carried out to explore the most suitable pre- sowing treatments on germination and seedling growth of *Melia azedarach* and *Tamarindus indica* seeds.

MATERIALS AND METHODS

Seeds of *Tamarindus indica* L. were obtained from Aswan Medicinal Market, Aswan, Egypt. Whereas, seeds of *Melia azedarach* L. were collected from healthy trees grown in Qena Governorate. The experiment was conducted at Al-Marashda Agricultural Research Station, Qena, ARC, Egypt (26° 9' N, 32° 42' E) during 15th February to 15th September of 2020 and 2021 seasons. The growing medium was sandy soil: clay (1:1 v/ v) and the physical and chemical properties of these growing medium according to Page *et al.* (1982) are shown in (Table 1).

The treatments

In both seasons, seven treatments were applied for the two species seeds i.e. untreated seeds (control); soaking seeds in GA_3 at 1000, 2000 and 3000 ppm for 24 h.; immersing seeds in concentrated sulphuric acid for 10 and 20 min. with no burning as well as seed scarification by steel file. Treated seeds were sown in the prepared growing medium. The experiment was arranged in completely randomized design with three replicates. There were 7 treatments for each species, and each treatment was represented by 30 seeds. Ten seeds per pot (25 x 30 cm) had been disinfected by a fungicide and irrigated daily. In addition, all other cultural practices were completed according to the requirements of nursery.

Recorded data

Germination percentage (G%) was measured as : G%= number of seedlings emerged/ total number of seeds planted x 100. Mean germination rate was recorded as number of days to attain 50% of total germination according to Odetola (1987). The different growth parameters were evaluated after three months from the date of seed sowing. The vigor index was calculated by the equation given by Akhasta *et al*. (2014): Vigour index (cm) = mean seedling length x germination percentage. For seedling growth, the following parameters were measured: root and shoot length (cm), number of leaves as well as fresh and dry weight of shoots and roots (g). Total chlorophyll content (mg/g FW) was calculated by the protocol designed by Arnon (1949). The collected data on the different parameters were tabulated for statistical analysis. However, the means were compared by using the least significant difference test (L.S.D.) at 5% level according to Snedecor and Cochran (1980).

RESULTS AND DISCUSSIONS

Germination characteristics

The effect of pre- sowing treatments on germination parameters of *T. indica* and *M. azedarach* seeds were tabulated in Table (2). The means of these parameters were significantly differed by the pre- sowing treatments for the two species in the 1st and 2nd seasons. Mechanical scarification treatment was the best method for germination improvement which gave 92 and 84.7 % in the mean of seasons for *T. indica* and *M. azedarach*, respectively. Also, acid scarification for 20 minutes showed 88.0 and 82.8 % germination in the mean of both seasons for *T. indica* and *M. azedarach*, respectively. The lowest values (62.2 and 44.6 %) of germination in the mean of seasons were noticed with the control for *T. indica* and *M. azedarach*, respectively. In addition, the obtained results in this table revealed that using mechanical scarification by steel file followed by, seed immersing for 20 min. in concentrated sulphuric acid led to highly significant reduction in time to attain 50% germination as well as the highest values of vigor index for the tested species in the 1st and 2nd seasons compared to other treatments. This result may be due to facilitating the water penetration to the seed embryo that speeds up germination and thus reducing days to attain 50% germination and producing stronger seedlings compared to other treatments. The obtained results agreed with those of Gonzalez- Melero *et al.* (1997) and Sujatha and Manjappa (2015). Ahmad *et al.* (2015) stated that nicking for *Acacia modesta*; acid scarification for 15 minutes for *Albizzia lebbeck;* nicking and acid scarification for 30 minutes for *Cassia fistula*, and nicking for *Leucaena leucocephala* seeds are recommended for improving percentage and speed of the germination. On the other hand, Nourmohammadi *et al.* (2019) on *Gleditsia caspica* found that sulfuric acid treatments have the best potential to break seed dormancy and produce high-quality seedlings.

Growth characteristics

The effect of pre sowing treatments on the growth parameters of *T. indica* and *M. azedarach* seeds was tabulated in Tables (3 and 4). Data presented in these tables showed that the most effective treatment was mechanical scarification, followed by concentrated sulphuric acid at 10 and 20 min. for both tree species compared to other treatments. However, scarification treatment had the highest values of shoot and root length, number of leaves/ seedling and fresh and dry weights of shoot and root compared to other treatments. The lowest values of these characters were recorded with untreated seeds, followed by soaking seeds in gibberellic acid at 1000 or 2000 ppm for 24 h. compared to other treatments. The findings of Maximous (1998) and Gomaa (1998); supported our results. Scarification seeds of *Acacia auriculiformis* brought about the highest germination percentages and the highest values for seedling growth compared to that of the control (Olatunji *et al.,* 2012). The stimulatory and positive effects of scarification on germination as well as growth traits had been reported for some tree species of the Fabaceae as *Tamarindus indica* (Muhammad and Amusa, 2003), *Prosopis juliflora* (Zare *et al.* 2011), *Centrosema pubescens* (Rusdy, 2015) and *Gleditsia caspica* (Nourmohammadi *et al*., 2019). The pre-germination methods of mechanical scarification positively influenced the growth and quality of *T. indica* seedlings (Gomes and de Sá, 2019).

Total chlorophyll content

Data obtained on the effect of some pre sowing treatments on chlorophyll content in the leaves of *T. indica* and *M. azedarach* are shown in Table (5). The highest values of total chlorophyll content were recorded in both species treated with mechanical scarification. Similar the control, followed by soaking seeds in GA_3 at the rate of 1000 ppm treatments resulted in the lowest content of chlorophyll. Wani and Singh (2018) found that all treatments proved successful in stimulating the rate of early growth in *Terminalia arjuna* compared to control.

Depending upon the different treatment sources, the enhancement of germination, growth along with plant metabolites and overcoming all the barriers including dormancy could be employed for improving the quality of planting stock of *T. arjuna.* They added that the increase in the chlorophyll content can cause increase in the total yield of *Terminalia arjuna*. Marcu *et al*. (2013) pointed out that the chlorophyll content of the leaf is a good indicator of the photosynthesis which is of special significance for precision forestry. Earlier germination when applied pre- sowing treatments as scarification and concentrated sulphuric acid may be the reason to increase of all growth seedling parameters and chemical characters (Kumar, 2016 and El-Bably and Rashed, 2018). In conclusion, under natural conditions, *Tamarindus indica* and *Melia azedarach* seeds take a long period of time to germinate because of the hard seed coat, which creates dormancy and slows down germination process. Our results revealed that treating seeds with mechanical scarification, followed by immersion in concentrated sulphuric acid for 20 or 10 minutes gave better germination and growth characteristics. Therefore, these pre- sowing treatments are very essential in breaking seed dormancy and hastening germination of *T. indica* and *M. azedarach.*

Table (1): Chemical analysis of the used media (clay and sandy soil) for germination and growth of *T. indica* and *M. azedarach* seeds.

Soil type	E.C. (m.mohs/cm^3)	pH	P_2O_5%	Anion (meq/L.)			Cation (meq/L.)		
				HCO_3^-	Cl^-	SO_4^-	Ca^{++}	Mg^{++}	K^+
Clay	1.34	7.83	0.19	4.26	16.61	4.28	26.47	8.43	6.04
Sand	1.82	7.45	0.11	6.43	21.07	3.33	4.28	3.56	5.26

Table (2): Effect of some pre- germination treatments on germination percentage (G%), mean germination rate (MGR) (days) and vigor index (VI) (cm) of *Tamarindus indica* and *Melia azedarach* seeds during 2020 and 2021 seasons.

Treatments	G %			MGR (day)			VI (cm)		
	1st season	2nd season	Mean	1st season	2nd season	Mean	1st season	2nd season	Mean
	T. indica								
Control	60.6	63.8	62.2	12.2	12.3	12.3	1898.2	2082.9	1990.6
GA_3 1000 ppm	64.2	66.0	65.1	11.7	11.2	11.5	2322.3	2485.7	2404.0
GA_3 2000 ppm	67.6	68.1	67.9	10.6	10.8	10.7	2620.2	2773.3	2696.8
GA_3 3000 ppm	74.8	73.4	74.1	9.3	9.8	9.6	3105.6	3194.2	3149.9
H_2SO_4 10 min.	87.2	85.2	86.2	7.9	8.6	8.3	3942.9	3968.5	3955.7
H_2SO_4 20 min.	88.5	87.5	88.0	7.3	7.5	7.4	4240.8	4335.7	4288.3
Scarification	92.3	91.7	92.0	6.4	6.7	6.6	4933.8	5082.9	5008.4
Mean	76.5	76.1		9.4	9.6		3294.8	3417.6	
LSD 5%	1.70	2.32		0.43	0.64		109.31	121.90	
	M. azedarach								
Control	45.5	43.7	44.6	14.3	14.2	14.3	1315.6	1327.4	1321.5
GA_3 1000 ppm	53.9	54.9	54.4	13.2	13.5	13.4	1770.2	1908.9	1839.6
GA_3 2000 ppm	61.7	62.6	62.2	12.0	12.3	12.2	2192.5	2333.8	2363.2
GA_3 3000 ppm	67.4	67.0	67.2	11.0	11.4	11.2	2517.3	2639.4	2578.4
H_2SO_4 10 min.	82.1	80.2	81.2	9.4	10.4	9.9	3350.5	3303.4	3327.0
H_2SO_4 20 min.	83.5	82.1	82.8	8.4	9.0	8.7	3596.0	3635.6	3615.8
Scarification	85.9	83.4	84.7	7.7	7.9	7.8	4066.4	4026.7	4046.6
Mean	68.6	67.7		10.9	11.3		2686.9	2686.9	
LSD 5%	1.60	1.71		0.83	0.72		107.13	100.11	

Table (3): Effect of some pre- germination treatments on shoot and root length (cm) and No. of leaves/ seedling of *Tamarindus indica* and *Melia azedarach* seedlings during 2020 and 2021 seasons.

Treatments	Shoot length (cm)			Root length (cm)			No. of leaves/ seedling		
	1st season	2nd season	Mean	1st season	2nd season	Mean	1st season	2nd season	Mean
	T. indica								
Control	20.0	20.4	20.2	11.3	12.3	11.8	11.5	11.0	11.3
GA_3 1000 ppm	23.5	24.2	23.9	12.7	13.4	13.1	13.4	12.5	13.0
GA_3 2000 ppm	25.2	26.1	25.7	13.5	14.6	14.1	14.8	13.7	14.3
GA_3 3000 ppm	26.8	27.7	27.3	14.7	15.8	15.3	16.3	15.4	15.9
H_2SO_4 10 min.	27.6	28.4	28.0	17.6	18.2	17.9	17.5	15.9	16.7
H_2SO_4 20 min.	29.4	30.2	29.8	18.5	19.3	18.9	18.4	18.1	18.3
Scarification	31.6	32.8	32.2	21.9	22.6	22.3	21.0	21.8	21.4
Mean	26.3	27.1		15.8	16.6		16.1	15.5	
LSD 5%	0.71	27.10		0.63	0.42		0.64	0.43	
	M. azedarach								
Control	17.9	18.8	14.4	11.0	11.6	11.3	8.7	7.5	8.1
GA_3 1000 ppm	20.5	21.3	20.9	12.3	13.5	12.9	9.9	8.9	9.4
GA_3 2000 ppm	22.2	22.8	22.5	13.4	14.5	14.0	11.0	10.4	10.7
GA_3 3000 ppm	23.2	23.8	23.5	14.1	15.5	14.8	13.0	11.5	12.3
H_2SO_4 10 min.	24.0	24.6	24.3	16.8	16.6	16.7	14.3	12.6	13.6
H_2SO_4 20 min.	25.5	25.8	25.7	17.6	18.5	18.1	14.9	13.6	14.3
Scarification	26.6	26.7	26.7	20.7	21.5	21.1	15.5	15.0	15.3
Mean	22.9	23.4		15.1	16.0		12.5	11.4	
LSD 5%	0.89	0.59		0.50	0.64		0.48	0.62	

Table (4): Effect of some pre- germination treatments on shoot fresh and dry weight and root fresh and dry weight (g) of *Tamarindus indica* and *Melia azedarach* seedlings during 2020 and 2021 seasons.

Treatments	Shoot fresh weight (g)			Shoot dry weight (g)			Root fresh weight (g)			Root dry weight (g)		
	1st season	2nd season	Mean	1st season	2nd season	Mean	1st season	2nd season	Mean	1st season	2nd season	Mean
T. indica												
Control	7.5	7.7	7.6	2.6	2.8	2.7	4.7	4.5	4.6	2.3	2.2	2.3
GA_3 1000 ppm	8.6	8.3	8.5	2.8	3.2	3.0	5.4	5.2	5.3	2.5	2.3	2.4
GA_3 2000 ppm	9.3	9.4	9.4	3.5	3.7	3.6	5.9	5.9	5.9	2.8	2.9	2.9
GA_3 3000 ppm	10.4	10.5	10.5	3.8	3.9	3.9	6.7	6.7	6.7	3.3	3.3	3.3
H_2SO_4 10 min.	11.6	11.4	11.5	4.3	4.3	4.3	7.7	7.5	7.6	3.6	3.5	3.6
H_2SO_4 20 min.	12.4	12.6	12.5	4.6	4.7	4.7	8.5	8.2	8.4	3.9	4.0	4.0
Scarification	13.0	13.3	13.2	4.8	5.2	5.0	9.0	9.1	9.1	4.4	4.5	4.5
Mean	10.4	10.5		3.8	4.0		6.8	6.7		3.3	3.3	
LSD 5%	0.51	0.52		0.33	0.30		0.42	0.43		0.20	0.22	
M. azedarach												
Control	6.0	5.3	5.7	1.8	1.6	1.7	3.7	3.5	3.6	1.3	1.4	1.4
GA_3 1000 ppm	6.7	6.4	6.6	2.3	1.8	2.1	4.3	3.9	4.1	1.5	1.6	1.6
GA_3 2000 ppm	7.5	7.1	7.4	2.5	2.4	2.5	5.1	4.3	4.7	1.9	1.8	1.9
GA_3 3000 ppm	8.5	7.7	8.1	2.8	2.7	2.8	5.7	4.7	5.2	2.3	2.2	2.3
H_2SO_4 10 min.	9.1	8.4	8.8	3.2	3.3	3.3	6.2	5.4	5.8	2.6	2.4	2.5
H_2SO_4 20 min.	9.7	9.2	9.5	3.6	3.6	3.6	6.7	6.4	6.6	2.8	2.8	2.8
Scarification	10.2	10.3	10.3	3.8	3.7	3.8	7.1	6.6	6.9	3.2	3.2	3.2
Mean	8.3	7.8		2.9	2.7		5.5	5.0		2.2	2.2	
LSD 5%	0.32	0.35		0.20	0.26		0.29	0.30		0.18	0.24	

Table (5): Effect of some pre- germination treatments on total chlorophyll in leaves of *Tamarindus indica* and *Melia azedarach* seedlings during 2020 and 2021 seasons.

Treatments	*T. indica*			*M. azedarach*		
	Total chlorophyll (mg/g FW)					
	1st season	2nd season	Mean	1st season	2nd season	Mean
Control	4.4	4.6	4.5	3.6	3.6	3.6
GA_3 1000 ppm	4.8	4.9	4.9	4.3	4.5	4.4
GA_3 2000 ppm	5.5	5.3	5.4	4.8	4.9	4.9
GA_3 3000 ppm	6.4	6.2	6.3	5.0	5.3	5.2
H_2SO_4 10 min.	6.7	6.6	6.7	5.4	5.6	5.5
H_2SO_4 20 min.	7.4	7.3	7.4	5.8	5.9	5.9
Scarification	7.7	7.5	7.6	6.3	6.2	6.3
Mean	6.1	6.0		5.0	5.2	
LSD 5%	0.31	0.33		0.35	0.34	

REFERENCES

Ahmad, R.Z.; M. N. K. Shaheen; J. Afzal; S. U. Siddique; I. A. Qamar and J. Ahmed (2015): Improvement of seed germination in some important multi-purpose leguminous trees of Islamabad Area: An experimental study. Basic Res. J. Agric. Sci. Rev., 4 (7): 217-224.

Akhasta, C.K.R.; H.M. Somashekarappa and J. Souframanien (2014): Effect of gamma irradiation on germination, growth, and biochemical parameters of *Terminalia arjuna* Roxb." Radiat. Prot. Environ..36(1): 38-44.

Anand, B.; G.M. Devagiri; M. Gurav; H.S. Vasudev and A.K. Khaple (2012): Effects of pre- sowing treatments on germination and seedling growth performance of *Melia dubia* CAV: An important multipurpose tree. Inter. J. of Life Science, 1 (3): 59- 63.

Arnon, D.L. (1949): Copper enzymes in isolated chloroplasts polyphenoloxidase in Beta Vulgaris. Plant Physiol. 24: 1-15.

Baskin, M.J. and C.C. Baskin (2004): A Classification System for Seed Dormancy. Cambridge University press, p. 1-66.

Coates-Palgrave, K. (1988): Trees of Southern Africa. 10. *Tamarindus indica L. C. S.* Striuk Publishers, Cape Town, 278–9.

El-Bably, Samia M.Z. and Nahed M. Rashed (2018): Influence of pre germination treatments on overcoming seed dormancy and seedling growth of baobab (*Adansonia digitata* L.). Zagazig J. Agric. Res., 45 (2): 465-476.

El- Keltawy, N.E.; I.H. El- Sallami; S.L. Maximous and A.F.A. Ebeid (2010): Germination and growth of some leguminous trees in response to pre- germination treatments. The 5th Int. Proc. for Develop. and the Env. In the Arab World, Assiut Univ. Center, Environmental Studies, Egypt, March, 21- 23: 395- 411.

Gomaa, E.E.A. (1998): Studies on propagation of some ornamental trees. M.Sc. Thesis, Agric. Fac. Kafr El- Sheikh, Tanta Univ.

Gomes, C.D.L. and J. M. de Sá (2019): Production of *Tamarindus indica* L. seedlings submitted to substrates and pre-germination methods. e-ISSN 1983-4063 - www.agro.ufg.br/pat - Pesq. Agropec. Trop., Goiânia, v. 49, e54029.

Gonzalez- Melero, J.A.; F. Perez- Garcia and G.B.M. Laborde (1997): Effect of temperature, scarification and gibberellic acid on the seed germination of three shrubby species of *Coronilla* (Leguminosae). Seed Sci. & Technol., 35: 167- 175.

Kumar, V. (2016): Effect of pre-sowing seed treatment on germination and seedling growth of *Terminalia bellirica* (Gaertn.) Roxb. Ind. J. Ecol., 43 (1): 233-238.

Maiguru, A.A., E.C. Chinweuba and S.S. Zaku (2020): Pre-sowing treatments for improved germination and growth performance of tamarind (*Tamarindus indica*) in Wukari, Taraba State, Nigeria. International Journal of Wildlife and Endangered Species Conservation (IJWESC), 3(01): 102-107.

Marcu, D.; V. Cristea and L. Daraban (2013): Dose-dependent effects of gamma radiation on lettuce (*Lactuca sativa* var. capitata) seedlings. Int. J. Radiat. Biol., 89 (3): 219–223.

Maximous, L.S. (1998): Effect of some growth regulators and scarification on seed germination and seedling growth of stored *Pinus pinea* seeds. Egypt. J. Appl. Sci. 13 (6): 201- 216.

Muhammad, S. and N.A. Amusa (2003): Effects of sulphuric acid and hot water treatments on seed germination of tamarind (*Tamarindus indica* L.). African Journal of Biotechnology, 2 (9): 376–279.

Murugesh, H.C. (2011): Effect of seed pre-treatments on germination and seedling attributes of *Grevillia robusta*. My Forest, 47 (1): 53- 62.

Nakamura, S. (1962): Germination of Legume Seeds. Proc. int. Seed Test. Ass. 27: 694-709.

Nourmohammadi, K.; D. Kartoolinejad; R. Naghdi; C. C. Baskin (2019): Effects of dormancy-breaking methods on germination of the water impermeable seeds of *Gleditsia caspica* (Fabaceae) and seedling growth. Folia Oecologica, 46 (2): 115- 126.

Odetola, J.A. (1987): Studies on seed dormancy, viability and germination in ornamental plants. Principles, 31 (1): 24- 30.

Olatunji, D.; J.O. Maku and O.P. Odumefun (2012): Effect of pre-treatments on the germination and early seedlings growth of *Acacia auriculiformis* Cunn. Ex. Benth. African Journal of Plant Science, 6 (14): 364– 369.

Page, A.L.; R.H. Miller and D.R. Keeny (1982): Methods of soil analysis part 2, 2nd (Edn.). Agron. 9, pub. Madison Wisconsin, U.S.A.

Rolston, M.P. (I978): Water impermeable seed dormancy. Bot. Rev. 44: 365-396.

Rusdy, M. (2015): Enhancing germination in seeds of *Centrosema pubescens.* International Journal of Scientific Research, 5 (10): 1–4.

Salim, A.; Z. Al- Musa and Abbdul Matin (2010): Effects of pre-sowing treatments on seed germination of *Melia azedarach*. J. of Forest. Res. 21 (2):193- 196.

Snedecor, C.W. and W.G. Cochran (1980): Statistical Methods. 6th ed. Iowa State Univ., Press, Ames. lowa, USA., 953p.

Souza, M. D.; R.R. Fernandes and M.C. Pasa (2010): Estudo etnobotânico de plantas medicinais na comunidade São Gonçalo, MT. Biodiversidade, 9 (1): 91-100.

Sujatha, V.N. and K. Manjappa (2015): Effect of pre-sowing treatments on seed germination of *Melia azedarach* L. Karnataka J. Agric. Sci., 28(2): 269-270.

Suralkar, A. A. (2012): Evaluation of anti-inflammatory and analgesic activities of *Tamarindus indica* seeds. International Journal of Pharmaceutical Sciences and Drug Research, (4) 3: 213-217.

Vasantha, P.T.; R.C. Vijendrakumar; T.R. Guruprasad; R.D. Muttappanavar and K.V. Santhosh (2014): Studies on effect of media composition and biofertilizer inoculants on seedling growth and seedling vigour of tamarind (*Tamarindus indica* L.). Asian J. Hort., 9(1) June: 178- 182.

Wani, M.R. and S. S. Singh (2018): Influence of different pre-sowing seed treatments on germination and early growth behavior of *Terminalia arjuna*: a potential medicinal tree. International Journal of Scientific Research in Multidisciplinary Studies, 4 (12): 45-48.

Wulandini , R. and N. Widyani (2007): *Melia azedarach* L. Seed Leaflet, No. 117, Forest & Landscape, Denmark (Website: www. SL. ku. dk).

Zare, S.; A. Tavili and M.J. Darini (2011): Effects of different treatments on seed germination and breaking seed dormancy of *Prosopis koelziana* and *Prosopis Juliflora*. Journal of Forestry Research, 22 (1): 35–38.

الملخص العربي

تأثير بعض معاملات ما قبل الزراعة علي الانبات ونمو الشتلة لأشجار الزنزلخت والتمر الهندي

[1]أحمد فخري علي عبيد – [2]عمرو محمود محمد محمود- [1]مني مصطفى عباس مصطفي

[1]قسم بحوث الاشجار الخشبية- معهد بحوث البساتين- مركز البحوث الزراعية- مصر
[2]قسم بحوث الحدائق النباتية- معهد بحوث البساتين- مركز البحوث الزراعية- مصر

أجري هذا البحث في موسمين متتاليين 2020 و 2021 لدراسة تأثير بعض معاملات ما قبل الزراعة علي الانبات ونمو الشتلة الناتجة لبذور نوعين من الأشجار الهامة، هما الزنزلخت والتمر الهندي. تم استخدام سبعة معاملات وهي النقع في حمض الجبريلليك تركيز 1000 و 2000 و 3000 جزء في المليون لمدة 24 ساعة والغمس في حمض كبريتيك مركز لمدة 10 و 20 دقيقة والخدش الميكانيكي باستخدام مبرد حديد بالاضافة الي معاملة المقارنة (الكنترول). وأهم النتائج التي تم الحصول عليها ما يلي: نتج أعلي القيم الخاصة بالنسبة المئوية للإنبات وأقل الايام اللازمة للحصول علي 50 % انبات عند معاملة البذرة بالخدش الميكانيكي يليها معاملة الغمس في حمض الكبريتيك المركز لمدة 20 دقيقة ثم معاملة الغمس في حمض الكبريتيك لمدة 10 دقائق لنوعي الأشجار في كلا الموسمين . نتجت أعلي القيم الخاصة بمعامل القوة عند معاملة البذرة بالخدش الميكانيكي يليها المعاملة بحمض الكبريتيك المركز لمدة 20 و 10 دقائق. أيضا كان لهذه المعاملات السابقة تأثيرا معنويا في زيادة صفات الشتلة الناتجة من حيث طول الشتلة وطول الجذر وعدد الأوراق والاوزان الطازجة والجافة لكل من الشتلة والجذر مقارنة بباقي المعاملات المستخدمة. كان أعلي محتوي من الكلوروفيل الكلي في الورقة للشتلات الناتجة من معاملة البذرة بالخدش الميكانيكي والغمس في حمض الكبريتيك المركز لمدة 20 و 10 دقائق لنوعي الأشجار في كلا الموسمين. وعليه توصي الدراسة، أنه للحصول علي نسبة انبات مرتفعة وفي فترة من الوقت أقل والحصول علي شتلة قوية يجب معاملة بذور هذين النوعين من الأشجار والتي بها سكون يرجع الي صلابة القصرة بالخدش الميكانيكي باستخدام المبرد الحديد أو بأي أداه دون الحاق ضرر بالجنين لتسهيل دخول الماء الي جنين البذرة أو بمعاملة البذرة بالغمس في حمض الكبريتيك المركز لمدة 20 أو 10 دقائق ثم الغسل السريع بالماء.