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EFFECT OF PRE-SOWING TREATMENT AND SEED SIZE ON GERMINATION IN *ALANGIUM LAMARCKII*

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ABSTRACT

The effect of pre-sowing treatment on seed germination of *Alangium lamarckii* was studied using mechanical scarification, sulphuric acid treatment (5, 10 and 15 minutes) and dry heat treatment at 60, 80, and 100 ^{0}C (15, 30, and 60 minutes). The percentage germination was different between these treatments. Seeds of treated with sulphuric acid for 10 minutes showed better germination (100%). Germination was higher at 60 ^{0}C dry heat incubation compared to 80 ^{0}C and 100 ^{0}C.

Introduction

Alangium lamarckii a member of family *Cornaceae* is a moderate sized deciduous tree with a rather open crown. This is one of the most beautiful of Indian flowering trees, vernacular name is Akola (Troop, 1921). The Fruit an indehiscent pod, (min. 9) 17-24 x (min. 3) 4-6 cm, stalked, covered with short brown hairs, pale yellowish-brown or grey when ripe, in the lower part flat, with a single seed near the apex. Seed ellipsoid, flattened, about 3cm long. It contains sugar, tartaric acid, malic acid, oxalic acid, one more acid catharatic acid considered the purgative principal of the drug (Bhatytacharya, 2000). Natural regeneration of this species is very limited (Singh, 1982).

We know much about the species potential in terms of growth and productivity. There are certain factors (intrinsic and extrinsic) which determine seed germination. Critical among intrinsic factors are seed coat impermeability and status of the embryo. Likewise, external environmental factors such as temperature and moisture can affect seed germination. The power of germination of *Alangium lamarckii* is lost during the storage (Arya and Arya, 2006). The seed coat of *Alangium lamarckii* is very hard due to the advancement of aril and crauncle during the time of megagametogenesis. Seed coat imposed dormancy is a delaying mechanism, which prevent germination under condition that might prove to be unsuitable for establishment, thereby, distribution germination both in time and space. Berry, N. et. al. (2021). Find best pre-sowing treatment for enhancement of germination in *G. arborea*. Seeds were treated with different treatment includes growth regulators (GA_3 100 and 20ppm), acid scarification (H_2SO_4), cold water and

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untreated seeds as control. Among all the treatments seeds treated with GA_3 (200ppm) recorded the higher germination percentage (98.88%) followed by H_2SO_4 (93.33%) as compared to untreated seeds in control. Khan, M. R. (2015) also studies the effect of different treatments on the seed germnation on *Pterocarpus marsupium*. Kumar, V. (2020) has studies Pre-sowing treatment in *Terminelia bellirica* and observed that Seeds of *Terminelia bellirica* shows best germination (100%) in seeds treated with H_2SO_4 for 10 minutes. Adebisi and Bello (2015) has studies in pre-sowing treatment in *Gmelina arborea*.

Therefore, large, medium and small sized seeds of *Alangium lamarckii* were treated with sulphuric acid, dry heat exposures and mechanical scarification to determine the germination.

Material and Methods

For experiment Seeds were collected from 20-22 years old *Alangium lamarckii* trees situated at Banguan and Orchha forests in the month of April to May 2023. For investigation, the seeds were divided into three categories on the basis of their weight. Large (0.21-0.30g), medium (0.11-0.20g) and Small (0.05-0.10g). The seeds were treated mechanically as well as with chemicals. Effect of temperature was also studied on seed germination.

Various Pre-sowing treatment made are summarized as under.

1. A small piece of the seed coat from distal end of cotyledon was removed mechanically using a nail clipper and sown (Scarification).
2. Seeds were treated with concentrated H_2SO_4 (98%) for 5, 10, 15 minutes and after treatment, the seeds were rinsed for about 3 minutes under tap water.
3. Dry heat treatment was given by keeping the seeds in preheated oven at 60^o, 80^o and 100^oC for 15, 30 and 60 minutes and then sown.
4. The treated seeds were sown in Polythene bags of 25cm X 10cm sized at Botanical garden, P. K. University Campus, Shivpuri. The experiment was set up in completely randomized design and replicated twice. Regularly watering was done in the experiment. After the germination data were collected and statistically analyzed.

Results and Discussion

The seeds of *Alangium lamarckii* were subjected to various Pre-treatments for enhancing germination percentage. It is interesting to note that all of the treatments were quite effective in enhancing seed germination percentage (table-1).

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Mechanical treatment

Removal of small part of seed from distal end before sowing enhanced seed germination (36.3%) as compared to 16.7% germination with intact seed coat (Control) in medium sized seeds while in small sized seeds no germination occurred. Other sized seeds showed poor germination. With the perusal of the results it has been concluded that the enhanced germination in the medium sized seeds was due to better inbibition of water through the seed coat.

Effect of acid treatment

Treatment with concentrated H_2SO_4 enhanced seed germination (Table-1). High germination (100%) was obtained by treatment with the acid for 10 minutes in large and medium sized seeds. Acid treatment with concentrated $H2SO_4$ for 5 minutes also showed good results (100%) in large sized seeds only but other large sized seeds did not show good results in 5 minutes acid treatment while treatment with 15 minutes showed less germination in all sized seeds. Thus, the suitable timing of breaking the dormancy of *Alangium lamarckii* by acid treatment (Con. H_2SO_4) was 10 minutes. Acid scarification with concentrated H_2SO_4 for 30 minutes improved seed treatment to the extent of 83% in *Acacia* (Natarajan and Rai, 1998). However, H_2SO_4 treatment for 60 minutes in *Acacia nilotica* seeds improved germination up to 90% (Zodape, 1991). During the course of present investigation treatment with concentrated $H2SO_4$ for only 10 minutes was found to be much effective and enhanced seed germination could have been the reason that the seed coat of the seed would have become fully permeable to water.

Dry heat treatment

Rate of germination differed significantly between dry heat treatment a well as incubation periods. In *Alangium lamarckii* the germination response to various dry heat treatments was not good. In general, dry heat treatment was not good. In general, dry heat treatment at 60^o C gave better results than other temperature. Temperature exposure for 30 minutes and above proved lethal in *Butea monosperma*. Dry heat treatment of *Pongamia galbra* at 25 ^{o} C showed maximum germination (Singh, et. al., 2005).

TABLE-1 Effect of Seed treatment on seed germination of *Alangium lamarckii*

Treatment	Categories of Seeds		
	Large	Medium	Small
Scarification	21.1	36.3	0

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(Mechanical)	(3.1)	(4.2)	(0)
Sulphuric acid			
5 minutes	100	66.7	50
	(9.1)	(8.3)	(6.3)
10 minutes	100	100	83.3
	(16.7)	(12.5)	(6.7)
15 minutes	50	66.7	66.7
	(8.3)	(8.3)	(11.1)
Dry heat, 60ºC			
15 minutes	50	33.3	50
	(3.33)	(2.1)	(3.1)
30 minutes	66.7	33.3	16.7
	(6.1)	(4.2)	(2.8)
60 minutes	0	33.3	16.7
	(0)	(3.3)	(2.8)
Dry heat, 80ºC			
15 minutes	33.3	16.7	33.3
	(1.5)	(1.3)	(2.6)
30 minutes	31.3	16.7	0
	(4.2)	(3.3)	(0)
60 minutes	16.7	16.7	16.7
	(1.7)	(2.1)	(1.7)
Dry heat, 100ºC			
15 minutes	16.7	16.7	16.7
	(2.8)	(1.1)	(2.1)
30 minutes	16.7	0	0
	(3.3)	(0)	(0)
60 minutes	0	0	0
	(0)	(0)	(0)
Control	0	16.7	0

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	(0)	(1.1)	(0)

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