

## EFFECT OF WATER SOAKING PERIOD ON SEED GERMINATION OF *TERMINALIA BELERICA* ROXB., *T.ARJUNA* W&A AND *AEGLE MARMELOS* L. CORR.

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### Abstract

Seed germination behaviour of three tree species of medicinal value viz. *Terminalia belerica*, *T.arjuna* and *Aegle marmelos*, was studied in an open nursery at Chittagong, Bangladesh. The influence of two different water soaking periods viz. 02 and 24 hours, on germination of seeds, sown both in seed bed and polyethylene bag containing a sowing medium of nursery soil and cowdung (3:1), was determined. Seeds of all three species, soaked in water for 24 hours before sowing and sown directly in polyethylene bag, showed best germination percentages. The results of the study suggest that longer water soaking period of seeds and sowing in polyethylene bag with high temperature could be recommended for better seed germination of all three species studies.

### Introduction

Use of herbal medicine in the treatment of various diseases is well recognized and popularly practiced in the rural areas of Asian countries, Bangladesh in particular. However, there is no organized plantation of medicinal plants in most of the Asian countries so far. In these circumstances, large scale cultivation of these plants deserves significant attention. Investigation on seed germination behaviour of medicinal plants need to be carried out so as to develop techniques of handling of seeds in the nursery to raise large number of seedlings for the purpose.

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Generally, seeds are soaked in water before sowing. Due to water soaking of seeds a series of events usually take place resulting the embryo to grow into seedling. The importance of water soaking in the enhancement of seed germination has been reported by Chen (1981). With the gradual increase in water soaking period of seeds, the germination would be enhanced (Ayerza 1981; Dayanand and Lohidas 1988). However, in some cases, prolonged period of water soaking of seed may induce low germination rate (Saxena *et al.*, 1985). Jatisatiener (1982) observed that high temperature of surrounding environment would also have positive influence on seed germination. Thus, the present study was conducted to determine the germination behaviour of seed of three tree species of medicinal value. The seed was sown both in seed bed and polyethylene bags after two different water soaking periods.

## Materials and Methods

After one month of collection, fully ripened fruits of *Terminalia belerica* (Bahera), *T.arjuna* (Arjun) and seeds of *Aegle marmelos* (Bel) were sown in a sowing medium consisting of nursery soil and cowdung in a proportion of 3:1, respectively. Before sowing, fruits/seeds of each species were soaked in tap water for a period of 02 and 24 hours. Two sowing methods viz; sowing in seedbeds and polyethylene bags, containing above-mentioned sowing medium were used for the study. The treatments included 3 species, 2 water-soaking periods and 2 sowing methods replicated 5 times. The experiment was carried out during the period from March to May. The data on seed germination were recorded at two days intervals from the date of first sprouting and continued for 68 days. The temperature of sowing medium, both in seed beds and polyethylene bags, was also recorded at 03, 07 and 11 hours of photoperiod for a period of 28 days at 07 days intervals. The data of each species were computed to determine germination percentage and then analysed statistically by means of factorial analysis.



## Results and Discussion

Seed germination of Bahera, Arjun and Bel started within 17, 08 and 12 days of seed sowing and continued upto 57, 68 and 32 days, respectively (Table 1). Seeds of all three species, soaked in tap water for 24 hours showed higher germination percentage than the seeds soaked for 02 hours, whether sown in seed bed or in polyethylene bag. The statistical analysis of data showed that the variation in mean germination percentages was highly significant for the two soaking periods of seed of all three species (Table 2). This is similar to the results observed by Ayerza (1981) in Jujoba seeds, where water soaking period of 24 hours gave best germination (85%). Prolonged period of water soaking may increase water potential in seeds which induce the softening of hard seed coat in association with leaching out of germination inhibiting substances. The observation of increased germination of red sanders (*Pterocarpus santalinus* Linn. f) seeds with the increase of water soaking period (Dayanand and Lohidas, 1988) supports the argument. However, this result is contradictory with the result of *Sesamum indicum* seeds, where prolonged water soaking period induce rapid leakage of solutes resulting in low germination rate (Saxena *et al.*, 1985).

Comparing the seed germination behaviour observed in seed beds and polyethylene bags, irrespective of water soaking period, seeds of all three species showed higher germination percentage in polyethylene bags than in seed bed (Table 1). This may be due to higher mean temperature (42°C) in sowing medium of polyethylene bag than that in sowing medium of seed bed (37°C). This is in agreement with the results that high temperature induce best germination percentage of *Solanum laciniatum* (Jatisatiener, 1982). Seed sowing method had shown significant difference in Arjun and Bel Whereas, the difference in mean germination percentage of Bahera seeds was statistically non-insignificant (Table 2).



Table 1. Germination behaviour of Bahera, Arjun and Bel seeds, sown in seed bed and polyethylene bag after soaking in tap water for 02 hours and 24 hours.

Name of species	Soaking period (hrs)	Germination behaviour			
		Seed bed		Polyethylene bag	
		G. Period (days)	G. %	G. Period (days)	G. %
Bahera	02	23-53	55	24-54	68
	24	19-55	82	17-57	95
Arjun	02	14-62	23	16-64	33
	24	08-66	48	08-68	70
Bel	02	16-30	37	17-35	49
	24	13-31	62	12-32	75

Table 2. Mean germination percentage of Bahera, Arjun and Bel seeds, sown in two different sowing place after soaking in tap water for two different periods

Name of species	Water soaking period			Seed sowing place			Tab. F.
	2 hours	24 hours	Cal. F.	Seed bed	Poly. Bag	Cal. F.	
Bahera	61.50	88.50	16.15	68.50	81.50	3.75	4.96
Arjun	28.00	59.00	27.55	35.50	51.50	7.34	4.96
Bel	43.00	68.50	30.07	49.50	62.00	7.22	4.96

Cal. F. = Calculated F. value;

Tab. F. = Tabulated F. value

## Conclusions

Seed of Bahera, Arjun and Bel sown in polyethylene bags, containing sowing medium of nursery soil and cowdung (3:1 ratio, respectively), after soaking in tap water for 24 hours showed best germination percentages (95,70 and 75%, respectively).

## Reference

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