

Published on: 1st March 2012**SEED GERMINATION BEHAVIOUR OF *SAPINDUS MUKOROSI***

UPMA DOBHAL, SNEHLATA BHANDARI, SHIVANI BISHT AND N.S.BISHT

DEPARTMENT OF BOTANY, H.N.B.GARHWAL UNIVERSITY, PAURI

CAMPUS, PAURI (GARHWAL),UK.

upmadobhal@yahoo.co.in**ABSTRACT:**

Sapindus mukorossi is an important tree of social forestry, known for its medicinal as well as commercial values. In this study, germination behaviour of seeds of *S.mukorossi* was investigated. The seed germination increased after giving some pre- sowing treatments like cow dung slurry, acid treatments and hot water treatments. A remarkable increase in germination percentage was recorded after pre-sowing treatment. The findings reveal that maximum germination percentage (66.6 %) was noticed in acid treatment, the results of hot water treatment were also good , germination percentage was comparatively poor in pre-treatment with cow dung slurry than other two treatments.

KEY WORD: Ayurvedic, Germination, Hot water treatment.

INTRODUCTION:

S. mukorossi is an important medicinal tree, known for its commercial values. Apart from being economically important, it is also suitable for afforestation and soil reclamation / phytoremediation programs. Owing to the rich medicinal properties, the plant has found mention in ancient literature. Different parts of the plant have been used in Ayurvedic formulation by Vaidyas for curing various ailments. The plant has also been exploited industrially, for production of soaps, detergents and other products of commercial importance. *Sapindus mukorossi* and its related species are known for their low, delayed and uneven germination. . The improvement in germination of *Sapindus* seeds can be achieved by using pre sowing treatments like cow dung slurry and acid treatments (Brahmam & Saxena 1996; Sheikh, 1979), hot water treatments (Campbell, 1983 & Jackson, 1994). Thus, a study on the effect of some pre sowing treatments on the seed germination was carried out to test and identify the few suitable pre sowing treatments during the present study.

MATERIAL AND METHODS:

The seeds were collected from the nursery of Forest Division of District Pauri, in the month of February and March 2008. About 6 months old healthy seeds were selected manually and these seeds were treated with boiling water, cow dung slurry and concentrated HCl as shown in Table 1 and some of the seeds were also sown as such without any treatment and considered as control. The pre-treated seeds were sown

in polythene bags containing equal mixture each of forest soil, compost and sand. Thirty seeds for each treatment were sown in three replicates (10 seeds per replicate). Germination was recorded after 20 days of sowing up to 120 days at an interval of twenty days.

RESULTS:

The analysis revealed that germination behaviour differed in all the treatments. No germination was observed after 80 days of sowing in control [W], one or two seeds germinated after 120 days of sowing reflecting very poor germination (6.66%) in untreated seeds.

Germination was noticed in all treated seeds after one month of sowing. Germination was found to be very poor in cow dung slurry treated seeds. Response was observed only in treatment [L] i.e. keeping seeds in cow dung slurry for 6 days (3.33 %). Best germination percentage was reflected in acid treatment. Maximum germination at 40 day stage (33.33) was recorded in treatment [V] i.e. 110 minutes in concentrated HCl while minimum (13.33) was recorded in treatment [O] where the seeds were kept for 5 minutes in concentrated HCl. The response was also good in boiling water treatment followed by cold water treatment. Maximum germination percentage (26.66) among boiling water treated seeds was recorded in treatment [G] where seeds were exposed for 15 minutes in boiling water and then 24 hours in cold water and minimum (10%) in [D] 10 minutes in boiling water and 24 hours in cold water [Table 2].

Observation after 60 days of sowing revealed that best germination (46.66 %) occurred in acid treatment [V]. After 100 days, results did not differ, except in some acid treatments where germination percentage was comparatively high. The final reading was recorded at 120 day stage. The maximum germination was 66.6 % in treatment [V] followed by 63.33 % in treatment [R]. The lowest germination (10 %) was observed in [M] keeping in cow dung slurry for 8 days. Maximum germination per cent in cow dung slurry was 20.

DISCUSSION:

The analysis revealed that the 22 pre-treatments differed in germination behaviour. In general, it was found that seeds germinated faster in acid treatment than other treatments indicating positive response of acid to hasten the germination process. Again the germination increased with the increase in duration of soaking in acid as there was 66.66 per cent germination in seeds soaked in concentrated HCl for 110 minutes. These results are consistent with the earlier studies conducted by various researchers (Thapa and Gautam., 2006, Brahman *et al.*, 1996).

The germination response was also good in the treatment of seeds in boiling water followed by cold water treatment, the maximum germination per cent being in 10 minutes in boiling water and 72 hours in cold water and minimum (40 %) in 10 minutes in boiling water and 24 hours in cold water [B]. The seed soaking in acid for 20 minutes significantly improved the germination (Sheikh, 1979) and he found similar

results in boiling water followed by cold water treatment. Similarly Campbell (1983) reported the improvement in germination with pre sowing treatment of immersing seeds in hot water and leaving for sometimes. Thapa (2002) also reported seed immersion in boiling water for 3 minutes and soaking in cold water for 72 and 48 hours, could be used to improve the germination of *S. murokossi* seeds.

The germination percentage was comparatively poor in pre-treatment with cow dung slurry than other two treatments. Similar response in cow dung slurry pre-treatment has been reported by Thapa (2002).

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Table 1: Pre-treatment trials in seeds of *S. mukorossi*

S.No	Treatments	Treatment code
1	5 minutes in boiling water and 24 hours in cold water	A
2	5 minutes in boiling water and 48 hours in cold water	B
3	5 minutes in boiling water and 72 hours in cold water	C
4	10 minutes in boiling water and 24 hours in cold water	D
5	10 minutes in boiling water and 48 hours in cold water	E
6	10 minutes in boiling water and 72 hours in cold water	F
7	15 minutes in boiling water and 24 hours in cold water	G
8	15 minutes in boiling water and 48 hours in cold water	H
9	15 minutes in boiling water and 72 hours in cold water	I
10	Keeping in cow dung slurry for 2 days	J
11	Keeping in cow dung slurry for 4 days	K
12	Keeping in cow dung slurry for 6 days	L
13	Keeping in cow dung slurry for 8 days	M
14	3 minutes in concentrated HCl	N
15	5 minutes in concentrated HCl	O
16	10 minutes in concentrated HCl	P
17	20 minutes in concentrated HCl	Q
18	40 minutes in concentrated HCl	R
19	60 minutes in concentrated HCl	S
20	80 minutes in concentrated HCl	T
21	100 minutes in concentrated HCl	U
22	110 minutes in concentrated HCl	V
23	Control	W

Table 2: Mean germination percentage (%) of *S. mukorossi* after pre-sowing treatments

Treatment code	Number of Days					
	20	40	60	80	100	120
A	0	16.66	23.33	30.00	33.33	40.00
B	0	16.66	26.66	33.33	40.00	43.33
C	0	13.33	16.66	30.00	36.66	43.33
D	0	10.00	13.33	26.66	30.00	36.66
E	0	20.00	26.66	30.00	30.00	33.33
F	0	23.33	23.33	30.00	33.33	36.66
G	0	26.66	30.00	33.33	33.33	40.00
H	0	23.33	23.33	30.00	30.00	33.33
I	0	20.00	26.66	26.66	36.66	43.33
J	0	00.00	10.0	13.33	20.00	20.00
K	0	00.00	6.66	10.00	10.00	13.33
L	0	03.33	10.00	13.33	13.33	16.66
M	0	00.00	3.33	03.33	10.00	10.00
N	0	23.33	26.66	26.66	30.00	36.66
O	0	13.33	20.00	23.33	33.33	40.00
P	0	26.66	30.00	36.66	43.33	46.66
Q	0	23.33	40.00	40.00	53.33	60.00
R	0	16.66	43.33	46.66	60.00	60.00
S	0	30.00	46.66	50.00	56.66	63.33
T	0	26.66	30.00	33.33	40.00	46.66
U	0	30.00	40.00	43.33	50.00	53.33
V	0	33.33	46.66	50.00	56.66	66.66
W	0	00.00	00.00	00.00	03.33	06.66