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Short Communication

STANDARIDIZATION OF *IN VITRO* SEED GERMINATION IN *TERMINALIA CHBULA* RETZ.

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ABSTRACT
Terminalia chebula seeds obtained from Madhugiri provenance of Karnataka germinated within 9.20 days when inoculated on MS medium containing l.0 ppm GA_3. Cent per cent germination was recorded from the seeds collected from Arasikere, with 1.0 ppm GA_3 in the MS medium. Whereas, the highest survival rate was recorded in seedlings grown from seeds collected from Channapattana provenance, with 1.5 ppm GA_3 (88.32%). The possible reason for good and early germination would be due to better exposure of seed organs to nutrients and hormones in pathogen free environment.

KEYWORDS: *Terminalia chebula,* GA_3, seed organs, seedlings

INTRODUCTION

Terminalia chebula is commonly known as 'Harda' belongs to family Cornbretaceae. It is distributed in most parts of the country except in arid zones. The fruits are astringent in taste having laxative properties. They are used externally for local applications to chronic ulcers and wounds (Bhardwaj arid Chakraborthy, 1994). It is one of the main constituents of "triphala", used for stomach disorders; powdered fruit pulp is used as dentrifice for curing teeth bleeding and ulceration of gums (Jain, 1994). Regeneration of T. *chebula* under natural habitat is very poor due to lower rate of seed germination creating scarcity of plant material. Presently, there is a vast demand worldwide for ayurvedic herbal products over allopathic system of medicines and the demand for its fruit has increased tremendously. Hence, there is a need for newer .and efficient technique to propagate *T. chebula* at faster rate. Presently, T. *Chebula* plants are raised in nurseries with conventional methods, which take longer time (3-4 months) for germination and success is very less. Further, excessive mortalities have greatly hamphered the production of seedlings. The present study describes a new in-vitro method to enhance germination, to reduce time and seedling mortality.

MATERIAL & METHOD

Matured fruits were collected from five different agro-climatic provenances of Karnataka *viz,* Arasikere, B.R. Hills, Madhugiri, Channapattana and Shimoga. The fruits were dehusked with the help of hammer and hard endocarp was removed carefully without causing damage to the seeds. They were then sterilised using 4 per cent sodium hypochlorite and surface sterilized with 0.1 per cent $HgCl_2$. The sterilized seeds were inoculated on to flasks containing MS (Murashige & Skoog) media alone (control) and with different concentrations of GA_3 (0.5, 1.0 and 1.5 ppm) under aseptic conditions. Inoculated flasks were incubated in growth chamber at 25 ± 2^0C and light intensity of 14 wm^{-2}.

RESULTS AND DISCUSSION

Germination percentage

The germination was significantly higher in seeds collected from Arasikere (100%) when inoculated on MS media with 1.0 ppm GA_3, which was *on par* with 0.5 and 1.5 ppm GA_3. Seeds obtained from B.R.Hills recorded 95 per cent germination in MS media with 1.0 and 1.5 ppm GA_3 which was *on par* with 0.5 ppm GA_3. Whereas, 1.5 ppm GA_3 recorded maximum per cent of germination in seeds collected from Cahnnapattan (95%) and Madhugiri (90%) which were alike to 1.0 and 0.5 ppm GA_3 in their respective provenances, while, 1.0 and 1.5 ppm GA_3 recorded significantly higher germination of 55 per cent in seeds collected from Shimoga provenance (Table-1), MS media without GA_3 recorded lower germination per cent from all the areas. Maximum germination in MS medium having GA_3 may be attributed to promotic effect of GA_3. The results obtained are in conformity with observations made by Sangam (1986) in *Spathoglotis, Plicates,* Florina and Rinaldi (1989) in *Cycas revolute* and Reddy *et al.* (1997) in *Tectona grandis.*

Time taken for germination

A definite trend was not observed among the different provenances, for time taken for germination of seeds (Table 2), but seeds grown on MS medium having 0.5, 0.1 and 1.5 ppm GA_3 resulted in quicker germination compared to MS medium along (control). However, MS medium with 1.0ppm GA_3 had minimum number of days (9.2) for germination in seeds collected from Madhugiri, Which was *on par* with MS media having 1.5 ppm GA_3 (9.8 days). Seeds collected from Arasikere took less number of days for germination (10.80) when they were inoculated on to MS medium with 1.0 ppm GA_3, which was *on par* with MS medium having 1.5 ppm GA_3 (11.00 days). Whereas, MS medium with 0.5 and 1.5 ppm GA_3 recorded early germination (10.80 days) of seeds collected from B.R.Hills. However seeds collected from Channapattan provenance recorded early germination on MS medium with 0.5 ppm GA_3 which was *on par* with other two GA_3 concentration. While, MS medium with 1.5

ppm GA_3 produced early germination in seeds of Shimoga (11.20 days) which was *on par* with MS medium having 0.5 and 1.0 ppm GA_3. Role of *in vitro* culture utilizing MS medium in enhancing the quick germination has been reported by Reddy *et al* (1997) in teak as against soil media (3-6 months). Randhawa (1990) reported that MS medium with GA_3 as best media for early germination in Anthurium. The possible reason would be the better exposure of seed organs to nutrients and hormones and lack of natural barrier caused by seed coat.

Survival percentage

There was no significant difference with respect to survival percentage of seedlings among different treatments (Table - 3).

TABLE 1: Effects of GA_3 on germination percentage in *Terminalia chebula* under *in vitro* conditions.

GA3concentration (ppm)	Arasikere	B. R. Hills	Channapattana	Madhugiri	Shimoga
0.00 ppm GA_3	55.00	45.00	60.00	60.00	30.00
0.5 ppm GA_3	90.00	90.00	85.00	80.00	35.00
1.0 ppm GA_3	100.00	95.00	95.00	85.00	55.00
1.5 ppm GA_3	95.0O	95.00	95.00	90.00	55.00
F test	*	*	*	*	*
SEM±	4.67	5.30	5.86	5.86	5.30
CD at 5%	14.02	15.90	17.57	17.57	15.90

TABLE 2: Effects of GA_3 on time taken (days) for germination in *Terminalia chebula* under *in vitro* conditions.

GA_3 concentrations (ppm)	Arasikere	B.R. Hills	Channapattana	Madhugiri	Shimoga
0.00 ppm GA_3	16.20	16.60	14.80	16.40	17.40
0.5 ppm GA_3	11.40	10.80	9.80	10.20	11.80
1.0 ppm GA_3	10.8O	11.40	10.20	9.20	11.40
1.5 ppm GA_3	11.00	10.80	10.40	9.80	11.20
F test	*	*	*	*	*
SEM±	0.18	0.22	0.21	0.21	0.22
CD at 5%	0.56	0.67	0.63	0.63	0.67

TABLE 3: Effects of GA_3 on survival percentage in *Terminalia chebula* seedlings

GA_3 concentrations (ppm)	Arasikere	B.R. Hills	Channapattana	Madhugiri	Shimoga
0.00 ppm GA_3	83.32	70.00	76.64	66.64	50.00
0.5 ppm GA_3	78.32	76.64	83.32	74.96	61.00
1.0 ppm GA_3	85.00	80.00	85.00	83.32	73.00
1.5 ppm GA_3	78.32	78.32	88.32	83.32	63.00
F test	NS	NS	NS	NS	NS
SEM±	-	-	-	-	-
CD at 5%	-	-	-	-	-

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