INFLUENCE OF CHEMICAL TREATMENTS ON SYZYGIUM CUMINI (L.) SKEELS SEEDS.

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ABSTRACT

The seeds of Syzygium cumini (L.) Skeels were treated with different chemical treatments. It was observed that the highest percentage of seed germination, shoot length, root length, number of leaves was recorded in Gibberellic acid ($C_{19}H_{22}O_6$) for 50 ppm as compared with other chemical treatments viz.Potassium hydroxide (KOH), Sodium hydroxide (NaOH), Potassium nitrate (KNO_3), Hydrochloric acid (HCl), Sulphuric acid (H_2SO_4) and Thiourea.

Key words: *Syzygium cumuni* , Germination, Shoot length and Root length.

INTRODUCTION.

Syzygium cumini (L.) Skeels, Myrtaceae is a multipurpose fruit tree with diverse medicinal significance. The fruits are rich sources of sugars, iron, minerals and proteins. (Thoke *et al.* 2011,Swamy *et al.* 1999,). The fruit of Syzygium cumini is used to removes bad smell from mouth, , astringent, antidiabetic, stomachic biliousness and diuretic (Nadkarni, 1976). The seed extract is used to treat skin problems such as rashes and the mouth, throat, intestines (Chandrasekaran and Venkatesalu, 2004). Seed viability can be retained, in short term, if the seeds have maintained above critical moisture content i.e. 40-50% (Ouedraogo *et al.*, 1999).Freshly harvested *Syzygium cumini* seeds gave better germination percentage within 1-2 weeks and may loose their viability soon after shedding (Mbuya *et al.*, 1994). Therefore its seeds are considered difficult to store for longer term and thus are sensitive to drying (Srimathi *et al.*, 2001,Pritchard *et al.*, 1999,). Several efforts were put forth for enhancing germination by use of chemicals and growth regulators like thiourea, KNO3, *etc*. besides soaking in water with varied success (Sadrollah *et.al* 2010,Shanmugavelu, 1970).) studied and concluded that the effect of different acids had a positive effect on seed germination and dormancy braking of *Prosopis* species. In chemical treatments, the maximum seed germination percent was observed after pre-treatment the seeds with H_2SO_4 for 10 min (57.33%) and followed by H_2SO_4 for 5 min (39.66%). On the other hand, lowest germination was obtained in HCl for 5 min by 7.33%. (Peinetti et al.1993 and Pelaez et al.1992) concluded that very high germination percentages (95%) for acid and mechanical scarified *Prosopis caldenia* seeds, respectively. (Muhammad and Amusa 2003) studied and concluded that the seed germination were increased with increasing H_2SO_4 concentration and treatment time in valuable medicinal plants viz. *Tamarindus indica* and *Retama raetam*, *Ononis serrata* and *Mesembryanthemum crystallinum*, respectively. Experimental results of (Villagra

1997) show that increasing salinity (NaCl) caused a decrease in both rate of germination and final percentages in *Prosopis alpataco* and *P. argentina* species. With the threats of global warming and increasing desertification. there is an need to conservation of dry land plants for the preservation of their diversity. Seeds is an effective means of achieving this goal for need of quick growing of seedlings in short span of time from their sowing time. With these application , to observe the effect of seed treatment on germination and seedling growth of *Syzygium cumini*, the present study was planned.

MATERIALS AND METHODS.

A) Collection and Sowing of Seed Material.

In the present study, *Syzigium cumini* seeds were collected from Gondpipri region District Chandrapur, India. Collected seeds were then packed in sterile polythene for experimental study.

Experiment was carried out at Department of Botany, Chintamani College of arts & Science College Gondpipri Dist.Chandrapur (M.S).India. Seeds were first' surface sterilized for 1 min by immersing in 0.1 % $HgCI_2$ solution for 5 min and subsequently washed with diluted water. Seeds were treated with Potassium hydroxide (KOH), Sodium hydroxide (NaOH), Potassium nitrate (KNO_3), Hydrochloric acid (HCl), Sulphuric acid (H_2SO_4), Gibberellic acid ($C_{19}H_{22}O_6$) .The seeds were sown in polybags. In first experiment *Syzygium cumini* seeds were sown at different depth of 5cm in already soil filled polybags. Polybags were filled with mixed soil. To each polybag single seed was sown. The pots were saturated with water by surface irrigation. During plant growth pots were irrigated daily by spraying with water until water drained from the bottom of the pot. Germination was measured daily for 30 and 60 days. All plants were harvested to determine percent germination, shoot height, root length, number of leaves and stem diameter of shoots (Asgharipour, 2011).

RESULTS AND DISCUSSION.

The effect of different chemical treatments viz.- inorganic compound-Potassium hydroxide (KOH), Sodium hydroxide (NaOH), Potassium nitrate (KNO_3), Hydrochloric acid (HCl), Sulphuric acid (H_2SO_4), Thiourea (CH_4N_2S), Gibberellic acid ($C_{19}H_{22}O_6$) for 50 ppm and hot water presoaking treatment on seeds of *Syzygium cumini* were treated. Percent germination, shoot length, root length and number of leaves stem diameter were observed. The results are mentioned in table 1. It is clear from result summarized in table 1 that seeds of *Syzygium cumini* treated with Gibberellic acid ($C_{19}H_{22}O_6$) for 50 ppm were proved favorable to express maximum percent germination, shoot length, root length, number of leaves and NaOH 5 minutes for stem diameter. While minimum in Con. H_2SO_4 4 minutes and Con. HCl 4 min as compared with hot water treatment and control. All results are statistically significant. Hence, above treatment are recommended for *Syzygium cumini* nursery growers. Several workers have performed such types of experiment on seeds of medicinal plants.

Table 1: Effect of different chemical treatments on seed germinability of *Syzygium cumini*.

Treatment (ppm)	Germination (%)	Mean			
		Shoot length (cm)	Root length (cm)	No. of leaves	Stem Diameter (mm)
KOH 5 Min	50	10.84	9.61	10.6	4.6
NaOH 5Min.	60	11.64	10.24	8.8	4.8
Con. KNO_3 5 Min	60	10.43	11.67	7.3	3.7
Con. HCl 5 Min.	40	8.31	9.59	6.8	4.2
Con .H_2SO_4 5 Min.	30	9.61	9.93	6.6	4.2
Thiourea	70	11.87	10.47	9.9	4.5
GA 50 ppm	70	17.41	15.71	10.3	4.7
Hot Water	80	10.32	9.89	9.5	4.5
Pre-Soaked (Control)	30	9.12	9.44	8.4	3.4

In order to study the incidence of infection of fungi on infected seeds of *Syzygium cumini*, the experiment was conducted. The results are mentioned that in Gibberellic acid ($C_{19}H_{22}O_6$) for 50 ppm chemical treatment, 07 different types of fungi was found to be observed namely *Alternaria alternata, Aspergillus niger, A. fumigatus, Aspergillus flavus, Fusarium oxysporum, Mucur* spp, *Rhizopus stolonifer* and seeds treated by Thiourea 5 minutes treatment 04 different types of fungi was found namely *Alternaria alternata, Aspergillus niger, Aspergillus flavus, Mucur* spp.

In the KOH 4 minutes treatment 07 different types of fungi was observed namely *Alternaria alternata, Aspergillus niger, A. fumigatus, Aspergillus flavus, Fusarium oxysporum, Mucur* spp, *Rhizopus stolonifer* and in case of NaOH 4 minutes treatment 08 different types of fungi was found namely *Alternaria alternata, Aspergillus niger, A. fumigatus, Aspergillus flavus, Fusarium oxysporum, Mucur* spp, *Penicillium* spp,. *Rhizopus stolonifer*. Similarly Seeds treated with Con. KNO3 4 minutes treatment 07 types of fungi was found to be observed similarly , Con. Hcl minutes (08 fungi), Con .H_2SO_4 4 minutes (07 fungi) was found to be observed. A seed borne pathogen present externally or internally or associated with the seed as contaminant, may cause seed abortion, seed rot, seed necrosis, reduction or elimination of germination capacity as well as seedling damage resulting in development of disease at later stages of plant growth by systemic or local infection (Jain *et.al.,* 1982) isolated *Fusarium oxysporum* from the seeds of mustard. KNO3 0.1% is recognized as the best treatment for improvement seed germination properties of C. persica. Similar results were reported in previous studies for the species of Citrullus colocynthis , Foeniculum vulgare and Cuscuta epithymum , Hypericum avicullariifolium and Avena fatua . According these results, KNO3 0.1% treatment is suggested for improvement of C. persica germination and this treatment is proper for propagation of studied species Asghar et.al (2014).

Acid scarification is known to be highly effective in improving germination of species with hard seed coats (Shaltout and Shorbagy 1989). In the present study, germination of the studied species found to be accelerated on treatment with 96% Sulfuric acid under the different periods. Treatment of 96% Sulfuric acid was

fully effective in breaking dormancy of P. farcta at 5 and 10 min. the similar results have been reported by (Grouzis and Danthu 2001) and (Kulkarni et al. 2006). For species of hard seeds (P.farcta), the resistance of the seed integument to the penetration of water may be lifted by Sulfuric acid treatment, manual or mechanical scarification or scalding, which reduce the resistance and the impermeability of the integument (Elberse and Breman 1989). The seeds of *Meizotropis buteiformis* were treated with KOH and result observed that highest percentage of seed germination for KOH and NaOH treatment(Gaisamudre and Dhabe 2011). Effect of chemical factors on seed germination of *Pentapetes phoenicea* were studied and observed that H_2SO_4 treatment for 20 minutes gives 98% of germination by breaking the dormancy. 5-10 minutes of KOH treatment shows 80% of germination. GA_3 also gives germination of 100%(Yawalikar et.al 2012).

CONCLUSIONS.

Chemical treatment enhance the seed germination under nursery conditions. Among the pre-sowing treatments, the best treatment for the sowing of *Syzygium cumuni* seeds are Gibberellic acid ($C_{19}H_{22}O_6$) for 50 ppm followed by Thiourea and NaOH 5Min. were proved favorable to express maximum percent germination, shoot length, root length, number of leaves as compared with other treatments. Therefore, Gibberellic acid ($C_{19}H_{22}O_6$) for 50 ppm may be recommended for plantation programme.

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