EFFECT OF PRE-SOWING TREATMENTS ON SEED GERMINATION AND PLANT GROWTH OF *SYZYGIUM CUMUNI* (L.) SKEELS.

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ABSTRACT *To study the effect of KOH and NaOH on seed germination. It was observed that, 10% KOH and 10% NaOH favoured maximum seed germination of Syzygium cumuni. Maximum shoot length was noted at 5% KOH and 10% NaOH. On the other hand, root length was maximum at 10% KOH and 5% NaOH.*

Keywords: *Syzygium cumuni , germination, shoot length and root length.*

Introduction.

Syzygium cumini (L.) Skeels (Myrtaceae) a hard timber tree of tropics and important for its edible fruit and medicinal value. Its fruit possess considerable nutritive value. It is a good source of iron apart from usual content e.g. Minerals, sugar, protein etc. (Singh, et.al. 1967). The bark is acrid, sweet, digestive, astringent to the bowels, anthelmintic and used for the treatment of sore throat, bronchitis, asthma, thirst, biliousness, dysentery and ulcers. It is also a good blood purifier. The fruit is acrid, sweet, cooling and removes bad smell from mouth, biliousness, stomachic, astringent, diuretic and antidiabetic (Nadkarni, 1976). The fruit has use for various medicinal purposes and currently use for the treatment of chronic diarrhea and other enteric disorders (Veigas, *et al.* 2007). Seeds have been reported to be rich in flavoniodes, antioxidents which accounts for the removing of free radicals. It is also rich in protein and calcium. Bark is acrid, sweet, digestive, astringent to the bowels, anthelmintic and used for the treatment of sour throat, bronchitis, asthma, thirst, dysentery and ulcers. The seed is sweet, astringent to the bowels and good for diabetes. The ash of the leaves is used for strengthening the teeth and gums. Vinegar prepared from the juice of the ripe fruit is used as stomachic, carminative and diuretic (Kiritikar and Basu, 1987). The seed extract is used to treat cold, cough, fever and skin problems such as rashes and the mouth, throat, intestines and genitourinary tract ulcers (infected by *Candida albicans*) by the villagers of Tamil Nadu (Chandrasekaran and Venkatesalu, 2004). Gaikwad (2009) reported that 2.5cm soil depth of sowing and red soil and mix soil supported maximum seed germinability for both the species of *Jatropha.* Freshly harvested Jaman seeds gave better germination percentage within 1-2 weeks and may loose their viability soon after shedding (Mbuya *et et.,* 1994; Patil *et al.,* 1997). Therefore its seeds are considered difficult to store for longer term and thus are sensitive to drying (Mittal *et al.,* 1999; Ouedraogo *et al.,* 1999; Pritchard *et al.,* 1999; Srimathi *et al.,* 2001). 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; Srimathi *et el.,* 2001). The survival of seeds during short terms to rage also depends on storage environment and seed moisture content, for example, seed lost viability within 2-3 weeks when stored at 25-30oe (Rawat and Nautiyal, 1997; Srimathi *et al.,* 1999).

With the threats of global warming and increasing desertification there is an urgent need to conservation of dry land plants for the preservation of their diversity. Seeds are an effective means of achieving this goal, little information is available on the seed germination of *Syzygium cumini.* For need of healthy, quick growing of seedlings in short span of time from their sowing time. Keeping this in view the present study was carried out with the main objective.

Materials And Methods.

Collection Of Seed Material.

In the present investigation seeds of the *Syzigium cumini* were widely collected from Vidoli-Mantha Road, District Jalna (M.S.) India. Collected seeds were then packed in sterile polythene bags in first week of June 2017.

Sowing Of *Syzygium Cumini* Seeds.

Experiment was carried out in second week of June 2012 at Department of Botany, Swami Vivekanand Senior College, Mantha Dist-Jalna (M.S.) India. The seeds were sown during the months of June 2012.

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. The seeds were sown in polybags. The preferred polybags having size of 22.5 x 12.5 cm were used for sowing. In first experiment *Syzygium cumini* seeds were sown at different depth of 6cm in already soil filled polybags. Polybags were filled with Mixed soil. In 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 60 days. All plants were harvested to determine percent germination, shoot height, root length, number of leaves and collar diameter of shoots (Asgharipour, 2011).

Results And Discussion

In order to study the effect of KOH and NaOH on seed of *Syzygium cumini* were treated with 5,10,15,20,25,30 minutes and percent germination, shoot length, root length, number of leaves and collar diameter of shoots in cm. were observed. The results are mentioned in table 1and 2. It is clear from result summarized in table 1 that seeds of *Syzygium cumini* treated with KOH for 10 minutes were proved favorable to express maximum percent germination, shoot length, root length, number of leaves and collar diameter of shoots, while minimum in 25minutes KOH treatment as compared with control. Seed treated with for 15 minutes showed equally more or less effective.

It is clear from result summarized in table 2 that seeds of *Syzygium cumini* treated with NaOH for 10 minutes were proved favorable to express maximum percent germination, shoot length, root length, number of leaves and collar diameter of shoots as compared with control. It was interesting to note that seed treated with for10, 15 minutes showed maximum percent germination. From the results of this study it is concluded that seed treated with KOH and NaOH for 10 and 15 minutes improved both seed germination and growth of *Syzygium cumini* seedlings. Hence, above treatment are recommended for *Syzygium cumini* nursery growers. Several workers have performed such types of experiment on seeds of medicinal plants. Yawalikar et.al (2012) studied on the effect of chemical factors on seed germination of *Pentapetes phoenicea* and concluded that H2SO4 treatment for 20 minutes gives 98% of germination by breaking the dormancy. 5-10 minutes of KOH treatment shows 80% of germination. GA3 also gives germination of 100%. Gaisamudre and Dhabe (2011) Observed that the seeds of *Meizotropis buteiformis* were treated with NaOH and KOH and concluded that highest percentage of seed germination for KOH (85.2) and NaOH (72.2) treatment.

In order to study the incidence of infection of fungi on infected seeds of *Syzygium cumini*, the experiment was conducted. The results are mentioned in table 3. It is clear from table 3 that the seeds treated by KOH showed 09 different types of fungi namely *Alternaria alternata, Alternaria tenuis , Aspergillus niger, A. fumigatus, Aspergillus flavus, Fusarium moniliforme, F. oxysporum, Mucur* spp, *Penicillium* spp,*. Rhizopus stolonifer* and seeds treated by NaOH showed 08 different types of fungi namely *Alternaria alternate, Aspergillus niger, A. fumigatus, Aspergillus flavus, F. oxysporum, Mucur* spp, *Penicillium* spp., *Rhizopus stolonifer.* 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 (Khanzada,et.al.,2002). The findings of the present study is almost similar to those reported in the earlier studies mentioned here.

Table 1: Effect of KOH on seed germination of *Syzygium cumini* seedling parameters.

KOH Treatment (Minutes)	% Germination	Mean			
		Shoot length (cm)	Root length (cm)	No. of leaves	Collar diameter (mm)
5	60	27.53	29.10	14.3	11.2
10	70	30.21	32.33	16.7	11.6
15	60	26.92	30.67	15.2	10.4
20	50	19.94	19.29	12.6	9.5
25	30	13.55	20.14	10.5	7.2
30	00	00	00	00	00

Control	**30**	**14.50**	**14.22**	**7.8**	**6.2**

Table 2: Effect of NaOH on seed germination of *Syzygium cumini* seedling parameters.

KOH Treatment (Minutes)	% Germination	Mean			
		Shoot length (cm)	Root length (cm)	No. of leaves	Collar diameter (mm)
5	70	25.81	32.52	15.4	11.2
10	80	30.63	29.81	20.6	11.6
15	80	29.78	24.24	16.8	10.3
20	40	19.25	10.59	10.4	9.5
25	30	13.54	14.73	8.9	7.2
30	00	00	00	00	00
Control	30	14.90	9.92	8.5	6.0

Table 3: Incidence of fungi on infected seeds of *Syzygium cumini.*

Fungi	*Syzygium cumini*	
	Incidence on seeds treated by KOH	Incidence on seeds treated by NaOH
Alternaria alternata	+	+
Alternaria tenuis	+	--
Aspergillus niger	+	+
Aspergillus fumigatus	+	+
Aspergillus flavus	+	+
Fusarium moniliforme	+	--
Fusarium oxysporum	+	+
Mucur spp	+	+
Penicillium spp.	--	+
Rhizopus stolonifer	+	+

-- =Absent + = Present.

PHOTO: [A] PHOTO: [B]

PHOTO:[A] -Effect of KOH on seed germination of *Syzygium cumini.*
PHOTO:[B]-Effect of NaOH on seed germination of *Syzygium cumini*

Conclusions.

Pre-sowing treatment of seed plays vital role to enhance the seed germination under nursery conditions. Among the pre-sowing treatments, the best treatment for the sowing of seeds is 10% KOH and 10% NaOH for 10 minutes favored maximum seed germination of *Syzygium cumuni*. Therefore, pre-sowing treatments of seeds 10% KOH and 10% NaOH for 10 minutes may be recommended for plantation programme.

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