

EFFECT OF CHEMICAL PRE-TREATMENTS ON SEED GERMINATION AND SEEDLING GROWTH OF SYZYGIIUM CUMUNI (L.) SKEELS.

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ABSTRACT

The present study was carried out to investigate the influence of different growth regulators (IAA+ IBA and IAA+ NAA) on seed germination and seedling growth of *Syzygium cumuni*. It was observed that IAA + IBA at 600 ppm favoured maximum seed germination. On the other hand shoot length and root length was maximum at IAA+ NAA at 400 ppm .

Key words: *Syzygium cumuni* , germination, shoot length and root length .

INTRODUCTION

Syzygium cumini Linn (family Myrtaceae), commonly known as “Jamun” is widely distributed in tropical and subtropical regions. The plant is a multipurpose large, evergreen native tree species belonging to the family Myrtaceae. The native home of the *Syzygium* is India and East Indies. It is found throughout in India up to an altitude of 1800 meters and its habitat starts from Myanmar and extended to Afghanistan. This plant is also found in other countries like Thailand, Philippines, Madagascar (AR Ivan 2006). It grows well in sandy soils, riverbeds and clayey loam soils, poorly drained soil too (Ramachandra & Kamakshi, 2005). It is cultivated as an avenue tree. This tree is a fast growing tree with good coppicing capacity, suitable for degraded wastelands (Singh, 1982). This tree is a pollutant tolerant tree (Jacob, 2002; Ahmad, 2003; Satya *et al.*, 2005). It has been valued in Ayurveda and Unani systems of medication for possessing variety of therapeutic properties, which is widely used in folk medicine for the treatment of various diseases. (Kirtikar & Basu, 1975). 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, , astringent, diuretic, biliousness, stomachic 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). The seeds have hypoglycemic (Chopra *et al.*, 1958), antibacterial (Bhuiyan *et al.*, 1996), and antidiarrheal effects (Indira & Mohan, 1993). leaf extracts are used for treatment of skin wounds (Oliveira *et al.*, 2007). 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). 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). Therefore its seeds are considered difficult to store for longer term and thus are sensitive to drying (Pritchard *et al.*, 1999; Srimathi *et al.*, 2001; Mittal *et al.*, 1999; Ouedraogo *et al.*, 1999;). Seed viability can be retained, in short term, if the seeds have maintained above critical moisture content i.e. 40-50% (Srimathi *et al.*, 2001; Ouedraogo *et al.*, 1999). 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). 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 is an effective means of achieving this goal, little information is available on the seed germination of *Syzygiumcumini*. 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.

A) Collection Of Seed Material.

In the present investigation seeds of the *Syzygium cumini* were widely collected from Mantha region, District Jalna (M.S.) India. Collected seeds were then packed in sterile polythene bags in first week of June 2018.

B) Sowing Of *Syzygium Cumini* Seeds.

Experiment was carried out in second week of June 2018 at Department of Botany, Swami Vivekanand Senior College, Mantha Dist-Jalna (M.S.) India. The seeds were sown during the months of June 2018. Seeds were first' surface sterilized for 1 min by immersing in 0.1 % HgCl_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. 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 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

The effect of IAA+ IBA and IAA+ NAA on seeds of *Syzygium cumini* were treated with different concentration of growth hormones. A combination solution of IAA+ IBA and IAA+ NAA at 50, 200, 400, 600 and 800 ppm were used 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 1 and 2. It is clear from result summarized in table 1 that seeds of *Syzygium cumini* treated with IAA+ IBA for 600 ppm were proved favorable to express maximum percent germination, shoot length, root length, number of leaves and collar diameter of shoots, while minimum in IAA+ IBA for 800 ppm treatment as compared with control.

It is clear from table 2 that seeds of *Syzygium cumini* treated with IAA+ NAA for 400 ppm were proved favourable to express maximum percent germination, shoot length, root length and collar diameter as compared with control. It was interesting to note that seed treated with for IAA+ NAA for 200 ppm showed number of leaves. From the results of this study it is concluded that seed treated with IAA+ IBA for 600 ppm and IAA+ NAA for 400 ppm 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. Gaikwad and Mule (2019), Gaikwad and Borkar (2018) studied and concluded that the seeds of *syzygium cumini* treated with pre-sowing chemical treatment favoured maximum seed germination and shoot length. Yawalikar et.al (2012) studied on the effect of chemical factors on seed germination of *Pentapetes phoenicea* and concluded that certain chemical treatment gives 98% of germination by breaking the dormancy. The role of plant growth regulators in overcoming the harmful effects on growth may be due to the change in the endogenous growth regulators (Izumi and Eiji 1996). Although varied in seed germination and root shoot elongation by different treatments, the pre-soaking with different treatments evident that soaked seed could improve in germination and seedling establishment and this observation was found equivalent the observation of Ahmad et al., (1998); Harris et al., (1999). The soaking period of 24 hrs increased the total uptake of water which help the maximum imbibition rate. It is clear from table 3 that the seeds treated by IAA+ IBA for 600 ppm, showed 07 different types of fungi namely *Alternaria alternata*, *Aspergillus niger*, *Aspergillus flavus*, *A. fumigatus*, *F. oxysporum*, *Mucor* spp, and *Rhizopus stolonifer*. Seeds treated by IAA+ NAA for 400 ppm showed 07 different types of fungi namely *Alternaria alternate*, *Aspergillus niger*, *A. fumigatus*, *Aspergillus flavus*, *F. oxysporum*, *Mucor* spp, *Rhizopus stolonifer*.

Table 1: Effect of IAA+ IBA on seed germination of *Syzygium cumini* seedling parameters.

IAA+ IBATreatment (ppm)	% Germination	Mean			
		Mean Shoot length (cm)	Mean Root length (cm)	Mean No. of leaves	Mean Collar diameter (mm)
IAA 50+IBA 50	50	17.81	14.92	9.7	8.4
IAA 200+IBA 200	60	24.61	20.22	14.5	12.3
IAA 400+IBA 400	80	25.12	21.81	18.3	12.5
IAA 600+IBA 600	90	30.84	24.83	22.3	14.7
IAA 800+IBA 800	70	10.26	9.44	7.1	7.2
Hot Water	50	9.30	9.39	9.1	6.4
Control (pre-soaked)	50	11.17	10.20	9.8	7.6

Table 2: Effect of IAA+ NAA on seed germination of *Syzygium cumini* seedling parameters.

IAA+ NAA Treatment (Minutes)	% Germination	Mean			
		Mean Shoot length (cm)	Mean Root length (cm)	Mean No. of leaves	Mean Collar diameter (mm)
IAA 50+IBA 50	60	19.86	16.45	10.32	10.3
IAA 200+IBA 200	80	21.10	18.14	16.67	11.2
IAA 400+IBA 400	90	30.42	26.67	16.35	12.6
IAA 600+IBA 600	80	19.51	11.54	10.21	8.2
IAA 800+IBA 800	70	11.33	10.19	8.65	6.5
Hot Water	50	9.13	8.53	7.41	6.7
Control (pre-soaked)	30	10.40	9.71	9.5	7.6

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

Fungi	<i>Syzygium cumini</i>	
	Incidence on seeds treated by IAA+ IBA	Incidence on seeds treated by IAA+ NAA
<i>Alternaria alternata</i>	+	+

<i>Aspergillus niger</i>	+	+
<i>Aspergillus fumigatus</i>	+	+
<i>Aspergillus flavus</i>	+	+
<i>Fusarium oxysporum</i>	+	+
<i>Mucor spp</i>	+	+
<i>Rhizopus stolonifer</i>	+	+

-- =Absent + = Present.

CONCLUSIONS.

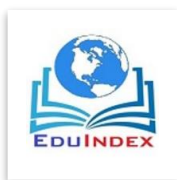
Pre-sowing treatment of seed plays vital role to enhance the seed germination under nursery conditions. Among the pre-sowing treatments, the best treatment for the sowing of seeds are IAA+ IBA for 600 ppm favoured maximum seed germination of *Syzygium cumuni*. Therefore, pre-sowing treatments IAA+ IBA for 600 ppm and IAA+ NAA for 400 ppm may be recommended for plantation programme.

ACKNOWLEDGEMENTS.

Author is grateful to the Principal, Swami Vivekanand Senior College Mantha, Dist. Jalna (M. S.) India, for providing necessary facilities.

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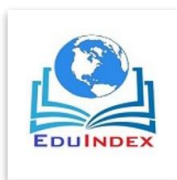
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