



## Effect of Different Treatments on Seed Germination of *Balanites aegyptiaca* (L.) Del.

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### ABSTRACT

Seeds of *Balanites aegyptiaca* were treated with various scarification treatments for enhancing seed germination such as mechanical treatment (scraping method), treating the seeds with conc. HCl, H<sub>2</sub>SO<sub>4</sub>, NaOH, KOH and hot water treatments. Of these treatments, the highest percentage of seed germination (90%) was observed in Conc. H<sub>2</sub>SO<sub>4</sub> treatment for 10 min. The hot water at 90°C, for 30 min. treatment was found to exhibit 80% seed germination.

## 1. Introduction

*Balanites aegyptiaca* (L.) Del. belongs to family Balanitaceae. It is commonly known as Higan-bet and less common in deciduous forests of the Marathwada region. *Balanites* is a medium sized to tall deciduous tree, branches armed with straight, sharp 3-5 cm long thorns, Leaves 2-foliolate; leaflets elliptic to obovate, flowers dull white or greenish, Drupes ovoid or ellipsoid and 5- angled yellowish (Naik, 1998). Fruit Pulp is bitter-sweet and edible. Seed is the pyrene (stone), 1.5 to 3 cm long, light brown, fibrous. Root and stem are used in yellow fever, jaundice with antimalarial activity (Bukar et.al, 2004). The bark, fruit and oil used to treat various disease or disorders such as cancer (Gnoul et al., 2008), the plant is used as an antiasthmatic (Khare, 2007). Seed oil used in skin diseases and diabetes (Cook et.al, 1998). Hence, efforts have been taken to propagate by seeds.

## 2. Materials and Methods

Seeds of *Balanites aegyptiaca* were collected from Dr. Babasaheb Ambedkar Marathwada University campus, Aurangabad. (M.S.) (Latitude-N19° 54' 52.3", Longitude- E- 075° 18' 06.19", Altitude- 585m.). Seed collected by the method described by Neergaard, (1977). Purity was tested by different methods (Agrawal, 1995). Seeds were plucked from the trees and sun dried. Seed purity percentage was calculated (Purohit, et, al., 1982). Seeds were treated with different mechanical as

well as chemical and growth hormones Viz. Presoaking treatment (Ghildiyal et. al., 2009), Hot water treatment,(Emongor,et al., 2004.,Thapliyal and Gupta, 1980), Mechanical (scraping method) (Singh et. al., 2005), Acid treatment: Seeds were treated with different acid such as Conc.H<sub>2</sub>SO<sub>4</sub>, Conc. HCl and HNO<sub>3</sub> for 5-15 min. All treated seeds were washed with running water and sown, Alkali treatments (Hou and Simpson, 1994), Thiourea treatment: Seeds were kept in thiourea for 15-45 min, at 50 ppm concentration, Cow dung treatment ((Rai et. al., 1986), Growth hormones treatments: Seeds were treated with different growth hormones like, IAA, IBA, NAA, 2-4D, Cytokine and Gibberellic acid etc (Liu et. al., 1998), Chilling (Maithani et. al., 1990), Control: Seeds were sown in soil at a depth of 2 cm. From each category 100 seeds in the five lots of 20 seeds each were used for the study on percent of seed germination (Prins and Maghembe, 1994).

All treated seeds were sown in Botanical garden of Dr.B.A.M.University, Aurangabad. Data on germination percentage of *Balanites aegyptiaca* was collected after 21 days of sowing.

## 3. Results and Discussion

The results of different pre-treatments on seed germination are given in Graph and Table-1. It is revealed from the data that, the untreated seeds of *Balanites aegyptiaca* exhibited only 20% germination. Maximum percentage of seed germination (90%) found in Conc. H<sub>2</sub>SO<sub>4</sub> treatment for 10 min. The hot water at 90°C, for 30 min. treatment was found to exhibit 80% seed

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germination. The mechanical treatment and pre-soaking treatment for 48 hrs were observed to exhibit high seed germination i.e. 75 and 70% respectively. Acid treatments like treatment with Conc. HCl and Conc. HNO<sub>3</sub> were found to be effective than control. All the Thiourea (50 ppm) and Cow dung slurry treatments enhanced seed germination. The seed treatments with KOH (1%) NaOH (1%) only slightly increased seed germination percentage than control. When different growth regulators (IAA, IBA, 2-4D, GA, NAA and Cytokinins) were used at 200 ppm and applied for 2, 4 and 6 hours; all the treatments enhanced the seed germination. Amongst these, treatment with GA<sub>3</sub> for 4 hours was more effective than the control as well as other treatments. Chilling at 4°C also slightly increased the seed germination. Conc. H<sub>2</sub>SO<sub>4</sub> treatment for 10 min was superior treatment in increasing the seed germination than the control, as well as other treatments used during present study of *Balanites aegyptiaca*.

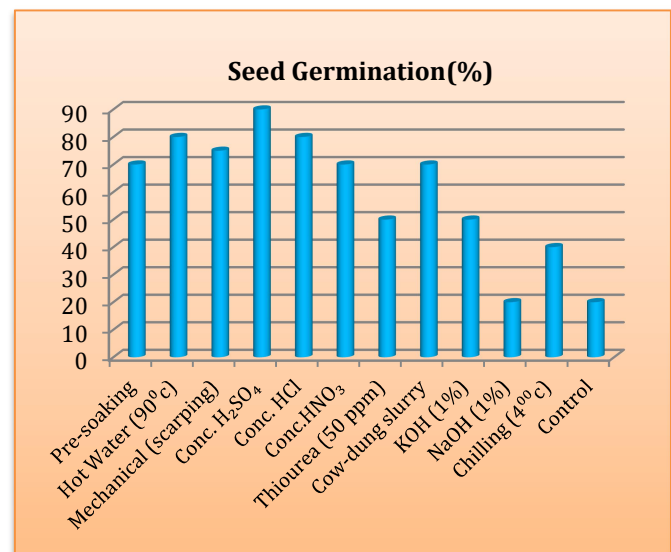
Similar observations were made in seeds of *Tamarindus indica* and *Charchanus tridens* (Muhammad and Amusa, 2003), *Melia azedarach*, (Azad et. al, 2010), *Pinus roxburghii* (Ghildiyal et.al 2009), and in *Balanites aegyptiaca* (Elfeel., 2012). The purity percentage of *Balanites aegyptiaca* seeds was 25%. Similar results were reported seed germination percentage of *Balanites aegyptiaca* (Meenakshi and Lingakumar, 2011) and in *Pongomia glabra* (Singh et. al 2005).

**Table 1. Effect of different pre-treatments on seed germination of *Balanites aegyptiaca***

Sr. No.	Treatment	Time	*Seed germination (%)
1	Presoaking	24 hr	30
		36	50
		48	70
2	Hot water (90°C)	15 min	60
		30	80
		45	70
3	Mechanical	-	75
4	Conc. H <sub>2</sub> SO <sub>4</sub>	5 min	50
		10	90
		15	70
5	Conc. HCl	5 min	30
		10	70
		15	80
6	Conc. HNO <sub>3</sub>	5 min	40
		10	60
		15	70
7	Cow -dung slurry	24 hr	30
		36	60
		48	70

8	KOH (1%)	15 min	20
		30	30
		45	50
9	NaOH (1%)	15 min	-
		30	-
		45	20
10	Thiourea ((50 ppm)	2hr	30
		4	50
		6	40
11	IAA (200 ppm)	2hr	35
		4	40
		6	50
12	IBA (200 ppm)	2hr	30
		4	50
		6	40
13	NAA (200 ppm)	2hr	30
		4	50
		6	40
14	2-4 D (200 ppm)	2hr	30
		4	50
		6	60
15	GA <sub>3</sub> (200 ppm)	2hr	40
		4	60
		6	50
16	Cytokinins (200 ppm)	2hr	25
		4	40
		6	37
17	Chilling 4°C	24 hr	20
		36	30
		48	40
	Control	-	20

\* After 21 day



**Fig. 1. Effect of pretreatments on seed germination (%) of *Balanites aegyptiaca* Linn.**

#### 4. Conclusion

In Conclusion, conc. H<sub>2</sub>SO<sub>4</sub> treatment for 10 min proved to be very effective in improving seed germination for *Balanites aegyptiaca* species. Also, seed germination was enhanced by treating with other Acids, Mechanical scarification, Pre-soaking, Thiourea (50 ppm) and GA3 (200 ppm).

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#### Conflicts of interest

The authors declare that there are no conflicts of interest.

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