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Effects of Hydro priming on Seed Quality Parameters under Laboratory Condition in Bhendi *(Abelmoschus esculentus)* var. ankur 41

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A B S T R A C T

To study the effects of hydro priming on seed quality parameters of bhendi a laboratory work was conducted at Mother Teresa college of agriculture in 2021. For this experiment, a study was conducted with the aim of evaluating seeds were soaked in water with different duration i.e, 3 hrs, 6 hrs, 9 hrs, 12 hrs, 15 hrs, while dry seeds were used as control (unprimed) were investigated in a CRD, each treatment being replicated three times. The result of the study revealed that the significantly showed the maximum germination %, Root length (cm), Shoot Length (cm), Vigour index I, Vigour Index II and Dry matter production as compared to control.

Introduction

Bhendi (*Abelmoschus esculentus)* is a most vegetable crop of tropical and sub tropical in world. It can be grown in a wide range of soils and it grows best in loose, friable, well-drained sandy loam soils. It also gives good yield in heavy soils with good drainage. A pH range of 6.0-6.8 is considered as optimum. The major producing states are Uttar Pradesh, Bihar, West Bengal, Odisha, Assam, Andhra Pradesh and Karnataka.

Seed priming is the process of controlled hydration of seeds which is potentially able to promote rapid and more uniform seed germination and plant growth (Sharma *et al.*, 2014). Priming allows some of the metabolic processes necessary for germination to occur without germination taking place.

Seed priming induced synchronized germination, increased seed vigor, and growth of seedlings under stressful conditions i.e. increase in germination and emergence rate (Bajehbaj, 2010). It had poor seedling emergence and vigor. In okra seeds the slow and uneven germination is the key hurdle in the early spring planting (Kaur *et al.*, 2015). The percentage of seeds germination of okra is relatively low, due toseed hardness (Mohammadi *et al.*, 2012). Hydropriming is a special type of seed priming in

which seeds are soaked in water followed by drying of seeds, but the emergence of radicle is prevented. This technique is a common method that increases rate, percentage and uniformity of germination of seed (Farooqi *et al.*, 2003).

Priming is done to increase the speed and uniformity of germination particularly under abiotic stress conditions of temperature, moisture and salinity condition. In addition, priming can overcome some types of environmental stresses such as temperature and moisture stress.

After priming the seeds can be dried, packed, distributed and planted in the same way as untreated seeds. When primed seeds are achieved complete germination much more rapidly and uniformly compared to unprimed seed (Dry seeds).

In bhendi crop, the major problem is uneven germination and poor seedling growth. Hence the present study was investigate the effects of hydropriming on seed quality parameters in bhendi var ankur 41.

Materials and Methods

The Laboratory experiment was conducted at Department of Seed Science and Technology, Mother Teresa college of Agriculture, Pudukkottai.

Seed Quality Parameters

Germination

The laboratory germination test was conducted as per ISTA (2007) procedure by adopting "Top of the paper method". Freshly harvested 100 seeds in three replications were taken at random from the seed lot of each treatment and placed uniformly on germination paper. Petri plate was kept in germinator, where the temperature was maintained at 25 ± 0.5C and the relative humidity at 95 ± 1 percent. The final counts were taken on fourteenth day of germination test for normal seedlings and expressed in percentage.

Seedling length (cm)

Ten normal seedlings were selected at random from the germination test. On the day of final count day the length between the collar region and the tip of the primary shoot was measured as shoot length (cm). While length between the collar region and the tip of primary root was measured as root length (cm). The seedling length will be computed by using the following formula,

Seedling length (cm) = Shoot length (cm) + Root length (cm)

Shoot length (cm)

Ten normal seedlings were selected at random from each replication and the distance between the collar regions to tip of the primary leaf was measured and the mean expressed in centimeter.

Root length (cm)

Ten normal seedlings were selected at random from each replication and the length of the root was measured from the collar region to the tip of primary root and the mean expressed in centimeter

Seedling dry matter production (g/ 10 seedlings^{-1})

After measuring the root and shoot length, the ten normal seedlings in each replication was shade dried for 24 h and then in hot air oven maintained at 85 ± 1°C for 48 h.

Then, they were cooled for 30 min in a desiccator which contained calcium chloride and then weighed in an electronic balance. The mean weight was expressed as dry matter production 10 seedlings in gram.

Vigour index

The vigour indices were calculated using the procedure suggested by Abdul-Baki and expressed in whole number.

Vigour index-I = Germination (%) X Seedling length (cm)

Vigour index-II = Germination (%) X Seedling dry weight (g)

Statistical analysis

The observations recorded were statistically analyzed using AGRESS software. The results of different experiments were subjected to an analysis of variance and treatment differences tested for significance (P =0.05) as per Gomez and Gomez (1984).

Results and Discussion

Seeds primed with T1 to T5 were soaked for different soaking hours. Priming with T_2 was found to be best in terms of maximum Germination %, Root length (cm), Shoot Length (cm), Vigour index I, Vigour Index II and Dry matter production as compared to control. Statistical analysis showed significant differences in treatment st $p \leq 0.05$ levels. Results showed that all treatment were found effective in enhancing germination rate and various quality parameters compared to control.

Germination % was significantly influenced by hydro priming treatments on bhendi. Highest germination percentage of 91 % was recorded in hydropriming in 6 hrs (Table 1). However, it was on par with hydropriming in 3hrs (T_1) followed by hydropriming in 9 hrs (T_3) and hydropriming in 12 hrs (T_4). The lowest germination percentage was observed in control (T_0). Venudevan *et al.,* (2013) also reported that, hydro primed seeds showed significant increase in germination performance.

As per observation made from the given treatment on the root length it was ranged between 16.3 to 23.7 cm (Table 1). However highest root length (23.7 cm) was registered in the treatment of hydropriming in 6 hrs (T_2) followed by (T_1) whereas, the root length 16.3 cm was numerically lowest in T_5. Hydropriming in 12 hrs. Ghassemi *et al.,* (2008) in lentil, Hosseein and Kasra (2011) in pungram seed reported improved germination rate, root weight compared to unprimed and chemo primed seed treatment.

The shoot length was significantly influenced by different hydro priming treatment (Table 1). The Shoot length ranged from 18.2 to 10.1 cm. However, the shoot length was numerically neither 18.2 cm in the treatment. The lowest shhot length of 18.2 cm was recorded in control T_0.

Seedlings length was significantly influenced by different hydropriming treatments (Table 1). Seedling length ranges from 41.9 to 26.8 cm. The highest seedling length of 41.9 cm was observed in the treatment of hydropriming in 6 hrs T_1, which was statistically influenced to other treatment. The lowest seedlings weight was observed in treatment t0 control.

What was the trend observed on the germination percentage of bhendi due to hydroprimimng treatments, Similar trend was also notices on the vigour index I and II of bhendi. Of the seed quality parameters, the vigour index I and II was also significantly influenced by various treatments of hydropriming, where in the vigour index I was ranged from 3812 to 2152 and vigour index II was ranged from 25.93 to 16.09 (Table 1). However the vigour index I (3812) was substantially higher in the treatment hydropriming in 6 hrs (T_2) followed by (T_1) while, lowest vigour index (21522) was recorded in treatment control (T_0) same trend of treatment effect was observed on vigour index II.

There was also significant effect on dry matter production of bhendi based on hydropriming treatment. Accordingly, there way significant increase in dry matter production of bhendi (0.2850) recorded in hydropriming in 6 hrs (T_2) (Table 1). On the other hand, the treatment hydropriming in 3 hrs(T_1) ranked 2nd in increasing production (0.2658) of bhendi. Among these treatment though the treatment control (T_0) recorded lessor in dry matter production (0.2012) in bhendi.

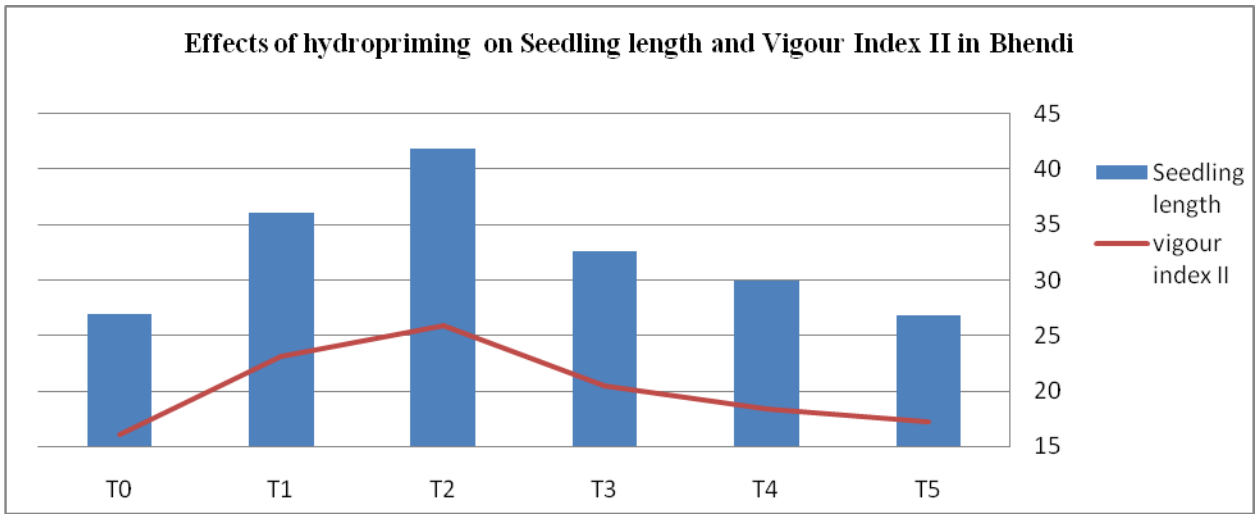
Table.1

S.No.	Treatment details
T_0	Control (Unprimed seeds)
T_1	Hydropriming in 3 hrs
T_2	Hydropriming in 6 hrs
T_3	Hydropriming in 9 hrs
T_4	Hydropriming in 12 hrs
T_5	Hydropriming in 15 hrs

Table.2 Effects of Hydro priming on seed quality parameters in Bhendi *(Abelmoschus esculentus)* var. ankur

S.no	Germination %	Root Length	Shoot Length	Seedlings Length	Vigour Index I	Vigour Index II	Dry Matter Poduction
T_0	80	16.8	10.1	26.9	2152	16.09	**0.2012**
T_1	87	20.3	15.8	36.1	3140	23.12	**0.2658**
T_2	91	23.7	18.2	41.9	3812	25.93	**0.2850**
T_3	85	18.3	14.3	32.6	2771	20.51	**0.2413**
T_4	83	17.4	12.5	29.9	2481	18.37	**0.2214**
T_5	81	16.3	10.5	26.8	2170	17.18	**0.2122**
SEd	1.76**	0.22**	0.27**	0.26**	3.86**	0.33**	**0.0037****
CD	**3.92**	**0.49**	**0.59**	**0.57**	**8.42**	**0.73**	**0.0080**

Fig.1 Effects of hydropriming on Seedling length and Vigour Index II in Bhendi var ankur 41.



Hydropriming of seeds is a cheap and convenient way to improve crop establishment. From this study, Priming of okra seeds might be the best option to overcome the reduced and delayed germination in fresh or stored okra seeds caused by seed hardness. Priming of seed before sowing facilitates the plant growth and development and its yield. Okra seed priming with different treatments on seed

germination and seedling vigor revealed that the T_2 priming was better than any other treatment So, seed priming is a useful technique for improving the germination percentage, root length, shoot length, Dry matter production, vigour index I and vigour index II.

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References

Abdul-Baki, A. A. and Anderson, J. D. 1973. Vigour determination in soybean seed by multiple criteria. *Crop Sci*. 13: 630- 633.

Bajehbaj, A. A. 2010. The effects of NaCl priming on salt tolerance in sunflower germination and seedling grown under salinity conditions. *African Journal of Biotechnology*, 9(12), 1764–1770.

Farooqi A A, Sreeramu B S, Srinivasappa K N. Tropical spice crops and their cultivation. Kavyakala prakashana, Bengaluru, 2003, 97.

Ghassemi, K. Aliloo A A, Valizadeh M, Moghaddam M (2008). Effect of hydro and osmo priming on seed germination and field emergence of lentil (Lens Culinaris Medik) Hort. Agrobut. 36(1):29-33.

Gomez, K. A. and Gomez, A. A. (1984) Statistical Procedures for Agricultural Research. 2nd Edition, John Wiley and Sons, New York, 680 p.

Hosseein, A F. and M. Kasra (2011) Effect of Hydropriming on Seedling Vigour in Basil (*Ocimum Basilicum* L.) Under Salinity Conditions. Adv. Environ. Biol. 5(5):828-833.

ISTA. 2013. International rules for seed testing. Bassersdorf (Switzerland): International Seed Testing Association.

Kaur, H. Chawlab, N. Bassia, G. Pathakb, M. 2015. Effect of different seed priming treatments on germination of Okra (*Abelmoschus esculentus* L.). *International Journal of Current Science 15*, 51-58.

Maguire, J. D. (1962). Speed of germination-aid selection and evaluation for seedling emergence and vigor. *Crop Science*, 2, 176-177.

Mohammadi G, Khah E M, Ghitouli M, Shirkhani A, Shabani G, Jabellou M. 2012. Improvement of Okra (*Abelmoschus esculentus* L.) Hardseedness by Using Micro Elements Fertilizer. *Annals of Biological Research 3*, 2153–2161.

Sharma, A. D., Rathore, S. V. S., Srinivasan, K. & Tyagi, R. K. (2014). Comparison of various seed priming methods for seed germination, seedling vigour and fruit yield in okra (*Abelmoschus esculentus* L. Moench). *Scientia Horticulturae*, 165, 75–81.

Venudevan1 B, Srimathi P. Conservation of endangered medicinal tree bael Aegle marmelos through seed priming. *Journal of Medicinal Plants Research*. 2013; 7(24):1780-1783.

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