

Influence of Organic and Botanical Priming on Seed Quality Parameters of Okra (Varieties) *Arka anamika* and Punjab No. 13 (*Abelmoschus esculentus*)

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ABSTRACT

The experiment was conducted in seed science post Graduate Laboratory, Department of Genetics and Plant Breeding, SHUATS, Allahabad, UP during *Zaid* 2021 the present investigation entitled “Influence of organic and botanical priming on seed quality parameters of Okra (varieties) (*Abelmoschus esculentus*) were carried out at Lab Experimentation Center during *Zaid* 2021. In order to standardize the best method of organic priming seed treatment for specific to Okra varieties V_1 - *Arka anamika* and V_2 - Punjab No. 13. The data of research study revealed that influence of organic and botanical priming on seed quality parameters on Beejamrutha, Panchagavya, Curry leaf, Moringa leaf and Sea weed extract of Okra was analyzed through Completely Randomized Design (CRD). It found that all the organic priming methods showed significance difference with T_2 -

Panchagavya (7%) @ 8h were observed in exhibited highest germination (V_1 - 85% and V_2 - 79.5%), seedling length (V_1 - 29.58 cm and V_2 - 30.67 cm), seedling fresh weight (V_1 - 5.35 g and V_2 - 6.239 g), seedling dry weight (V_1 - 0.795 g and V_2 - 0.78 g) and Seed vigour index I (V_1 - 2336.3 and V_2 - 2348.53), Seed vigour index II (V_1 - 62.72 and V_2 - 62.525) and followed by value was exhibited by V_1 - T_4 - Moringa leaf extract and V_2 - T_1 - Beejamrutha. The study helps to improve the quality of seeds with the help of seed organic priming treatments which are cost effective and economic, non-toxic, eco-friendly sources.

Keywords Okra varieties (*Arka anamika* and Punjab no. 13), Completely Randomized Design (CRD), Beejamrutha, Panchagavya, Moringa leaf extract.

INTRODUCTION

Okra *Abelmoschus esculentus* (L.) Moench, is an economically important vegetable crop grown in tropical and sub - tropical parts of the world. This crop suitable for cultivation as a garden crop as well as on commercial farms. Okra is an often- cross pollinated crop having chromosome number $2n= 130$. Okra is an erect herbaceous annual having 1-2 m tall. Stem is green or purple reddish tinge (Musara *et al.* 2015). It is grown

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commercially in India, Turkey, Iran, Western Africa, Yugoslavia, Bangladesh, Afghanistan, Pakistan, Burma, Japan, Malaysia, Brazil, Ghana, Ethiopia, Cyprus and Southern United States. India ranks first in the world with 3.5 million tonnes (70% of the total world production) of okra produced from over 0.35 million hectare land (FAOSTAT 2008). The major okra growing states includes, West Bengal (14%), Bihar (12%), Gujrat (12%), Andhra Pradesh (10%), Odisha (9%), Jharkhand (7%), Chhattisgarh (7%), Telangana (6%), Madhya Pradesh (5%), Maharashtra (4%), Haryana (3%), Assam (3%), Uttar Pradesh (2%) and others (6%) (Anonymous 2014). Okra Raw Nutrition value per 100 g energy 33 kcal carbohydrates 7.45 g (140 kj) - sugars 1.48 g - dietary fibers 3.2 g fat 0.19 g protein 2 g water 90.19 g Vitamin A 36 µg (7%), Thiamine (B1) 0.2 mg (17%), Riboflavin (B2) 0.06 mg (5%) Niacin (B3) 1 mg (7%) Vitamin C 23 mg (28%), Vitamin E 0.27 mg (2%), Vitamin K 31.3 µg (30%), calcium 82 mg (8%), iron 0.62 mg (5%), magnesium 57 mg (16%), potassium 299 mg (6%), zinc 0.58 mg (6%). Percentages are related to US recommendations to for adults (Source: USFDA database).

Beejamrutha, a mix of cow dung, cow urine, water, lime and a handful of soil, a totally organic product helpful for the plant growth and protects the crop from harmful soil-borne and seed-borne pathogens. Smearing the seeds with Beejamrutha before sowing control many diseases that attack the plant right from its seedling stage Sreenivasa *et al.*

(2009), Devakumar *et al.* (2014), Shakuntala *et al.* (2012) India practice panchagavya for sustainable agriculture. Use of chemical fertilizers and pesticides in agriculture fields led to environmental degradation and hence as an alternative to chemicals. Panchagavya is also being sought to improve crop establishment and health. Bashir *et al.* (2014) foliar application of Moringa leaf extract causes longer life-span, heavier roots, stems and leaves, produce more fruit, larger fruit and increase in yield 20-35%.

MATERIALS AND METHODS

The present investigation entitled "Influence of organic and botanical priming on seed quality parameters of Okra (varieties) (*Abelmoschus esculentus*) were carried out at seed science Post Graduate Laboratory, Department of Genetics and Plant Breeding, SHUATS, during Zaid 2021 Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. The experimental will be carried out to study the influence of Beejamrutha, Panchagavya, Curry leaf, Moringa leaf and Sea weed extract on germination and vigour of Okra *Abelmoschus esculentus* (L.) varieties V₁ - Arka anamika V₂ - Punjab no. 13 seeds were soaked in distilled water and various solutions at 25°C for 8 h after that shade dried and method of germination was between the paper with four Replication analyzed through Completely Random Design (CRD) (Hong *et al.* 2007, Lima and Marcos 2010, Ambika and Balakrishnan 2015, Swaminathan 2005), Tables 1-3.

Table 1. Mean performance on effect of treatments on seed quality parameters of Okra (*Arka anamika*).

Treatments	Germination (%)	Root length (cm)	Shoot length (cm)	Seedling length (cm)	Seedling fresh weight (g)	Seedling dry weight (g)	Seedling vigour index-i	Seedling vigour index-ii
T ₀	73.5	8.28	8.96	17.34	3.92	0.412	1273	30.22
T ₁	79	14.93	14.79	29.58	5.95	0.795	2336.3	62.72
T ₂	85	11.75	11.78	23.56	5.35	0.55	2003.3	46.775
T ₃	79.5	13.205	13.21	26.49	4.06	0.455	2104.8	36.25
T ₄	77	12.03	12.38	24.57	5.9	0.64	1892.9	49.5
T ₅	77	12.835	12.94	25.77	5.0	0.512	1984.3	39.26
Grand mean	78.5	12.17	12.34	24.55	5.03	0.56	1932.5	44.12
Grand total	1884	292.22	296.30	589.325	120.5	13.46	46380.1	1058.9
CD at 5%	4.40	0.839	0.88	1.54	0.81	0.182	150.16	14.36
SEm	1.48	0.2834	0.297	0.521	0.274	0.061	50.53	4.83
Min	73.5	8.28	8.96	17.34	3.92	0.412	1273.2	30.22
Range Max	85	14.93	14.79	29.58	5.95	0.795	2336.3	62.72

Table 2. Mean performance on effect of treatments on seed quality parameters of Okra. Punjab no.13.

Treatments	Germination (%)	Root length (cm)	Shoot length (cm)	Seedling length (cm)	Seedling fresh weight (g)	Seedling dry weight (g)	Seedling vigour index-i	Seedling vigour index-ii
T ₀	75	8.87	8.75	17.62	3.825	0.45	1321.22	33.7
T ₁	77	13.25	12.56	25.82	4.37	0.76	1989.81	58.61
T ₂	79.5	11.77	11.95	23.73	4.23	0.632	1888.48	50.44
T ₃	73.5	13.09	13.16	26.70	4.39	0.65	1927.33	47.77
T ₄	79.5	15.14	15.53	30.67	6.239	0.78	2348.53	62.525
T ₅	79.5	13.92	13.92	27.87	5.795	0.72	2214.4	57.76
Grand mean	77.33	12.67	12.63	25.318	4.809	0.667	1963.29	51.80
Grand total	1856	304.295	303.35	607.64	115.42	16.01	119.14	1243.22
CD at 5%	4.25	0.961	0.768	1.4028	0.799	0.1615	177.64	13.76
SEm	1.43	0.323	0.258	0.474	0.269	0.054	59.78	4.63
Min	75	8.87	8.75	17.625	3.825	0.45	1321.22	33.7
Range Mix	79.5	15.14	15.53	30.67	6.239	0.78	2348.53	62.52

RESULTS AND DISCUSSION

Gemination percentage (%)

Gemination percentage of *Arka anamika* significantly highest percentage of germination (85%) was reported in T₂- Panchagavya followed by (79.5%) T₃- Curry leaf extract and T₁- Beejamrutha (79%) minimum germination percent (73.5%) was recorded by T₀ – Control (Amarnath et al. 2015, Ambika et al. 2014, Arif et al. 2008, Bradford et al. 2002). Germination percentage of Punjab no. 13 significantly highest percentage of germination (79.5%) was reported in

Table 3. Analysis of variance of Annova table of Okra.

Treatments	Variety	Treatment	Replication
Germination percentage	<i>Arka anamika</i>	258.84**	72.81
	Punjab no .13	58.4**	8.77
Root length	<i>Arka anamika</i>	19.578**	0.319
	Punjab no .13	18.7375**	0.418
Shoot length	<i>Arka anamika</i>	18.44**	0.343
	Punjab no .13	21.087**	0.308
Seedling length	<i>Arka anamika</i>	66.799**	1.038
	Punjab no .13	78.29**	0.89
Seedling fresh weigh	<i>Arka anamika</i>	3.090**	0.300
	Punjab no .13	3.73**	0.28
Seedling dry weight	<i>Arka anamika</i>	0.077**	0.150
	Punjab no .13	0.039**	0.011
Seed vigour index- I	<i>Arka anamika</i>	509294.5**	10217.04
	Punjab no .13	566995.4**	14299.35
Seed vigour index -II	<i>Arka anamika</i>	528.5759**	93.44173
	Punjab no .13	434.099**	85.823

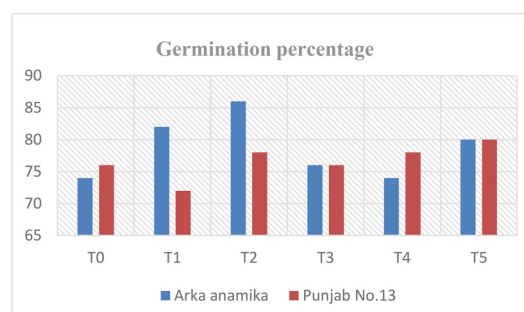
T₂- Panchagavya, T₄- Moringa leaf extract, T₅- See weed extract. Minimum germination percent (75%) was recorded by T₀– Control (Fig.1).

Shoot length(cm)

Shoot length of *Arka anamika* significantly highest shoot length and T₁- Beejamrutha (14.79 cm) followed by T₃- Curry leaf extract (13.21cm) minimum shoot length (8.96 cm) was recorded by T₀ – Control. Shoot length of Punjab no. 13 significantly highest shoot length (15.53 cm) was reported in T₄- Moringa leaf extract, T₃- Curry leaf extract (13.16 cm). Minimum shoot length (8.75 cm) was recorded by T₀ – Control (Fig. 2).

Root length (cm)

Root length of *Arka anamika* significantly highest

**Fig. 1.** Germination percentage.

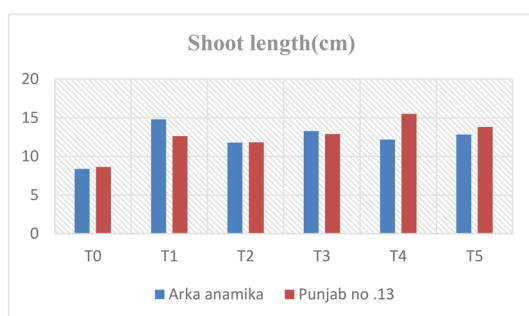


Fig. 2. Shoot length.

Root length and T_1 - Beejamrutha (14.93 cm) followed by T_3 - Curry leaf extract (13.205 cm) minimum Root length (8.28 cm) was recorded by T_0 – Control. Root length of Punjab no.13 significantly highest percentage of Root length (15.14 cm) was reported in T_4 - Moringa leaf extract, T_1 -Beejamrutha (13.25 cm). Minimum Root length (8.87 cm) was recorded by T_0 – Control (Fig. 3).

Seedling length (cm)

Seedling length of *Arka anamika* significantly highest seedling length T_1 - Beejamrutha (29.58 cm) followed by T_3 - Curry leaf extract (26.49 cm) minimum seedling length (17.34 cm) was recorded by T_0 – Control. Seedling length of Punjab no.13 significantly highest percentage of seedling length (30.67 cm) was reported in T_4 - Moringa leaf extract, T_5 - See weed extract (27.87 cm). Minimum seedling length (17.62 cm) was recorded by T_0 – Control (Fig. 4).

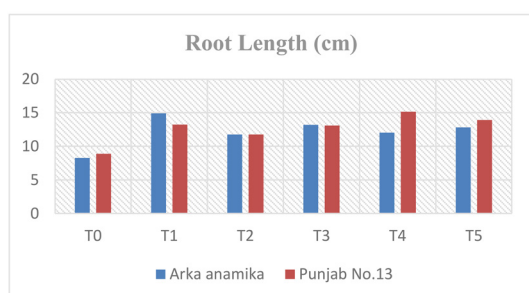


Fig. 3. Root length (cm).

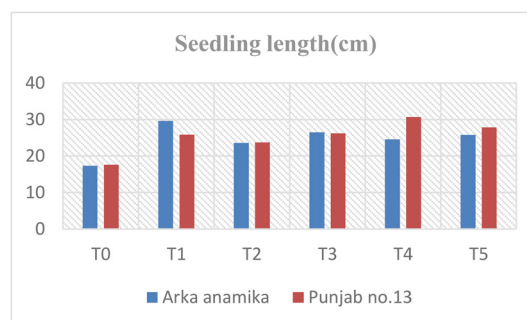


Fig. 4. Seedling length (cm).

Seedling fresh weight (g)

Seedling fresh weight of *Arka anamika* significantly highest seedling fresh weight T_1 -Beejamrutha (5.95 g) followed by T_4 - Moringa leaf extract (5.9 g) minimum seedling fresh weight (3.92 g) was recorded by T_0 – Control. Seedling fresh weight of Punjab no.13 significantly highest seedling fresh weight (6.239 g) was reported in T_4 - Moringa leaf extract, T_5 - See weed extract (5.795 g). Minimum seedling fresh weight (3.825 g) was recorded by T_0 – Control (Fig. 5).

Seedling dry weight (g)

Seedling dry weight of *Arka anamika* significantly highest seedling dry weight T_1 - Beejamrutha (0.795 g) followed by T_4 - Moringa leaf extract (0.64 g) minimum seedling dry weight (3.92 g) was recorded by T_0 – Control. Seedling dry weight of Punjab no.13 significantly highest seedling dry weight (0.78 g) was reported in T_4 - Moringa leaf extract, T_1 - Beejamrutha (0.76 g) T_5 - See weed extract (0.72 g). Minimum

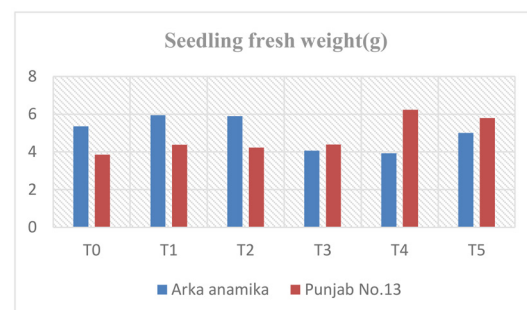


Fig. 5. Seedling fresh weight (g).

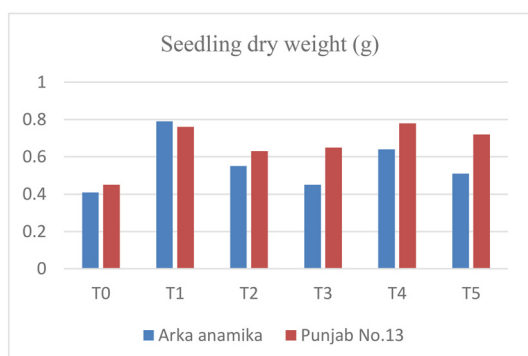


Fig. 6. Seedling dry weight (g).

seedling dry weight (0.45 g) was recorded by T_0 – Control (Fig. 6).

Seed vigour index - I

Seed vigour index - I of *Arka anamika* significantly highest Seed vigour index - I T_1 -Beejamrutha (2336.3) followed by T_3 - Curry leaf extract (2104.8) minimum Seed vigour index - I (1273) was recorded by T_0 – Control. Seed vigour index - I of Punjab no.13 significantly highest Seed vigour index - I (2348.53) was reported in T_4 - Moringa leaf extract, T_5 - See weed extract (2214.4). Minimum Seed vigour index - I (1321.2) was recorded by T_0 – Control (Fig. 7).

Seed vigour index - II

Seed vigour index - II of *Arka anamika* significantly highest Seed vigour index - II T_1 -Beejamrutha (62.72) followed by T_2 - Panchagavya (46.775) minimum Seed vigour index - II (30.22) was recorded by T_0 – Control. Seed vigour index - II of Punjab no.13

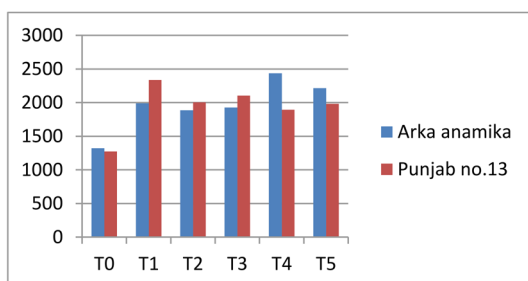


Fig. 7. Seed vigour index - I.

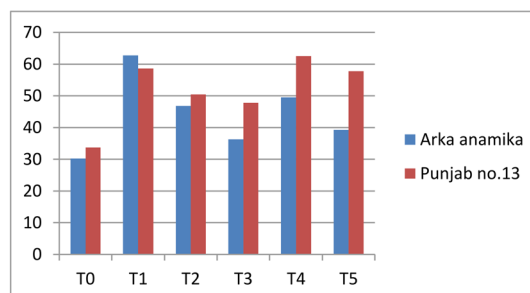


Fig. 8. Seed vigour index - II.

significantly highest Seed vigour index - II (62.525) was reported in T_4 - Moringa leaf extract, T_5 - See weed extract (57.76). Minimum Seed vigour index - II (33.7) was recorded by T_0 – Control (Fig. 8).

CONCLUSION

In the present investigation *Arka anamika* showed T_1 - Beejamrutha, the best results in lab. Among all the treatments T_1 - Beejamrutha has given the highest results in seed quality parameters of *Arka anamika* i.e., in highest percentage of germination (85%), highest shoot length (14.79 cm), Root length (14.93 cm), Highest seedling length (29.58 cm), Highest fresh weight (5.95 g), Highest dry weight (0.795 g), Highest vigour index-I (2336.3), Highest vigour index-II (62.72) followed by T_3 -Curry leaf extract and T_0 - Control.

In the present investigation Punjab no.13, among all the treatments T_4 - Moringa leaf extract has given the highest results in seed quality parameters of Punjab no.13 i.e., in highest percentage of germination (79.5%), highest shoot length (15.53 cm), Root length (15.14 cm), Highest seedling length (30.67 cm), Highest fresh weight (6.239 g), Highest dry weight (0.78 g), Highest vigour index-I (2348.53), Highest vigour index-II (62.52) followed by T_5 - See weed extract and T_0 - Control.

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