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The production of Okra (Abelmoschus esculentus(L) as affected by priming in Uyo, Nigeria

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Abstract: The field experiment was conducted during the cropping season of 2024 at the Teaching and Research Farm, Department of Crop Science, Faculty of Agriculture, University of Uyo. The aim was the production of Okra (Abelmoschus esculentus(L) as affected by priming in Uyo, Nigeria. The farm is located on latitude 05°2` North and longitude 07°58`East, with an elevation of–52 m above sea level. Mean annual rainfall of the area stands at about 2,500mm, with mean monthly relative humidity of 79.8%. Seeds of lady finger, a variety of okra were obtained from the National Seeds Centre, National Root Crops Research Institute, Umudike, Abia State for the experiment. The experimental treatments were four levels of priming: 0 (control), 12 hours, 24 hours and 36 hours. The experiment was laid out in a Randomized Complete Block Design (RCBD), and replicated three (3) times. The experiment consisted of four plots per replicate, totaling 12 plots for the entire experiment. The parameter measured during the research work are germination percentage, plant height, leaf area, number of leaves, number of fruits, fruit length, fruit diameter, fruit weight and yield. Each plot (flat) measured 2.25 m × 2.25 m. Each replicate was separated from one another by 1 m while plots were separated by 1 m paths. The experiment consisted of four treatment factors as follows; Treatment A - (Control; 0 hours priming) Treatment B - (12 hours priming), Treatment C - (24 hours), Treatment D - (36 hours). The land which measured 13 m x 9.75 m was cleared with the aid of machete and the trash packed to the borders of the farm. Significant difference ($p<0.05$) on both growth and yield parameters where 36 hours of priming recorded higher in both germination percentage (80.33), plant height (67.44), leaf area (311.59), number of leaves (11.79), number of pod per plant (34.64), number of seeds (26.71), fruit length (12.11), fruit diameter (6.00), fruit weight (3.51), dry pod weight (0.32) and yield 700.45). From the research finding, recommendation is hereby made for farmers within the locality, to prime their okra seeds 36 hours before planting for fast germination and over-all yield.

Keywords: *Okra, Priming, Germination and Yield.*

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INTRODUCTION

Okra (*Abelmoschus esculentus* (L.), is an annual vegetable crop in tropical and sub-tropical regions of the world which belongs to the family Malvaceae (Naveed *et al.,* 2009). The global okra production was estimated to be around 9.96 million tons in 2020 with India leading with 6.18 million tons, followed by Nigeria with 1.82 million tons (FAOSTAT, 2020). Nigeria recorded the highest okra fruit yield in 2010 with an average yield of 27, 275kg/ha, and since then it has been on the decline with the sharpest drop recorded in 2011 with an average yield of 8,735tons/ha. The scarcity of improved okra varieties with important desirable end-user traits also contributes to the yield decline (Kumar *et al*., 2010). Nutritionally, the richest part of the okra plant is the seed. The mature fruit and stems are used in the paper industry. Okra mucilage can be used as food additives (Bassey *et al.,* 2006). Okra is important because of its nutritive value that are present in the leaves and fruits (Akintoye *et al.,* 2011). The fresh fruit is a good source of carbohydrates and minerals, especially calcium, potassium, iron, magnesium and zinc. Okra is very rich in vitamins A and C (Eke *et al.,* 2008). The edible portion of the fruit on the average contains approximately; 70-86% water, 2.2% protein, 10% carbohydrate, 1.0% fibre, 0.9% ash, 0.2% fat and vitamins A, B and C. According to Akata (2015), the immature fruits and leaves of okra are used in soup as thickener because of its rich sources of mucilage, vitamins and minerals. Okra contains about 20% edible oil and protein, while its mucilage is utilized for medicinal purposes. Okra is also used in the control of blood sugar in diabetic patients and fight cancer. It improves the heart and brain health

Uniform and fast germinating seeds are of prime importance in agriculture. In order to improve the germination potential of seeds, different treatments are used including priming (Badek *et al.,* 2006). Germination under natural conditions may therefore be delayed for a considerable time until the seed coat has softened or rotten away. Seeds with hard cover can produce vigorous seedlings

when primed (Natarajan *et al.,* 2007). Slow and uneven germination of okra seed and indeed all crops has been a major constraint to farmers. Reports have shown that the percentage germination of okra seeds is relatively low, due to its hard seed coats (Felipe *et al.,* 2010). This challenge has resulted in fewer stands of okra plants in farmers' fields causing farmers to take to alternative crop like waterleaf. Farmers have been practicing seed priming before sowing, but the time or duration has not been established due to lack of interest for research into seed priming. Seed priming is the pre-sowing treatment used to enhance seed germination in terms of rate and uniformity of germination, thereby improving seedling stands and proper crop establishment (Job *et al.,* 2000). It is a simple, low cost and effective approach for early seedling growth and yield under stress and non-stress conditions. Priming may increase resistance to abiotic stresses (Farooq *et al.,* 2008). Out of several methods of seed priming, three of them namely hydro-priming (soaking seeds in water for a considerable time depending on recalcitrance) and osmo-priming (soaking seeds in any osmotic solution of inorganic salts such as KNO_3, K_3PO_4, KH_2PO_4, $NaNO_3$, $MnSO_4$, $MgSO_4$, Na_2HPO_4, KCl and $MnCl_2$ and heating or thermo-priming are the most common. This research is therefore, aimed at investigating the appropriate level of seed priming that could produce the highest percentage germination and improved fruit yield of okra in the humid environment.

Material and method

The field experiment was conducted during the cropping season of 2024 at the Teaching and Research Farm, Department of Crop Science, Faculty of Agriculture, University of Uyo. The farm is located on latitude 05°2` North and longitude 07°58`East, with an elevation of–52 m above sea level. Mean annual rainfall of the area stands at about 2,500mm, with mean monthly relative humidity of 79.8%. The mean monthly atmospheric temperature is 26°C with the sunshine duration of about 5.5 hours/day (UCCDA, 2007). Seeds of lady finger, a variety of okra were obtained from the National Seeds Centre, National Root Crops Research Institute, Umudike, Abia State for the experiment. The experimental treatments were four levels of priming: 0 (control), 12 hours, 24 hours and 36 hours. The experiment was laid out in a Randomized Complete Block Design (RCBD), and replicated three (3) times. The experiment consisted of four plots per replicate, totaling 12 plots for the entire experiment. Each plot (flat) measured 2.25 m × 2.25 m. Each replicate was separated from one another by 1 m while plots were separated by 1 m paths. The experiment consisted of four treatment factors as follows; Treatment A - (Control; 0 hours priming) Treatment B - (12 hours priming), Treatment C - (24 hours), Treatment D - (36 hours). The land which measured 13 m^2 x 9.75 m^2 was cleared with the aid of machete and the trash packed to the borders of the farm. The experimental area was tilled with the use of spade to provide good tilth for the seedling growth. The land was marked using the 3 4 5 square method to determine right angle for the farm using tapes, ropes and pegs. The experiment was laid out in a randomized complete block with three replicates (blocks).Two Okra seeds were sown directly into the soil at 2.5 cm depth on the 10th of July at a spacing of 0.45 cm x 0. 45 cm intra and inter row, respectively. The seeds were arranged by 6 rows and 6 columns, giving 72 seeds per plot (i.e. about 864 plants in total), equivalent to 68,000 seeds per hectare. Weeding was done to keep the plots clean and properly aerated to ensure better growth and development. Weeding was done manually with the aid of weeding hoe at 4 and 8 weeks after sowing(WAS). After sowing, similar cultural operations such as irrigation, weeding, top dressing and plant protection measures were carried out for better growth and development of the okra seedlings. Okra fruits were harvested at maturity with sterilized knife within a 3-4days' intervals until final harvest. For the purpose of this research, 4 plants were tagged for data collection. The following growth and yield parameters were studied; **Growth parameters:** Number of days at emergence: Number of days to 50% emergence in each treated (primed) seeds was counted and recorded. Number of germinated okra seeds were counted from 5 days after sowing and expressed in percentage till a half of the seeds emerged. Percentage establishment at seven days after sowing: This involved counting the number of seeds that germinated in each treatment

$$\%\ Germination = \frac{Number\ of\ germinated\ seeds}{Total\ number\ of\ seeds\ sewn}\ x\ 100$$

Plant height at 3, 6 and 9 WAS: Heights of okra was obtained by measuring four randomly tagged plants from the ground level to terminal point of the plant using measuring tape in centimeter. Number of leaves per plant at 3, 6 and 9 WAS: This was done by counting the number of leaves on four randomly tagged plant at the centre of each plot at intervals of 3,6 and 9 weeks after sowing. Leaf area (cm^2): Leaf area was determined by measuring the length of all lobes and width of all leaf lobes of four randomly tagged plants. The leaf area was calculated as the product of leaf length (L) multiplied with leaf width (W) and the product multiplied with the correction factor (0.74) (Breda, 2003), LA = L × W × 0.74. Number of pods/plant: This involved the physical counting of all the okra fruits that emerged from the tagged plants and the mean recorded per treatment. Length of pods/plant: Length of pods(fruits) of 4 tagged plants was taken with the use of measuring tape in centimeters and the mean recorded per plant based on treatment. Number of seed/pod: The pods were opened, and the seeds counted according to treatment and recorded. Fresh pod weight: This involved weighing together the pods harvested from the tagged plants in a fresh form using the electronic weighing scale in grams and the mean recorded per treatment. Dry pod weight (g): This involved weighing together of all the okra pods harvested per treatment when dried to constant weight and then allowed to cool before being weighed. All the data collected were subjected to Analysis of Variance (ANOVA) and significant means separated using the Least Significant difference at 5% probability level. using GENSTAT statistical software package 17.1DE (2015).

Result and Discursion

Table 1: Seed germination (%) of okra as influenced by different of seed priming

Treatment Germination (%) of seeds	Days after sowing (DAS)			
	4	**5**	**6**	**7**
Control (No- Hydro priming)	23.23[d]	40.16[d]	50.03[c]	67.50[d]
12 hours of hydro priming	26.76[c]	44.16[c]	53.16[bc]	70.16[c]
24 hours of hydro priming	28.50[b]	47.83[b]	67.33[b]	78.83[b]
36 hours of hydro priming	32.33[a]	51.50[a]	69.66[a]	80.33[a]
LSD (0.005)	0.4941	0.8535	1.3255	1.2403

LSD= Least Significant Differences at 5% Level of Probability, * = 95% level of probability

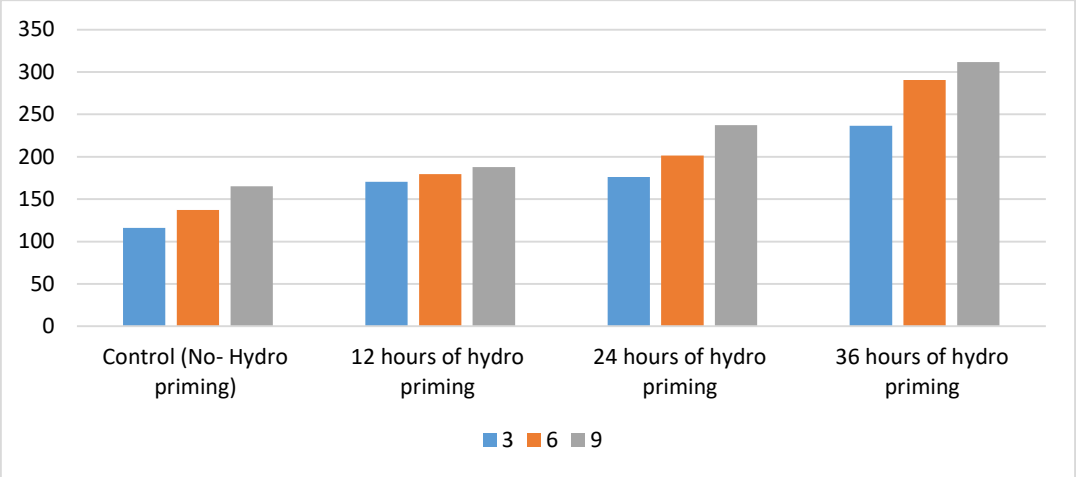
The substantial increase in seed germination was observed with increasing hydro priming durations (Table 1). Hydro-priming duration for 36 hours showed maximum germination (80.33%) and control (un-primed seeds) recorded lowest germination (67.50%) at 7 days. It was further observed that seed germination was relatively higher when hydro-primed for 36 hours' duration in comparison with lesser hydro-priming durations. Significant differences ($p<0.05$) were observed among the treatments in term for seed germination percentage. At four (4) days of the germination, seeds in the control had mean germination of 23.23%, while those of 12h was 26.76% plants. Seeds imposed with 24h had mean germination of 28.50 %, while those of 36h recorded 32.33% seedlings. At five (5) days after sowing, there were significant differences ($p<0.05$) in seed germination among the means. Seeds without priming recorded 40.16% germination, while those subjected to 12h priming had 44.16% plants. At 24h, the number of germinated seedlings increased to 47.83% while the highest number of seeds that germinated came from seeds which were imposed with 36h priming, being 51.50%. At six (6) days after priming, the value number for seeds germination was produced by seeds with 36h priming, being 69.66%, while the least was recorded in the control being 50.03%. A similar trend was repeated for the 7th day in which seeds imposed to 36h priming produce the highest germination percentage of 80:33, followed by 24h (78.83%), 12h (70.16%) while the least came from the control. The result showed that increase in priming hours also increases seed germination rate, these work collaborate with the work of Madina et al., 2024 who reported same trend on date seeds

Uniform and fast germinating seeds are of prime importance for agriculture. In order to improve the germination properties of seeds, different seed treatments are used including priming (Badek *et al.*, 2006). Germination under natural conditions may therefore be delayed for a considerable time until the seed coat has softened or rotted away. Seeds with hard cover produce seedlings when primed (Natarajan *et al.,* 2007). Seed priming with different durations enhances germination because before priming, seeds are inactive due to low moisture content (Adhikari *et al*., 2021). When seeds are primed with any source, the water imbibition occurs in the seed and seed dormancy breaks up leading to better and uniform germination of seeds (Harris *et al*., 2007; Rehman *et al*., 2011). Similarly, in this study hydro-priming durations improved the seed germination and seedling growth of okra. It was observed in the study that long priming duration (36 hours) showed better germination in comparison with control and other priming durations.Sharma *et al.* (2014) worked with four methods of seed priming , all the treatments of hydro-priming enhanced the seed germination even up to 76% in comparison to non-primed seeds i.e. control as 66%. Similarly, Kuppusamy and Ranganathan (2014) revealed that among the treatments, hydro-priming (both 12 and 24h) was the only priming treatment which proved to be detrimental to seeds, in terms of seed germination. Okra seed is hard and considerable time is required to make softer the seed coat which leads to delay in germination. Seeds soaked in water for longer periods results in better and uniform germination of the seed (Singh *et al*., 2015; Ullah *et al*., 2019), as shown in table 4.1.2, where 24 and 36 hours hydro priming recorded higher germination percentage. Hardeep Kaur *et al*. (2015) observed that the germination percentage significantly increased in the treated seeds as compared to control. The results of various soaking durations indicate that the highest seed germination was recorded in the seeds which were soaked for 24hr in all treatments. The maximum seedling length was observed in T2 (osmo-priming with 5% Poly ethylene glycol), T3 (osmo-priming with 10% Poly ethylene glycol) and T1 (hydro-priming). Minimum seedling length was observed in T4 (priming with distilled water). Maximum root length in osmopriming with 5% polythene glycol than other priming treatments. Sharma *et al.* (2014) worked with four methods of seed priming , all the treatments of hydro-priming enhanced the seed germination even up to 76% in comparison to non-primed seeds i.e. control as 66%. Similarly, Kuppusamy and Ranganathan (2014) reported that hydro-priming (both 12 and 24h) was the only priming treatment which proved to be detrimental to seeds, in terms of seed germination. Also examined hydro-priming (12, 24h), sand matric priming (60% WHC; 3, 6h), halo-priming (3% NaCl; 12, 24h) and osmo-priming (PEG,24h) two osmotic levels (-1 and-1.5 Mpa) and revealed that among the treatments, hydro-priming (both 12 and 24h) was the only priming treatment which proved to be detrimental to seeds, in terms of seedling height (cm). Hydro-priming (both 12 and 24h) was the only priming treatment which proved to be detrimental to seeds, in terms of seedling length(cm). Sharma *et al.* (2014) studied the comparison of various seed priming methods for seed germination, seedling vigour and fruit yield in okra. Results revealed that hydro-priming for 12 hours and solid matrix priming with calcium aluminium silicate (1:0.4:1; Seed:SM:Water) for 24 hours significantly increased the seed germination, seedling vigour, mean germination time and marketable fruit yield in okra cv.

HissarUnnat. Hydropriming, being simple, economic a land safe, is recommended which can be effective to increase the fruit yield up to 55% as compared to control.(Madina and Akinyemi 2023)

Table 2: Height (cm) of okra as influenced by different levels of seed priming Treatments Plants Height(cm)

	Weeks after sowing (WAS)		
	3	**6**	**9**
Control (No- Hydro priming)	12.78	27.20^{c}	46.50^{c}
12 hours of hydro priming	14.84	36.60^{b}	60.87^{b}
24 hours of hydro priming	15.79	39.96^{a}	63.37^{b}
36 hours of hydro priming	15.97	40.86^{a}	67.44^{a}
LSD (0.005)	NS	2.18	3.36



LSD= Least Significant Differences at 5% Level of Probability, * = 95% level of probability

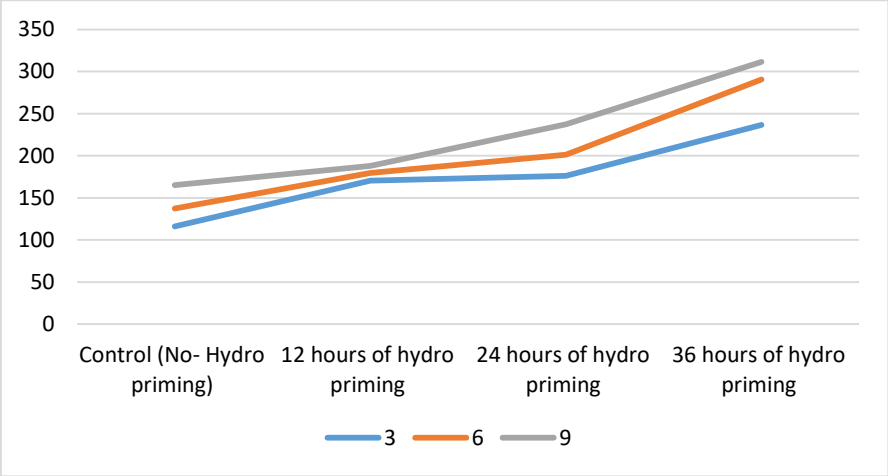
Different priming durations exhibited considerable effect on plant height as revealed in (Figure 1). Plant height increased simultaneously with increasing priming durations. There was no significant differences ($p<0.05$) among the treatments at 3WAS. However, at 6WAS, significant differences ($p<0.05$) were observed amongst the heights of okra. The tallest plants (40.86^{a}) were produced by okra imposed with 36 hours priming, followed by seed imposed with 24 hours priming being 39.96^{c} which were not significantly different in height. Seeds imposed with 12 hours priming produced seedlings of 36.60^{c}, while those without priming (control) were the shortest plants (27.20cm) respectively. The tallest plants observed on 36 hours hrydo-priming durations (67.44 cm) at week 9, which was significantly different ($p<0.05$) from other priming durations. Seed priming of 24 hours produced plant height 63.37cm, while 12 hours priming recorded 60.87cm plant height. The shortest plants were observed among seed lots in the control, being 46.50cm. The result showed that increase in levels/duration of seed priming resulted in a corresponding increase in plant height. The early and uniform germination of the seeds results in faster growth of plants making plants taller (Afzal *et al*., 2002). In this study, plants emerged from the treated seed grow taller than those produced from untreated seed. Correspondingly similar results were also documented by Adhikari *et al*. (2021) who found positive effect of priming on plant height of bitter gourd. The positive influence of priming on plant height may be associated with the initiation of different biological activities in the seed that may lead to better growth of plants with maximum height. The better height of the plants is also attributed to the better growth and development of roots, subsequently better nutrient acquisition occurred leading to taller plants (Shakuntala *et al*., 2020). Hardeep Kaur *et al*. (2015). Observed that the germination percentage significantly increased in the treated seeds as compared to control.

Table 3: Leaf of area okra as influenced by different levels of seed priming Treatments Leaf Area (cm^{2})

	Weeks after sowing (WAS)		
	3	**6**	**9**
Control (No- Hydro priming)	115.96^{b}	137.22^{c}	165.19^{c}
12 hours of hydro priming	170.42^{ab}	179.35^{c}	187.71^{c}
24 hours of hydro priming	176.26^{ab}	201.35^{b}	237.33^{bc}
36 hours of hydro priming	236.49^{ab}	290.64^{b}	311.59^{a}

LSD (0.005)	7.21	10.42	13.22

LSD= Least Significant Differences at 5% Level of Probability, * = 95% level of probability



The effects of different levels of seed priming on leaf area of okra in (cm^2) presented in table 4. The results shows significant differences ($p<0.05$) in leaf area among the treatments at 3, 6 and 9 WAS. The leaf area increased simultaneously with increasing priming durations. The largest leaf area was observed on 36 hours hydro-priming duration (236.49cm, 290.64cm and 311.59cm) at week 3, 6 and 9 respectively, which was considerably greater than other priming durations, followed by 24 hours priming duration with leaf area 176.26cm, 201.35cm and 237.33cm^2 at 3, 6 and 9 WAS respectively. The least were recorded in control with leaf area of 115.96cm, 137.22cm and 165.19cm respectively. Healthy leaves with better leaf area are pre-requisite for satisfactory growth of plants and also aid in intercepting solar radiation converting the assimilate for reproductive characters (Danlingi et al., 2022 and Mehta *et al*., 2014). In this study, early emergence and faster growth of plants produced from primed seeds led to better vegetative growth, plant height, subsequently vigorous plants with maximum leaves were produced. Lee & Kim, (2000) also found positive effect of priming on seedling growth and leaf area. Several other authors have also reported that plant vegetative growth including leaves in individual plants is highly influenced by seed priming. Root depth is one of the main traits that considerably affect the growth and development of any plant species (Grover and Yadev, 2004). Pre-soaking hydro-priming duration significantly

Table 4: Number of leaves of okra as influenced by different levels of hydro priming TreatmentsNumber of leaves

	Weeks after sowing (WAS)		
	3	**6**	**9**
Control (No- Hydro priming)	4.83c	7.00c	8.43c
12 hours of hydro priming	5.50b	7.33c	9.00c
24 hours of hydro priming	5.51b	8.66bc	10.67b
36 hours of hydro priming	6.16a	9.66b	11.78a
LSD (0.005)	1.00	1.34	1.12

LSD= Least Significant Differences at 5% Level of Probability, * = 95% level of probability

Table 4 shows number of leaves of okra as influenced by different levels of hydro priming. The number of leaves was slightly increasing higher hydro priming durations. The 36 hours seed hydro-priming duration showed the highest number of leaves (11.79^a) at week 9 and control un-primed seeds recorded lowest number of leaves (8.43^c) at week 9. It was further observed that number of leaves was relatively higher for 36 hydro-primed. Control plot recorded the lowest (4.83, 7.00 and 8.43) at week 3, 6 and 9 respectively Hydro-priming showed positive effect on leaves of plants. Early germination resulted in better leaves formation (As leaves are the main photosynthetic organs of greenest plants and generally known as food factory of plant) (Damalas *et al.*, 2019). In this study, early emergence and faster growth of plants produced from primed seeds led to better vegetative growth, seedling height, subsequently vigorous plants with maximum leaves were produced. Lee & Kim, (2000) also found positive effect of priming on seedling growth and leaf area. In this study higher hydro priming durations results in better growth, root establishment, leaves formation. (Danlingi et al., 2022) in his work on data seeds reported that primed seeds had early leaf development and establishment lending to fast and vigorous plant growth which could lead to better and higher yield. Madina et al., 2024 collaborated with the finding in this work starting that uniform germination, spacing and available nutrient affect plant early establishment which eventually lead to positive increase in yield and yield related parameters.

Table 5: Yield components of okra as influenced by different levels of hydro priming durations.

Treatment	Number of pods per plant	Length of pods	Number of seeds per pod
Control (No- Hydro priming)	31.80c	11.38c	18.47c
12 hours of hydro priming	32.25bc	1166bc	24.76bc
24 hours of hydro priming	33.38b	11.93ab	25.47b
36 hours of hydro priming	34.64a	12.11a	26.71a
LSD (0.005)	1.21	0.27	1.45

LSD= Least Significant Differences at 5% Level of Probability, * = 95% level of probability

The yield parameter presented in table 5 revealed that 36 hours hydro priming duration recorded the highest number of pods per plant, length of pod and number of seeds per plot (34.64, 12.11 and 26.71) respectively, this was closely followed by 24 hours hydro priming duration. However, control unit recorded the lowest number of pods per plant, length of pods and number of seeds per pool plant (31.80, 11.38 and 18.47) respectively. Priming at 36 hours hydro priming recorded the highest yield output (34.64, 12.11 and 26.71) for number of pods per plant, length of pods and number of seeds per pod, which was closely followed by 24 hours hydro pruning duration. This is as resulted of vigorous growth experienced by 36 hours primed seeds. This is in accordance with the findings of Arif *et al*., (2008) which states that Increased in germination of primed seeds is attributed to better enzymatic activities that caused dehydrogenase, and increases amylase production which enhances biochemical activities in the seed; resultantly, plants with optimum performance were produced. According to Ratikanta, (2011), the higher the photosynthesis of the plant, the higher the yield output of that plant. Furthermore, Madina et al., 2023 reported that early vegetative plant establishment has a direct and positive effect on the crop reproductive characters.

Table 6: Yield components of okra as influenced by different levels of hydro priming durations

Treatment	FW/P (g)	DW/P (g)	FD	Yield (kg/ha)
Control (No- Hydro priming)	2.61^{c}	0.20^{c}	3.43^{d}	433.54^{d}
12 hours of hydro priming	3.09^{b}	0.27^{b}	4.01^{c}	502.21^{c}
24 hours of hydro priming	3.41^{a}	0.31^{a}	5.43^{b}	632.78^{b}
36 hours of hydro priming	3.51^{a}	0.32^{a}	6.00^{a}	700.45^{a}
LSD (0.005)	0.11	0.011	1.01	60.54

FW/P= Fruit weight per pod, DW/P= Dry weight per pod, FD= Fruit Diameter. LSD= Least Significant Differences at 5% Level of Probability, * = 95% level of probability.

The yield parameter presented in table 6 revealed that 36 hours hydro priming duration recorded the highest Fruit weight per pod, Dry weight per pod, Fruit Diameter and Yield (3.51, 0.32, 6.00 and 700.45) respectively, this was closely followed by 24 hours hydro priming duration. However, control unit recorded the lowest Fruit weight per pod, Dry weight per pod, Fruit Diameter and Yield (2.62, 0.20, 3.43 and 433.54) respectively. The Fruit weight per pod, Dry weight per pod, Fruit Diameter and Yield was also higher in 36 hours hydro priming duration as recorded in Table 7 was closely followed by 24-hour hydro priming duration. The differences in the Fruit weight per pod, Dry weight per pod, Fruit Diameter and Yield was slightly significant between the hydro priming durations. Primed seeds have been reported to give rise to crops, which matured earlier, and gave higher yields (Ndunguru and Rajabu, 2004). This finding was in agreement with the work of Esang et al., 2025 who reported that fast germination contribute to early plant establishment which translate to increase in the over-all crop yield. Yield is a factor of many attribute according to (Akinyemi et al., 2024) starting from germination, availability of nutrients, right spacing, interception of solar radiation, cultural practice just to mention but few, the variability in priming in this work could have led to early and fast germination staging a good foundation for the over-all yield recorded in the research.

Conclusion and Recommendation

Priming of seed is one of the sustainable approaches to overcome sluggish and uneven germination of okra. The findings of this study recorded significant priming of okra and the following conclusion were deduced: The pre-sowing hydro-priming periods had positive effect on seed germination, growth and root growth parameters of okra. The priming durations 24 hours and 36 hours significantly augmented water uptake in the seed thus showed increased and uniform germination with better shoot and root growth. 36 hours hydro priming duration had significant effect on the growth and yield of okra. Therefore, seed priming of higher levels produces greater effect. As the duration increases so does the growth and the yield of okra.

The results of this study revealed that hydro priming especially longer duration up to 36 hours resulted in overall better development and productivity (yield output) of okra. Therefore, farmers going in into okra farming are advice to use 36hours priming for germination of okra seeds is recommended. Further studies should be conducted to provide further information on okra production.

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