Effect of Seed Priming and NPK on Growth of *Capsicum Annum* L.

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Abstract

The seed priming and growing of *Capsicum annuum* L. was conducted at Botany department, Dagon University. The local variety of *Capsicum annuum* L. was used in this experiment. Priming method with NPK fertilizer was used compared with no-priming plant with NPK fertilizer.Ninety five percentage of survival rate was obtained from the priming of *Capsicum annuum* L. in germination. The NPK fertilizer treatments were applied to the plants established by seed priming and non-priming treatments. The results exhibited that primed seeds with 10 g NPK fertilizer treatment produced plant height 15.3 cm, leaf number 17.6, leaf length 8.2 cm and leaf width 4.75 cm. But the plant height and leaf number from primed seeds with 5g NPK fertilizer were more effective. However, the biomass fresh and dry weight of primed seeds with 10g NPK fertilizer was higher than the plants established by non – primed seeds. It is therefore concluded that the priming plants with NPK fertilizer possessed the superior growth characters than that of the non -priming plants.

Introduction

Capsicum annuum L. is a dicotyledonous flowering plant commonly grown worldwide and originate from South and Central America. It is also known as peppers possible with many general names in English, such as hot pepper, chilli or chilli pepper (Bosland,1996).

It belongs to the family Solanaceae. The plants are bushy and grow up to 60-80 cm tall. They are semi-perennials but usually grown as annuals. *Capsicum* fruits are one of the major sources of red food colourant and pungency for spice production. *Capsicum* can be used in several ways. It may be used fresh in salads. The world demand for *Capsicums* has been continuously increasing recently, and production increased by 40% between 1900 and 2000 with about 1.4 million hectares cultivated (FAO, 2009).

Capsicums are generally planted as seedlings. Seedlings may be obtained from commercial nurseries or growers can produce their own. Growers should buy seedlings from reputable nurseries to obtain plants that are well grown and free from diseases. *Capsicum* grow best on deep (minimum of 30 cm) loamy and well – drained soils. Soil pH should be in the range of 5.5.-7.0.A long frost-free growing season with high temperature is desirable. Adequate water is essential for the crop. *Capsicums* are sensitive to cold and growth is significantly reduced below 10°C (Bosland, 1996).

Seed germination and rapid germination are usually essentially processed in seedling establishment and plant development to obtain seedling number those results in higher crop (Almansouri*et al*.,2001). Seed priming technique has germination uniformity, improve seedling establishment and stimulate vegetative growth in more field crops, such as Chickpea (Kaur *et al.,* 2002), *Capsicum* (Patade*et al*., 2011).

Seed priming is a seed treatment that imbibition and activation of the initial metabolic events associated with seed germination but prevents radicle emergence and growth. Seeds are tolerant of desiccation, and even though during seed priming imbibition allows water uptake, the tolerance to desiccation is not lost. Thus, the seed can be dried again and stored. If the seeds are primed too long, desiccation tolerance will be lost, and the seeds may lose viability upon re-drying. The secret to successful seed priming is to stop the priming treatment at just the right time to allow re-drying.

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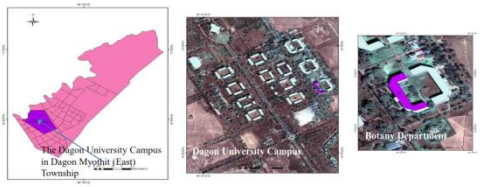
The advantage of primed seed is that when the primed seeds are planted their germination is faster and more uniform (Harris *et al.*, 1999).

Growth can be measured in many different ways. Individual leaf size (length, width, area); plant fresh weight and dry weight partitioned among organs, such as roots, stems, leaves and fruits; cell number in tissue and organs; and concentration of specific chemical constituents (nucleic acids, soluable nitrogen ,lipids, carbohydrates) in tissues and organs are examples of growth data(Noggle and Fritz, 2002).Growth may be regarded as an increase in fresh weight or an accumulation of dry weight (Leopold and Kriedemann 1975).

According to the above facts, the study was aimed to study the germination rate of no- priming and priming seeds, to observe the NPK fertilizer effect on the growth of *Capsicum annum* L. which passed through seed- priming process and no – priming process.

Materials and Methods

Germination and cultivation of *Capsicum annum* L. were set up in September 2013 to December 2013 at Botany department, Dagon University located at Latitude:16° 54´40.47´´ Longitude: 96°12 ´52.25´´ (mm.geoview.info/ Dagon – University)(Figure1). The seeds of *Capsicum annuum*L. used in this experiment were the local variety.



Source:Geography Department in Dagon University

Figure.1 The study area, Botany Department, Dagon University Campus in Dagon Myothit (East) Township

Medium Preparation

The medium used in the germination was soil mix.

Experiment 1.Germination of *Capsicum annuum* L.

In this experiment, two treatments with 4 replicates were used. One treatment had 200 seeds and thus a total of 400 seeds was sown in seed germination. The distance between plants (inside poly bag) and between row was 1.0 cm (Figure.2).

The treatments are :

T_1 = Non- priming (control)

T_2 = Priming overnight (immersed in water)

Data Collection

The germination rate, survived and non- survived plants were daily recorded. The germination rate was using the formula.

$$\text{Germination Rate (\%)} = \frac{\text{Germinated seeds}}{\text{Total sown seeds}} \times 100 \text{ (Soupe,2009)}$$

Figure.2 Germination state of non – priming and priming of *Capsicum annuum*L.

Experiment 2. Evaluation of the growth of *Capsicum annuum* L. growing in Polyethylene bags

Growing of *Capsicum annuum* L. was conducted in the department of botany, Dagon University. The experiment was set up to observe the growth of seedlings.

Soil Analysis

The soil used for growing of *Capsicum annuum* L. is the soil mix. The soil mix was submitted to the soil laboratory, Land Use Division, Myanmar Agriculture Service, Insein Township, Yangon Region for analyzing the physical and chemical properties of soil.

Experimental design

In this experiment, six treatments with 4 replicates were set up in Completely Randomized Design (CRD). The distance between the individual bag and between row is 25 cm.The treatments are as follows:

T_1 - Non - priming (control) T_4 - Priming with NPK 5g per plant

T_2 - Priming (overnight immersed in water)T_5 - Non- Priming with NPK 10g per plant

T_3 - Non- priming with NPK 5 g per plantT_6- Priming with NPK 10 g per plant

The area of the field was 600 × 120 cm^2. The distance between rows 150cm and plants was 20 cm.

Growing of *Capsicum annuum* L.

The germinated seedlings were first raised in nursery pots for 30 days to assist to obtain adequate water for the plant survival. Thirty days after growing, the plants were transplanted into 20 x 20cm sizepoly bags containing prepared soil medium. The NPK fertilizer application was started 7days after transplanting.

Data collection and statistical analysis

The plant height, number of leaves per plant, leaf length, leaf width, leaf area were collected in every four days interval and the fresh and dry weights of the whole plant were collected in every month.

The collected data were statistically analyzed using IRRI software developed by International Rice Research Institute (IRRI), the Phillippines. Mean separation was expressed by 5% LSD.

Leaf area of *Capsicum annuum* L.

The leaf area of three selected plant was measured to know the growth of the plant. Firstly, three fresh leaves of *Capsicum annuum* L. were harvested for calculating the single leaf area. These leaves were weighed and calculated the leaf area using the hard paper method of Blanco and Folegatti (2005). After drawing the fresh leaf sketches, the sample leaves were dried in the oven at 70°C for 72 hours. The rest of the leaves, stems and roots of these plants were also harvested and oven dried to compute the total leaf area of the whole plant (Figure 3).

Calculation of leaf area with Hard paper method

$$A = \frac{L \times a}{P}$$

Where:

A = area of leaves (cm^2) P = weight of 20 x 20 cm hard paper

L = weight of leaf blade figure of hard papera = area of hard paper (20 x 20 cm)

Biomass fresh and dry weighs

The fresh and dry weights of the vegetative plants from respective treatments were analyzed in every month. The representative plants from each treatment were thoroughly taken out and removed the soils from the roots.Then the roots, stem and leaves of each plants were separately weighed and recorded for the fresh weight. After weighing, these parts were air dried and the air dried ones were finally dried in an oven at 70°C for 72 hours until getting the constant dried weight. Dry weight biomass is measured to obtain the overall appearance of plant growth (Sitompul and Guritno ,1995)(Figure 4).

Figure.3 Biomass fresh and dry weights of *Capsicum annuum*L.

Experiment 1.Germination of *Capsicum annuum* L.

The germination of both non prime and prime seed were started at 5days after sowing (DAS) and it was continued to 12 DAS. (Table 1 and Figure 5). Out of 200 seeds in priming, 190 seeds are germinated and thus germination rate was 95%. Similarly, 141 seeds of non – priming were germinated and 70.5 % of germination rate was recorded (Table1, Figure 4, 5). When compare the non- prime and priming seeds in germination, primed seeds were more efficient germination 25% more than non- primed seeds

Table.1 Daily recorded germination rate of *Capsicum annuum* L.

Treatment	Number Germinated Seedlings									
	5 DAS	6 DAS	7 DAS	8 DAS	9 DAS	10 DAS	11 DAS	12 DAS	% of Germination	Total % of Germination
NP_1	0	14	4	3	1	2	1	2	54	
NP_2	0	16	11	8	1	0	0	0	72	**70.5**
NP_3	0	19	8	6	1	1	0	0	70	
NP_4	0	8	16	14	2	0	2	1	86	
P_1	1	25	1	3	1	0	2	10	86	
P_2	0	29	1	6	3	0	6	2	94	**95**
P_3	4	31	1	1	5	8	0	0	100	
P_4	3	30	0	4	8	5	0	0	100	

DAS = Days After Sowing NP = Non-priming P = Priming

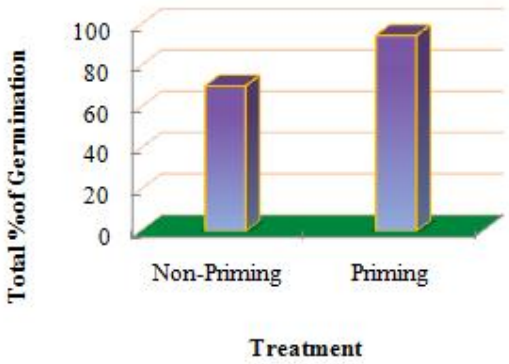


Figure.4 Germination rate of non priming and priming of *Capsicum annuum* L.

Figure.5 Germination rate of *Capsicum annuum* L. thro seed- priming and non-priming treatments

Experiment 2. Evaluation of the growth of *Capsicumannuum* L.

In this experiment, 30 days old germinated seedlings were grown in CRD to evaluate the growth of plants. There were six treatments and each treatment had 4 replicates. Before growing the germinated seedlings, the soil was analyzed.The meteorological data during the growing period was also collected.The analyzed soil results experiment showed that the soil contained 19% moisture (%), 9.92 soil pH (strongly alkaline),1.129% organic carbon(low),0.175% total N_2(low), phosphorous 0.1 ppm phosphorous(low), K_20 is 0.144mg^{-1} 100 g K_20 (low) (Table 2).

Table.2 Result of the analyzed soil of the experiment

Moisture (%)	pH(1:2.5)	Organic Carbon (%)	Humus (%)	Total N_2 (%)	P2O5 ppm	K_2O mg/100g	C :N
19.00%	9.92	1.129	2.413	0.175	0.1	0.144	3.741
	Strongly alkanline	Low	-	Low	low	low	

The weather condition during the experimental period showed that the highest mean rainfall was 612 mm in September 2013; the highest mean temperature was 28.5°C in November 2013; the highest mean humidity was 91% in September 2013 (Table 3).

Table .3 Monthly mean rainfall, temperature and humidity of the year 2013

Month	Rainfall (mm)	Temperature (C)	Humidity (%)
September	612	27.6	91
October	371	28.2	84
November	13	28.5	79
December	3	24.3	74

The growth of *Capsicum annuum*L. was evaluated by measuring the vegetative growth of the plants.

Plant height

The result showed that the plant height from T_4(Priming +NPK 5g) was maximum 15.8 cm followed by 15.3cm from T_6(Priming +NPK 10 g), 12.0 cm from T_1(Non

priming) and T_5(Non priming + NPK 10 g). Latter two treatments showed the least growth. The statistical analysis showed that the treatments were nonsignificant from each other (Table 4).

Table.4The symbiotic effect of priming and NPK on the plant height of *Capsicum annuum*L.

Treatment	Plant height (cm)								
	36DAS	**43DAS**	**50DAS**	**57DAS**	**64DAS**	**71DAS**	**78DAS**	**95DAS**	**Mean**
T_1(Non Priming)	4.8	5.2	7.2	9.9	12.4	16.1	19.4	21.0	12.0
T_2(Priming)	5.1	5.3	8.2	9.8	12.8	15.2	19.8	22.1	12.3
T_3(NP+5g NPK)	4.5	4.8	7.2	10.3	13.3	17.4	23.5	26.0	13.3
T_4(P+5g NPK)	5.0	6.0	8.3	13.4	16.5	19.0	25.8	32.5	15.8
T_5(NP+10gNPK)	4.1	5.6	6.2	8.5	11.0	15.1	19.8	26.0	12.0
T_6(P+10g NPK)	4.8	6.4	8.9	12.5	16.0	18.6	24.6	31.0	15.3
F-test	ns	ns	ns	ns	ns	ns	ns	ns	-
5%LSD	1.4861	1.1288	2.2902	4.1424	5.72	5.32	7.33	6.69	-
CV%	21.00	13.50	19.80	25.70	0.28	0.21	0.22	0.17	-

DAS = days after sowing ns = non-significant

Number of leaves

The result showed that the number of leaves from T_4(Priming +NPK 5g) was a maximum 17.8 followed by 17.6 from T_6(Priming +NPK 10 g), 14.1 from T_5(Non priming +NPK 10 g) which showed the least developed in leaf number. The statistical analysis showed that the treatments were not significant from each other(Table 5, Figure 7).

Table.5The symbiotic effect of priming and NPK on the leaf number of *Capsicum annuum*L.

Treatment	Number of Leaves								
	36DAS	**43DAS**	**50DAS**	**57DAS**	**64DAS**	**71DAS**	**78DAS**	**95DAS**	**Mean**
T_1(Non Priming)	5.3	7.5	9.3	12.5	16.8	18.0	21.3	23.0	14.2
T_2(Priming)	5.0	7.3	9.5	11.5	16.5	19.3	22.8	26.3	14.8
T_3(NP+5g NPK)	5.8	6.8	8.3	12.5	14.5	17.3	23.0	28.8	14.6
T_4(P+5g NPK)	6.0	7.3	8.3	15.0	19.8	21.8	28.3	36.5	17.8
T_5(NP+10gNPK)	5.5	7.0	8.8	13.3	15.8	17.0	20.5	24.8	14.1
T_6(P+10g NPK)	6.5	8.3	12.5	17.3	19.0	21.3	25.2	30.8	17.6
F-test	ns	ns	ns	ns	ns	ns	ns	ns	-
5%LSD	1.3004	1.6356	3.3664	6.2284	6.1134	6.9993	6.8198	8.1906	-
CV%	15.2	14.8	23.7	30.2	23.8	24.3	19.2	19.2	-

DAS = days after sowing ns = non-significant

Leaf length

The result showed that the leaf length from T_4(Priming +NPK 5g) and T_6 (Priming +NPK 10) were the maximum 8.2 cm followed by 7.6 cm from T_3(Non priming +NPK 5 g)and 6.1 cm from T_5(Non priming +NPK 10 g) was the least. The statistical analysis showed that the treatments were significant at 71 DAS, 78 DAS and 95 DAS (Table 6).

Table 6.The symbiotic effect of priming and NPK on the leaf length of *Capsicum annuum*L.

Treatment	Leaf Length (cm)								
	36DAS	**43DAS**	**50DAS**	**57DAS**	**64DAS**	**71DAS**	**78DAS**	**95DAS**	**Mean**
T_1(Non Priming)	2.6	3.8	6.0	6.8	7.3	8.8	9.9	10.3	6.9
T_2(Priming)	2.9	4.3	6.1	7.2	7.5	9.7	10.7	11.3	7.5
T_3(NP+5g NPK)	2.3	3.3	4.0	6.6	8.7	10.3	12.2	13.2	7.6
T_4(P+5g NPK)	2.6	3.7	4.7	5.8	9.6	12.0	13.3	13.9	8.2
T_5(NP+10gNPK)	2.0	3.2	3.8	5.3	6.7	7.7	9.0	11.4	6.1
T_6(P+10g NPK)	2.7	3.8	4.9	6.6	9.2	11.3	13.0	14.0	8.2
F-test	ns	ns	ns	ns	ns	*	*	*	-
5%LSD	0.7758	1.3151	1.3745	2.7619	2.6775	1.9624	2.0303	1.92	-
CV%	17.4	20.1	15.8	24.2	18	10.8	9.8	8.5	-

DAS = days after sowing ns = non-significant * = significant

Leaf width

The result showed that the leaf width from T_6(Priming +NPK 10g) was the maximum 4.75 cm followed by 4.70 cm from T_4(Priming + NPK 5 g) and 3.67 cm from T_5(Non priming + NPK 10 g) which showed the least. The statistical analysis showed that the treatments were significant at 50 DAS (Table 7).

Table 7.The symbiotic effect of priming and NPK on the leaf width of *Capsicum annuum* L.

Treatment	Leaf Width (cm)								
	36DAS	**43DAS**	**50DAS**	**57DAS**	**64DAS**	**71DAS**	**78DAS**	**95DAS**	**Mean**
T_1(Non Priming)	1.30	2.50	3.50	4.17	4.50	5.03	6.06	6.46	4.19
T_2(Priming)	1.50	2.73	3.63	4.23	4.63	5.23	6.00	6.93	4.36
T_3(NP+5g NPK)	1.33	2.17	2.63	3.83	4.83	6.03	7.33	7.96	4.51
T_4(P+5g NPK)	1.50	2.20	3.10	3.83	5.53	6.26	7.46	7.70	4.70
T_5(NP+10gNPK)	1.20	2.17	2.67	3.13	4.03	4.73	5.23	6.23	3.67
T_6(P+10g NPK)	1.43	2.23	3.20	4.10	5.16	6.43	7.46	8.00	4.75
F-test	ns	ns	*	ns	ns	ns	ns	ns	-
5%LSD	0.3509	0.4468	0.5844	1.0112	1.1041	1.0507	1.6853	1.6396	-
CV%	14	10.5	10.3	14.3	12.7	10.3	14	12.5	-

DAS = days after sowing ns = non-significant * = significant

Leaf Area

The result showed that the total leaf area from T_6(Priming +NPK 10g) was the maximum 660.5 cm^2followed by 639.5 $cm^2$from T_4(Priming + NPK 5 g)and 176.5 cm^2 from T_1(Non priming) which showed the least. The statistical analysis showed that the treatments were significant at 57DAS (Table 8).

Table 8. The symbiotic effect of priming and NPK on the total leaf area of *Capsicum annuum* L. at 36 DAS, 57DAS and 95 DAS

Treatment	Total leaf area (cm^2)			
	36 DAS	57DAS	95 DAS	mean
T_1(Non Priming)	34.6	280.9	215.2	176.9
T_2(Priming)	41.5	330.9	298.2	223.5
T_3(NP+5g NPK)	34.0	561.9	576.0	390.6
T_4(P+5g NPK)	56.6	868.4	993.6	639.5
T_5(NP+10gNPK)	38.8	399.8	986.1	474.9
T_6(P+10g NPK)	61.2	792.7	1127.5	660.5
F-test	ns	*	ns	-
5%LSD	21.6789	320.007	749.426	-
CV%	26.8	32.6	58.9	-

DAS = Days after sowing ns = non – significant * = significant

Fresh and dry weights at 57 DAS

The result showed that the fresh and dry weights at 57 DAS from T_4(Priming +NPK 5g) were the maximum 27.0 g and 3.2 g followed by 16.5 g and 2.6 g fromT_6(Priming +NPK 10 g)and 8.7 g and 1.7 g from T_1(Non priming) which showed the least. The statistical analysis showed that the treatments were highly significant in leaf fresh weight and stem fresh weight (Table 9).

Table 9. The symbiotic effect of priming and NPK on the biomass fresh and dry weights of *Capsicum annuum* L. at 57DAS

Treatment	**Fresh and Dry Weights (g) @ 57 DAS**							
	Leaf		**Stem**		**Root**		**Biomass**	
	FW	DW	FW	DW	FW	DW	FW	DW
T_1(Non Priming)	3.21	0.70	3.70	0.67	1.82	0.34	8.73	1.71
T_2(Priming)	4.45	0.64	3.66	0.56	2.12	0.31	10.23	1.50
T_3(NP+5gNPK)	9.24	1.28	2.90	0.40	1.56	0.21	13.70	1.88
T_4(P+5gNPK)	14.01	1.66	9.34	1.11	3.67	0.44	27.02	3.22
T_5(NP+10gNPK)	7.86	0.85	2.91	0.32	1.60	0.12	12.37	1.29
T_6(P+10gNPK)	9.86	1.53	4.77	0.73	1.88	0.29	16.50	2.55
F-test	**	*	**	ns	ns	*	-	-
5%LSD	3.018	0.560	2.444	0.475	1.162	0.155	-	-
CV%	20.50	27.7	29.6	41.4	30.3	30.1	-	-

DAS = days after sowing FW = fresh weight DW = dry weight

Fresh and dry weights at 95 DAS

The result showed that the fresh and dry weights at 95 DAS from T_6(Priming +NPK 10 g) was the maximum 52.4 g and 7.7 g followed by 35.8 g and 4.8 g from T_5(Non priming +NPK 10 g)and 8.1 g and 1.0 g from T_1(Non priming) which showed the least. The statistical analysis showed that the treatments were significant to each other except root dry weight (Table 10).

Table. 10 The symbiotic effect of priming and NPK on the biomass fresh and dry weights of *Capsicum annuum*L. at 95 DAS

Treatment	Fresh and Dry Weights (g) @ 95 DAS							
	Leaf		Stem		Root		Biomass	
	FW	DW	FW	DW	FW	DW	BFW	BDW
T1(Non Priming)	5.05	0.64	1.95	0.25	1.12	0.15	8.1	1.0
T2(Priming)	4.86	0.79	1.19	0.19	1.26	0.21	7.3	1.2
T3(NP+5gNPK)	9.98	1.17	7.83	0.93	2.73	0.32	20.5	2.4
T4(P+5gNPK)	13.77	1.75	5.43	0.68	2.24	0.29	21.4	2.7
T5(NP+10gNPK)	17.41	2.54	12.94	1.64	5.46	0.66	35.8	4.8
T6(P+10gNPK)	22.11	3.70	22.83	2.97	7.48	0.99	52.4	7.7
F-test	*	*	*	*	*	ns	-	-
5%LSD	7.8746	1.4927	10.071	1.2763	3.2197	0.5184	-	-
CV%	35.3	46.5	63.7	63.2	53.1	65.2	-	-

DAS = days after sowing ns = non-significant * = significant ** = highly significant
FW = fresh weight DW = dry weight

Comparative Biomass Fresh and Dry Weights at 60 and 90 DAS

The result showed that the fresh and dry weights at 95 DAS from T_6(Priming +NPK 10 g) was the maximum 34.39 g and 5.27 g followed by 24.18 g and 2.95 g from T_4(Priming +NPK 5 g)and 8.01 g and 1.15 g from T_1(Non priming) was the least. The statistical analysis showed that the treatments were highly significant to each other except fresh weights at 95DAS (Table 11).

Table 11. The symbiotic effect of priming and NPK on the biomass fresh and dry weights of *Capsicum annuum*L. at 57DAS and 95 DAS

Treatment	Biomass Fresh and Dry Weights (g)					
	57DAS		95DAS		Mean	
	FW (g)	DW (g)	FW (g)	DW (g)	FW (g)	DW (g)
T_1(Non Priming)	7.80	1.14	8.21	1.16	8.01	1.15
T_2(Priming)	7.92	1.19	10.28	1.48	9.10	1.34
T_3(NP+5g NPK)	14.46	1.99	20.58	2.42	17.52	2.20
T_4(P+5g NPK)	21.20	2.68	27.17	3.21	24.18	2.95
T_5(NP+10g NPK)	12.08	1.31	35.51	4.83	23.79	3.07
T_6(P+10g NPK)	18.52	2.88	50.25	7.66	34.39	5.27
F-test	**	**	*	**	-	-
5%LSD	4.3646	0.638	20.6495	3.4097	-	-
CV%	17.6	18.8	44.8	54.2	-	-

FW = fresh weight DW = dry weight ** = highly significant * = significant

Discussion and Conclusions

The seed germination of seed priming experiment showed that primed seeds were germinated start at 5 days after sowing (5 DAS)and non primed seeds at 6days after germinated after sowing (6DAS). Germination continued and it was completed at 12 days after sowing.The results showed that primed seeds had 95% germination but non primed seeds had 70.5%. McDonald, (1999) reported that priming may improve germination by acceleration imbibitions, which in turn would facilitate the emergence phase and the multiplication of radical cells. Ashraf and Foolad (2005)also reported that seed priming accelerates seed germination and seedling establishment under both normal and stressful environments.The results were also agreement with Hopper et al., (1979) who reported that primed seeds had better emergence percentage in comparison with non primed seeds during germination process commenced much earlier than radicle and plumule appearance, so the primed seeds emerged earlier than non primed.

The germinated seedlings were grown in the polyethylene bags containing prepared soil medium. The soil analyzed before growing of seedlings. The result of the soil analysis revealed that the texture of the field was loamy sand soil and pH of 9.92 (strongly alkaline). This result was not totally agreement with Jerry Lovatt (1999) who reported that *Capsicum* prefers a slightly acid soil around 6.0- 6.5 (www.deedi.qld.gov.au). This soil type was suitable for the growth of *Capsicum annuum* L. Bosland and Votava (2000) reported that the *Capsicum annuum* L. can be successfully grown from sandy to heavy clays and sandy loam-soil is preferred for *Capsicum annuum* L. production. John Burt (2008) also reported that *Capsicum* usually grows well at soil must be well-drained, with optimum pH of 5.5- 6.5.

The cultivation period of the priming and non priming plants of *Capsicum annuum*L. was from September to December 2013.Mean temperature of the open field during cultivation period was 27.2°C. Bakker and van Uffelen (1988) reported that the mean temperature of 21-23 °C were optima for *Capsicum*during vegetative growth followed by 21°C during fruit growth.

The result of vegetative growth such as plant height, number of leaves, leaf length and leaf width of priming plants 5 g NPK were greater at 57DAS and 90DAS.

O' Sullivian(1979) and Akande*et al*., (2008) who reported that *Capsicum* has also shown to respond very well the application of fertilizer.

Peck and MacDonald (1975) also reported that *Capsicum* produced well it is adequately supplied with the essential nutrients.The results were agreement with Ewulo*et al*.,(2007) who discussed that NPK fertilizer increased growth parameters of *Capsicum* such as number of leaves, plant height.

The result of the total leaf area of the seed primed plants fertilized with 10 g NPK showed that it had a larger total leaf area than non seed primed plants at 36DAS, 57DAS and 95DAS. Ahmad and Shad, (2010) reported that priming of seed prior to sowing has a key role in improving crop growth during seedling emergence and consequently affects crop leaf area.

The result of totally fresh and dry weight showed that seed primed plants fertilized with 5 g and 10g NPK treatments were greater than non primed with NPK

fertilizer treatments but the treatments were not significant in stem dry weight and root fresh weight at 57 DAS and the latter treatment was not significant in root dry weight at 95 DAS.Kartasapoetra (1995) reported that fresh weight is the total weight of plants showing the results of metabolic activity. Fertilization can affect plant fresh weight as it provides nutrients from the soil. Fresh weight of *Capsicum* plants was varied by different fertilizer treatment.

Inconclusion, the results of these experiments showed that seed priming treatments with NPK fertilizer was more effective than non priming with NPK fertilizer. Seed priming increased the percentage emergence,plant height, number of leaves and leaf area leading to ability of *Capsicum annuum* L. to grow successfully. This method is simple, cheap and it does not require any special equipment, so farmers can use it to increase the germination and plant growth of *Capsicum annum* L.

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