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Short Communication

Effect of different levels of NPK on yield attributes and fruit quality of capsicum (*Capsicum annuum L.*) cv. Asha under shade net house cultivation

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Capsicum (*Capsicum annuum* L.), commonly known as sweet pepper / bell pepper or shimla mirch is a member of the Solanaceae family which originated from central and south America. The principle pungency is due to presence of the alkaloid compound called capsainoid ($C_{18}H_{27}NO_3$) present in the pericarp and placenta of fruits. Mature fruits are rich in pigments such as carotenoid and xanthophylls, the major pigment. The carotenoid is called capsanthin ($C_{40}H_{55}O$) responsible for color development of Capsicum. Although, it is one of the most highly demand crop but due to low production of quality fruits and yield potential it is not fulfilling the demand. Increase in Capsicum production can be achieved either bringing more area under protected cultivation, or by adopting improved varieties and better cultural practices. The second approach is more often preferred and among various cultural practices fertilizer application is one of the quickest and easiest ways of increasing the yield per unit area under Capsicum. Shrivastava (1996) recorded the application of NPK @ 250: 200: 200 give the highest numbers of fruits / plant (10.66) , fresh weight / fruit (128g) , yield per plant (637.5 g) and yield / ha (92.95 q/ha) respectively in capsicum. Malik *et al* (2011) reported that the application of NPK @ 150: 120: 60 kg / ha with FYM 40 t / ha proved better to improve the yield attributing traits than other treatment combinations. Maximum fruit length (8.30 cm), fruit diameter (8.00 cm) was recorded with this combination. They also observed highest fruit yield (686.39 kg / ha), best fruit quality in terms of vitamin-C (243.34 mg /100g), total chlorophyll content (732.66 mg /100 g), dry matter content (9.93 g/100 g), nitrogen (4.38%), phosphorus (0.46%) and potassium (3.65%) in fruit of capsicum. Ganjare *et al* (2013) reported that application of NPK @ 150:50; 50 kg / ha recorded the minimum period for first flowering , first harvesting, number of fruits per plant and yield per plant , yield per hectare in Capsicum. Pundir and Porwal (1999) reported that application of NPK @ 100:25: 50 kg / ha recorded the highest numbers of fruits / plant in hot pepper. Suresh (2000) found that application of NPK @ 150:50:75 kg / ha resulted in the highest ascorbic acid content (189.83 mg /100 g), capsaicin content (150 mg /100 g). Thus the experiment was carried out to fine out the effect of different levels of NPK on yield and quality of capsicum under agro climatic condition of Allahabad region.

The experiment was laid out in Randomized Block Design (RBD) with nine treatments and three replication at a spacing of 60×30 cm. Different treatments of NPK were T_0 (Control) , T_1 (150-75-60 NPK kg / ha), T_2 (90-75-60 NPK kg / ha), T_3 (250-75-60 NPK kg / ha), T_4 (150-50-60 NPK kg / ha), T_5 (150-120-60 NPK kg / ha), T_6 (150-75-50 NPK kg / ha), T_7 (150-75-120 NPK kg / ha), T_8 (180-80-80 NPK kg / ha).NPK were given in the form of urea, di-ammonium phosphate and murate of potash. Seedling of Capsicum c.v Asha were sown on raised bed under shade net house. Nitrogen was given in split doses. First half dose of nitrogen was applied as basal dose at the time of transplanting, while the remaining dose was applied after 45 and 60 days after transplanting (DAT). Full dose of P and K were applied at the time of transplanting. All cultural practices i.e., irrigation, hoeing and weeding were carried out throughout the growing season as recommended. Data were collected as number of fruits /plant, fruits length (cm), fruits yield / plant (kg), fruits yield / plot (kg), yield / ha (t), juice content (%), TSS content (^{0}B) , ascorbic acid content (mg / 100g) , average physiological weight loss (%) and shelf life (days) was recorded and statistically analyzed following methodology suggested

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Table 1. Effect of NPK on yield attributes parameters of capsicum (*Capsicum annuum* L) cv. Asha under shade net condition

Treatments	Treatment combination	No. of fruits/plant	Fruit length (cm)	Fruit yield/plant (kg)	Fruit yield/plot (kg)	Yield /ha (t)
T_0	Control	4.53	7.33	0.38	3.02	10.09
T_1	NPK 150:75:60	8.20	8.03	0.92	7.38	24.62
T_2	NPK 90:75:60	5.20	6.83	0.47	3.75	12.52
T_3	NPK 250:75:60	6.27	9.07	0.63	5.03	16.78
T_4	NPK 150:50:60	5.53	7.73	0.59	4.70	15.69
T_5	NPK 150:120:60	9.40	9.23	1.10	8.82	29.41
T_6	NPK 150:75:50	6.60	8.02	0.63	5.03	16.80
T_7	NPK 150:75:120	7.53	8.63	0.95	7.56	25.22
T_8	NPK 180:80:80	8.80	8.93	1.02	8.20	27.34
S.Ed(±)		0.21	0.20	0.35	0.08	0.26
C.D(5%)		0.45	0.42	0.75	0.16	0.56

Table 2. Effect of NPK on quality parameters of capsicum (*Capsicum annuum* L) cv. Asha under shade net house

Treatments	Treatment combination	Juice content (%)	TSS content (^{0}B)	Ascorbic acid content (mg / 100g)	Average Physiological weight loss (%)	Shelf life (days)
T_0	Control	50.87	5.52	56.40	16.22	3.92
T_1	NPK 150:75:60	64.33	6.32	76.80	15.25	4.86
T_2	NPK 90:75:60	52.33	5.72	64.70	16.15	4.35
T_3	NPK 250:75:60	58.87	6.12	68.30	14.93	4.71
T_4	NPK 150:50:60	60.90	6.18	74.50	15.10	5.10
T_5	NPK 150:120:60	66.56	6.62	78.60	14.81	5.37
T_6	NPK 150:75:50	55.73	5.82	70.80	15.66	4.65
T_7	NPK 150:75:120	72.03	6.74	92.30	15.38	5.30
T_8	NPK 180:80:80	69.73	6.53	83.85	14.81	5.27
S.Ed (±)		1.39	0.10	0.46	0.08	0.28
C.D (5%)		2.95	0.21	0.98	0.17	0.13

by Fisher (1963).

Effect of NPK on Yield attributes: Statistically significant results were observed for number of fruits / plant, fruit length (cm), fruit yields / plant (kg), fruit yield / plot (kg) and fruit yield / ha (t) as affected by different levels of NPK, as shown in Table 1.Treatment T_5 (NPK @ 150:120: 60 kg/ha) recorded highest Number of fruits / plant, fruit length (9.23 cm), fruits yield / plant (1.10 kg), fruit yield / plot (8.82 kg), and yield / ha (29.41 t / ha). This might be due to abundant availability of nutrients that increase vegetative growth and balanced C/N ratio and accelerated the synthesis of carbohydrates and its better translocation from sink to source resulting in higher yield. These results were in line with findings by Malik *et al* (2011) in capsicum, Magray (2002) in capsicum and Hiremath *et al* (2006) in capsicum.

Effect of NPK on quality parameters: Results revealed a significant variation due to various treatments with respect to different quality attributes (juice content, TSS content, ascorbic acid content, average physiological weight loss and shelf life) of fresh fruit of capsicum as shown in Tables 2. Among all the treatments, T_7 (NPK @ 150: 75: 120 kg / ha) recorded highest juice percentage (75.20 %), TSS content (6.74 ^{0}B), ascorbic acid content (92.30 mg / 100g) whereas average physiological weight loss (14.81%) and shelf life (5.30 days) was recorded in T_5 (NPK @ 150: 120: 60 kg / ha).With the increment in supply of essential nutrients especially potassium (which play a very important role for quality improvement of crops), their availability, acquisition, mobilization and influx into the plant tissues increased that might have exhibited regulatory role on absorption and translocation of various metabolites, in which most important carbohydrates affect the quality of fruits. This might be the reason for these treatments. Similar results were reported by Shukla *et al*., (2009) in tomato. Lowest physiological weight loss and maximum shelf life might be because of the genetical make up and fruit characters like thick pericarp of the fruit which might have reduced the loss of water during storage of fruits. Similar observations were made by Jeevansab (2000) and Ramachandra Naik (2005) in capsicum. Thus, from the above finding it is concluded that application of NPK @ 150: 120: 60 kg / ha has proved to be economically feasible to get higher returns in terms of yield attributes whereas in terms of quality traits application of NPK @ 150: 75; 120 kg / ha proved to be the best.

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