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# Influence of Foliar Feeding of N.P.K. (19:19:19) on Growth, Yield and Quality of Cucumber (*Cucumis sativus* L.) cv. Pusa Seedless Cucumber-6 under Nethouse

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**A B S T R A C T**

This research work is conducted on the topic "Influence of foliar feeding of N.P.K. (19:19:19) on growth, yield and quality of Cucumber (*Cucumis sativus* L.) Cv. PUSA SEEDLESS CUCUMBER-6 under nethouse" at Vegetable Research Farm, Dept. of Veg. Science, CSAUA&T, Kanpur (U.P.). Different concentration of fertilizer grade N.P.K. (19:19:19) were sprayed at the different interval of time and effect were recorded.

## Introduction

Cucumber (*Cucumis sativus* L.) is one of the most common and popular vegetable belonging to family Cucurbitaceae, having chromosome number 2n=14. It is consisting of 118 genera and 825 species, amongst these the genus Cucumis have about 30 species (Das, 1987). Cucumber is originated in India. Cucumber is also good source of Iodine and it contains a total of 95% water and 4-6% of dry substances, approximately 2% sugars, 1% albuminous substances, 0.7% cellular tissues and 0.1% fat. It has most common sex form: Monoecious. Many modern hybrids are Gynoecious- they produce only Female flowers and are referred as female varieties. It is an ideal Summer Vegetable crop it or can be grown in polyhouse in different seasons it is chiefly grown for its edible tender fruits, preferred as salad, pickles, and desert fruits and as cooked Vegetables (Choudhari and More, 2002; Arshad Ali and Khan, 2014).

Cucumber has got cooling effect, so in the eastern countries; fruits are often used as cooling vegetables. It is ideal for people suffering from Jaundice and allied disease and also very much useful in preventing constipation. Seeds contain Oil, which is helpful for brain development and body

smoothness. Hence, it is being used in Ayurvedic preparations. (Pandey, 1973). India is a Second largest producer of vegetables in the world, next to China, by producing around 184.40 million tonnes of vegetables annually from an area of around 10.26 million hectares (2017-18). For this period the total vegetable production was highest in case of Uttar Pradesh (283.16 million tonnes) followed by West Bengal (276.95 million tonnes). However, the present area under cucumber cultivation in India and Uttar Pradesh is about 82.04 and 3.26 ('000 hectares) with the annual production of 1260 and 81.47 ('000 MT) (Arun and Kumar, 2014; Horticultural Statistics at a Glance 2018).

Hybrid varieties play a vital role in increasing vegetable production due to their higher yield potential, early maturity, vigorous, superior quality, pest and disease resistance attributes.

Cucumber is cultivated by growers as a sole crop, planted in kitchen garden or as an inter crop in Mango, Guava, Papaya, near fencing, near some trees and even on the thatch of the dwellings etc (Jagraj Singh *et al.*,2018).

Protected cultivation is a unique and specialized form of agriculture in which the microclimate surrounding the plant is controlled partially or fully, as per the requirement of the plant species grown (Janapriya *et al.,* 2010). India being a vast country with diverse and extreme Agro-Climatic conditions, the protected vegetable cultivation technology can be utilized for Year around and off-season vegetable production.

## Materials and Methods

This research work was conducted in RBD design at vegetable research farm CSA kalayanpur, Kanpur. Total thirteen treatments are taken and divided in three blocks. $T_1$ is Control plot on which water are sprayed at 25, 40 & 55 days after transplanting and observations are recorded. In treatment $T_2$ N.P.K. (19:19:19) @ 0.5% are sprayed at 25 D.A.T. In treatment $T_3$ N.P.K. (19:19:19) @ 0.5% are sprayed at 40 D.A.T. In treatment $T_4$ N.P.K. (19:19:19) @ 0.5% are sprayed at 55 D.A.T. In treatment $T_5$ N.P.K. (19:19:19) @ 0.5% are sprayed at 25 & 40 D.A.T. In treatment $T_6$ N.P.K. (19:19:19) @ 0.5% are sprayed at 40 & 55 D.A.T. In treatment $T_7$ N.P.K. (19:19:19) @ 0.5% are sprayed at 25, 40 & 55 D.A.T. In treatment $T_8$ N.P.K. (19:19:19) @ 1.0% are sprayed at 25 D.A.T. In treatment $T_9$ N.P.K. (19:19:19) @ 1.0% are sprayed at 40 D.A.T. In treatment $T_{10}$ N.P.K. (19:19:19) @ 1.0% are sprayed at 55 D.A.T. In treatment $T_{11}$ N.P.K. (19:19:19) @ 1.0% are sprayed at 25 & 40 D.A.T. In treatment $T_{12}$ N.P.K. (19:19:19) @ 1.0% are sprayed at 40 & 55 D.A.T. In treatment $T_{13}$ N.P.K. (19:19:19) @ 1.0% are sprayed at 25, 40 & 55 D.A.T.

## Results and Discussion

Effect of different fertilizer dose of N.P.K. (19:19:19) on different days on Growth parameters, Yield attributes and Quality parameters are as under following

### First flower bud opening

The first flower bud opening was influenced significantly by application of different fertilizer dose of N.P.K. (19:19:19) on different days. The days at which first flower bud opened ranged from 25.33 to 27.66. Among the treatments minimum number of days was induced in $T_{13}$ (25.33) followed by $T_{11}$ (25.66), $T_7$ (25.99). The maximum number of days at which first flower bud was opened was observed control $T_1$ (27.66) followed by $T_4$ (27.33) which was significantly different from all other treatments.

### First flowering knot

The first flowering knot was influenced significantly by application of different fertilizer dose of N.P.K. (19:19:19) on different days. The days at which first flower bud opened ranged from 1.11 to 3.55. Among the treatments minimum number of knot was appear in $T_{13}$ (1.11) followed by $T_{11}$ (1.44), $T_7$ (1.88). The maximum number of knot at which first flowering was observed in control $T_1$ (3.55) followed by $T_4$ (3.22) which was significantly different from all

other treatments.

**No. of leaves per plant**

The No. of leaves per plant was influenced significantly by application of different fertilizer dose of N.P.K. (19:19:19) on different days. The days No. of leaves per plant ranged from 13.21 to 18.55. Among the treatments maximum number of leaves per plant was observed in $T_{13}$ (18.55) followed by $T_{11}$ (17.66), $T_7$ (17.11). The minimum number of leaves per plant was observed in control $T_1$ (13.21) followed by $T_4$ (14.11) which was significantly different from all other treatments.

**Length of plant (in cm.)**

The length of plant was influenced significantly by application of different fertilizer dose of N.P.K. (19:19:19) on different days. The length of plant ranged from 103.77 to 140.99. Among the treatments maximum length of plant was observed in $T_{13}$ (140.99) followed by $T_{11}$ (134.22), $T_7$ (131.10). The minimum number of leaves per plant was observed in control $T_1$ (103.77) followed by $T_4$ (111.55) which was significantly different from all other treatments.

**Crop duration (fruiting end) from date of sowing**

The crop duration was influenced significantly by application of different fertilizer dose of N.P.K. (19:19:19) on different days. The crop duration ranged from 119.55 to 129.66. Among the treatments maximum crop duration was observed in $T_{13}$ (129.66) followed by $T_{11}$ (127.99), $T_7$ (127.21). The minimum number of crop duration was observed in control $T_1$ (119.55) followed by $T_4$ (121.99) which was significantly different from all other treatments.

**No. of fruits per plant**

The number of fruits per plant was influenced significantly by application of different fertilizer dose of N.P.K. (19:19:19) on different days. The number of fruits per plant ranged from 18.44 to 23.77. Among the treatments maximum number of fruits per plant was observed in $T_{13}$ (23.77) followed by $T_{11}$ (22.55), $T_7$ (21.77). The minimum number of fruits per plant was observed in control $T_1$ (18.44) followed by $T_4$ (19.10) which was significantly different from all other treatments.

**Fruit yield per plant (Kg.)**

The fruit yield per plant was influenced significantly by application of different fertilizer dose of N.P.K. (19:19:19) on different days. The fruit yield per plant ranged from 2.33 to 4.55. Among the treatments maximum fruit yield per plant was observed in $T_{13}$ (4.55) followed by $T_{11}$ (4.22), $T_7$ (3.88). The minimum fruit yield per plant was observed in control $T_1$ (2.33) followed by $T_4$ (2.66) which was significantly different from all other treatments.

**Fruit length at edible stage (in cm.)**

The fruit length at edible stage was influenced significant different fertilizer dose of N.P.K. (19:19:19) on different days. The fruit length at edible stage ranged from 13.22 to 15.77. Among the treatments maximum fruit length at edible stage was observed in $T_{13}$ (15.77) followed by $T_{11}$ (15.22), $T_7$ (14.88). The minimum fruit length at edible stage was observed in control $T_1$ (13.22) followed by $T_4$ (13.55) which was significantly different from all other treatment.

**Girth of fruit at edible stage (in cm.)**

The girth of fruit at edible stage was influenced significantly by application of different fertilizer dose of N.P.K. (19:19:19) on different days. The girth of fruit at edible stage ranged from 9.11 to 11.66.

Among the treatments maximum girth of fruit at edible stage was observed in $T_{13}$ (11.66) followed by $T_{11}$ (11.33), $T_7$ (10.88). The minimum girth of fruit at edible stage was observed in control $T_1$ (9.11) Followed by $T_4$ (9.44) which was significantly different from all other treatments.

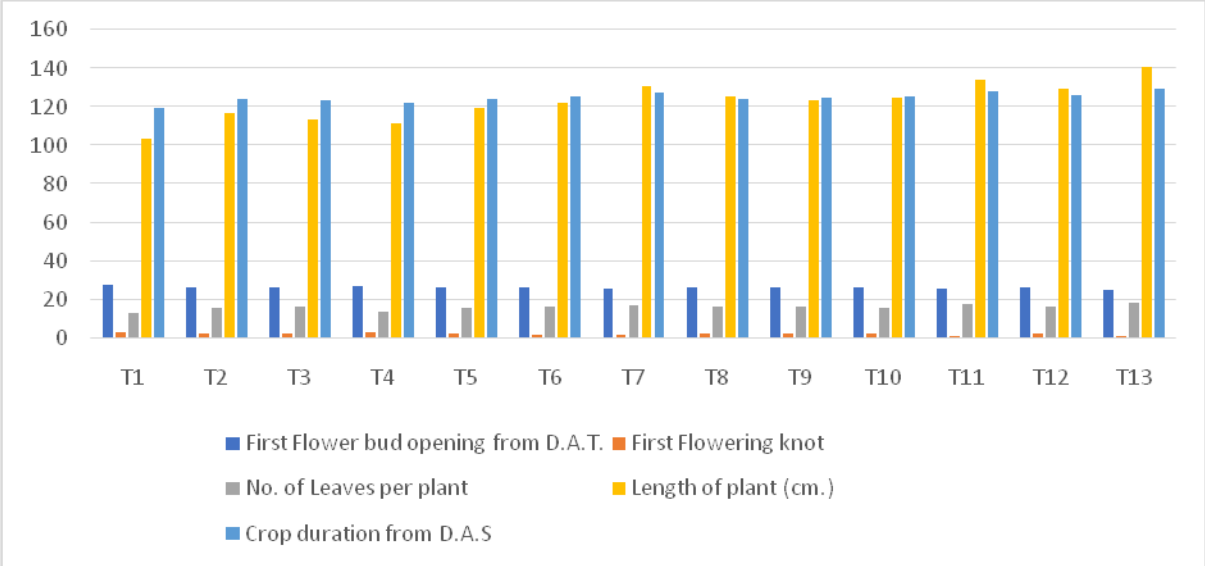
**Table.1** Showing different yield attributing characters and growth parameters

| Treatments | First Flower bud opening from D.A.T. | First Flowering knot | No. of Leaves per plant | Length of plant (cm.) | Crop duration from D.A.S |
|---|---|---|---|---|---|
| **$T_1$- Control Plot (water spray at 25, 40 and 55 D.A.T.)** | 27.66 | 3.55 | 13.21 | 103.77 | 119.55 |
| **$T_2$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 25 D.A.T.** | 26.77 | 2.55 | 16.22 | 116.88 | 124.21 |
| **$T_3$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 40 D.A.T.** | 26.77 | 2.55 | 16.66 | 113.77 | 123.44 |
| **$T_4$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 55 D.A.T.** | 27.33 | 3.22 | 14.11 | 111.55 | 121.99 |
| **$T_5$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 25 & 40D.A.T.** | 26.33 | 2.77 | 16.22 | 119.77 | 124.22 |
| **$T_6$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 40 & 55 D.A.T.** | 26.77 | 2.22 | 16.44 | 122.10 | 125.21 |
| **$T_7$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 25,40 & 55 D.A.T.** | 25.99 | 1.88 | 17.11 | 131.10 | 127.21 |
| **$T_8$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 25 D.A.T.** | 26.66 | 2.66 | 16.77 | 125.77 | 124.00 |
| **$T_9$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 40 D.A.T.** | 26.33 | 2.33 | 16.77 | 123.77 | 124.55 |
| **$T_{10}$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 55 D.A.T.** | 26.88 | 2.66 | 15.88 | 124.77 | 125.66 |
| **$T_{11}$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 25 & 40 D.A.T.** | 25.66 | 1.44 | 17.66 | 134.22 | 127.99 |
| **$T_{12}$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 40 & 55 D.A.T.** | 26.55 | 2.66 | 16.33 | 129.22 | 126.22 |
| **$T_{13}$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 25,40 & 55 D.A.T.** | 25.33 | 1.11 | 18.55 | 140.99 | 129.66 |
| **SE (m)** | 0.129 | 0.128 | 0.335 | 1.448 | 0.488 |
| **SE (d)** | 0.183 | 0.181 | 0.473 | 2.047 | 0.690 |
| **C.D. (P=0.05)** | 0.379 | 0.377 | 0.982 | 4.251 | 1.434 |

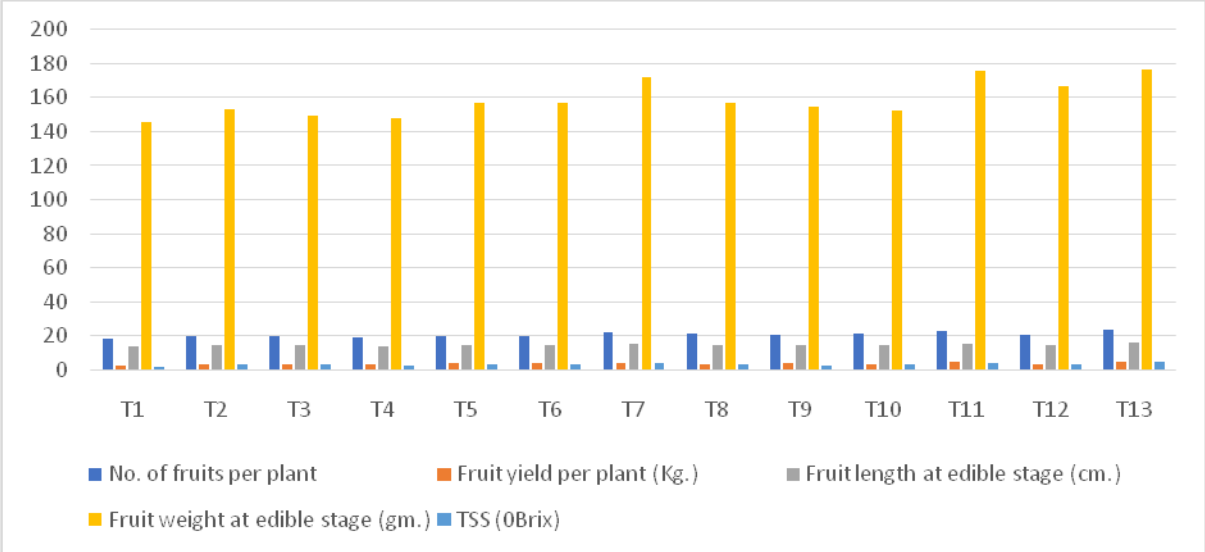
**Table.2** Table showing different yield attributing character and quality parameters

| Treatments | No. of fruits per plant | Fruit yield per plant (Kg.) | Fruit length at edible stage (cm.) | Fruit weight at edible stage (gm.) | TSS ($^0$Brix) |
|---|---|---|---|---|---|
| **$T_1$- Control Plot (water spray at 25, 40 and 55 D.A.T.)** | 18.44 | 2.33 | 13.22 | 145.77 | 1.77 |
| **$T_2$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 25 D.A.T.** | 19.88 | 3.22 | 14.22 | 153.55 | 2.66 |
| **$T_3$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 40 D.A.T.** | 19.77 | 3.33 | 13.99 | 149.22 | 2.88 |
| **$T_4$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 55 D.A.T.** | 19.10 | 2.66 | 13.55 | 148.10 | 2.22 |
| **$T_5$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 25 & 40D.A.T.** | 19.77 | 3.44 | 14.22 | 157.21 | 2.77 |
| **$T_6$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 40 & 55 D.A.T.** | 19.88 | 3.44 | 14.21 | 156.99 | 2.99 |
| **$T_7$- N.P.K. (19:19:19:) @ 0.5% of foliar spray at 25,40 & 55 D.A.T.** | 21.77 | 3.88 | 14.88 | 171.77 | 3.44 |
| **$T_8$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 25 D.A.T.** | 20.77 | 3.33 | 13.99 | 156.99 | 2.88 |
| **$T_9$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 40 D.A.T.** | 20.22 | 3.44 | 14.22 | 154.99 | 2.55 |
| **$T_{10}$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 55 D.A.T.** | 20.77 | 3.33 | 14.10 | 152.21 | 2.99 |
| **$T_{11}$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 25 & 40 D.A.T.** | 22.55 | 4.22 | 15.22 | 175.66 | 3.88 |
| **$T_{12}$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 40 & 55 D.A.T.** | 20.22 | 3.33 | 14.10 | 166.44 | 2.99 |
| **$T_{13}$- N.P.K. (19:19:19:) @ 1.0% of foliar spray at 25,40 & 55 D.A.T.** | 23.77 | 4.55 | 15.77 | 176.77 | 4.22 |
| **SE (m)** | 0.343 | 0.114 | 0.176 | 0.743 | 0.132 |
| **SE (d)** | 0.484 | 0.162 | 0.249 | 1.051 | 0.187 |
| **C.D. (P=0.05)** | 1.006 | 0.336 | 0.517 | 2.182 | 0.388 |

**Graph.1** Showing different yield attributing character and growth parameters




**Graph.2** Showing different yield attributing characters and quality parameters




## Fruit weight at edible stage

The fruit weight at edible stage was influenced significantly by application of different fertilizer dose of N.P.K. (19:19:19) on different days. The fruit weight at edible stage ranged from 145.77 to 176.77. Among the treatments maximum fruit weight at edible stage was observed in $T_{13}$ (176.77) followed by $T_{11}$ (175.66), $T_7$ (171.77). The minimum fruit weight at edible stage was observed in control $T_1$ (145.77) followed by $T_4$ (148.10) which was significantly different from all other treatments.

## Total soluble solid (T.S.S.) of edible fruit (°Brix)

The total soluble salt at edible stage was influenced significantly by application of different fertilizer dose of N.P.K. (19:19:19) on different days. The total soluble salt at edible stage ranged from 1.77 to

4.22. Among the treatments maximum total soluble salt at edible stage was observed in $T_{13}$ (4.22) followed by $T_{11}$ (3.88), $T_7$ (3.44). The minimum total soluble salt at edible stage was observed in control $T_1$ (1.77) followed by $T_4$ (2.22) which was significantly different from all other treatments.

Treatment $T_{13}$ [N.P.K. (19:19:19) @ 1.0% of foliar spray at 25, 40 & 55 D.A.T. had maximum effect over early flower bud opening with minimum number of days the value of 25.33. Whereas, the maximum number of days to first flower bud opening was recorded in control T1 (27.66) where without nutrient only water spray at 25,40 and 55 D.A.T.).

The minimum node number at which first flower appeared was recorded in $T_{13}$ (N.P.K. (19:19:19) @ 1.0% of foliar spray at 25, 40 & 55 D.A.T.} and that is 1.11 which is significantly superior over control plot while, the maximum node number was recorded in control $T_1$ (3.55).

The number of leaves per plant increased with application of different fertilizer dose of N.P.K. (19:19:19). The maximum number of leaves was recorded in $T_{13}$ (N.P.K. (19:19:19) @ 1.0% of foliar spray at 25, 40 & 55 D.A.T.} and that is 18.55. In this treatment the number of leaves appeared While, the minimum number of leaves was recorded in control $T_1$ (13.21).

The length of plant was significantly influenced with the application of recommended dose of fertilizers accompanied by N.P.K. (19:19:19). The maximum length of plant was recorded in $T_{13}$ (N.P.K. (19:19:19) @ 1.0% of foliar spray at 25, 40 & 55 D.A.T.} and that is 140.99. While, the minimum length of plant was recorded in control $T_1$ (103.77).

The maximum number of days of crop duration was recorded in $T_{13}$ (N.P.K. (19:19:19) @ 1.0% of foliar spray at 25, 40 & 55 D.A.T.} and that is 129.66. Which is significantly superior over other while, the minimum number of the days crop duration was recorded in control $T_1$ (119.55). The maximum number of fruits per plant was obtained in $T_{13}$ {N.P.K. 19:19:19) @ 1.0% of foliar spray at 25, 40 & 55 D.A.T.} with the value of 23.77. Which is significantly superior over other treatment while, the minimum number fruits per plant was observed in the control $T_1$ (18.44).

The fruit length at edible stage was significantly influenced with the application of recommended dose of fertilizers accompanied by N.P.K. (19:19:19). Among the treatments, $T_{13}$ (N.P.K. (19:19:19) @ 1.0% of foliar spray at 25, 40 & 55 D.A.T.} had maximum fruit length at edible stage with the value of 15.77 cm. While, the minimum fruit length was observed in the control $T_1$ (13.22).

The maximum fruit girth was recorded in $T_{13}$ (N.P.K. (19:19:19) @ 1.0% of foliar spray at 25, 40 & 55 D.A.T.} with the value of 11.66 cm. It might be due to higher accessibility of nitrogen in chemical fertilizer that induced protein production which cause more meristem cells and cell division that finally led to higher cucumber girth. While, the minimum girth of fruit was observed in control $T_1$ (9.11).

Treatment $T_{13}$ (N.P.K. (19:19:19) @ 1.0% of foliar spray at 25, 40 & 55 D.A.T.} proves most effective for increasing weight, exhibited maximum fruit weight with the value of 176.77 g. Whereas, minimum fruit weight was observed in control $T_1$ (145.77 g).

Highest fruit yield per plant was obtained in $T_{13}$ (N.P.K. (19:19:19) @ 1.0% of foliar spray at 25, 40 & 55 D.A.T.) with the value of 4.55 Kg. While, least was obtained from control $T_1$ (2.33 Kg.).

Among the different combinations, $T_{13}$ (N.P.K. (19:19:19) @ 1.0% of spray at 25, 40 & 55 D.A.T.} reflected maximum T.S.S. of edible fruit (4.22°Brix). Whereas, the minimum T.S.S. of edible fruit was found in control $T_1$ (1.77°Brix).

The findings indicate that varied fertiliser doses of N.P.K. (19:19:19) source nutrients applied at the

recommended level were successful in stimulating early blooming, growth, flowering, and yield of cucumber. N.P.K. (19:19:19) @ 1.0% of foliar spray at 25, 40, and 55 D.A.T. reported is the most efficient combination of different fertiliser doses of N.P.K. (19:19:19) source of nutrients for early blooming, maximum quantity of fruit, weight of edible fruits, and maximum edible fruit output per plant.

## References

Arshad, I., Ali, W. and Khan, Z. A. 2014. Effect of different levels of NPK fertilizers on the growth and yield of greenhouse cucumber (*Cucumis sativus* L.) By using drip irrigation technology. International Journal of Research, 1 (8):650-60.

Arun, R and Kumar, R. J. 2014. Influence of nutrient management system on yield attributes of cucumber (*Cucumis sativus* L. var. Beit Alpha) cultivated in polyhouse conditions. Trends in Biosciences, 7 (21): 3450-52.

Choudhari, S. M. and More, T. A. 2002. Fertigation, fertilizer and spacing requirement of tropical gynoecious cucumber hybrids. Acta-Horticulture 588: 233-240. https://doi.org/10.17660/ActaHortic.2002.588.36

Das, M. K. 1987. Growth and yield of pointed gourd as influenced by nitrogen and phosphorus fertilization. Veg. Sci., 14 (1):18-26.

Jagraj Singh, Manoj Kumar Singh, Mukesh Kumar, Archi Gupta and Kaushalendra Pratap Singh 2020. Growth, Yield and Quality Parameters of Cucumber (*Cucumis sativus* L.) as Influenced by Integrated Nutrient Management Application, International Journal of Current Microbiology and Applied Sciences, 9 (10). https://doi.org/10.20546/ijcmas.2020.910.173

Janapriya S., Palanisamy, D. and Rangaswami M. V. 2010. Soilless media and fertigation for naturally ventilated polyhouse production of cucumber (*Cucumis sativus*) cv. green long, International J. Agri., Envi. and Biotech, 3 (2): 199-205.

Pandey, R. P. 1973. Note on the effect of nitrogen and maleic hydrazide on sex expression and yield in bottle gourd (*Lagenaria siceraria* Mol. Standl.). Indian J. Agric. Sci., 43 (9): 882-883.

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