

Effect of Organic, Inorganic and Bio-Fertilizers on Physico-Chemical Attributes of Dragon Fruit (*Hylocereus undatus* L.) under Lucknow Conditions

R. S. Verma, Rubee Lata, R. B. Ram, Sanjay Kumar, S. S. Verma* and Som Prakash

Department of Horticulture, Babasaheb Bhimrao Ambedkar University (A Central University)

Vidya Vihar, Rae Bareilly Road, Lucknow-226025 (U.P.) India

*Department of Agriculture, Barabanki, (U.P.) India

*Corresponding Author E-mail: ravihort.009@gmail.com

Received: 30.10.2019 | Revised: 25.11.2019 | Accepted: 2.12.2019

ABSTRACT

The present investigation was conducted to find out the response of combined “Effect of organic, inorganic and bio-fertilizers on physico-chemical attributes of dragon fruit (*Hylocereus undatus* L.)”. The results clearly revealed that physico-chemical parameters were significantly influenced by the integrated of organic, inorganic and bio-fertilizers. The maximum length of fruits (25.03 cm), width of fruits (21.56 cm), weight of fruits (572.33 g), edible portion (91.33%), The colour of pulp in dragon fruits varied from red colour and the colour of skin in dragon fruits varied from pink colour, and TSS (14.00 °Brix) were observed under the various treatments consisting of T₁ Water spray, T₂ FYM, T₃ NPK (100%), T₄ Azotobacter, T₅ PSB, T₆ FYM + NPK (50%), T₇ FYM + NPK (75%), T₈ FYM + NPK + (50%) + Azotobacter, T₉ FYM + NPK (75%) + Azotobacter, T₁₀ FYM + NPK (50%) + PSB, T₁₁ FYM + NPK (75%) + PSB, T₁₂ FYM + NPK + (50%) + Azotobacter + PSB, T₁₃ FYM + NPK + (75%) + Azotobacter + PSB respectively. Hence, treatments combination (T₁₃) can be considered as best treatment for enhancing physico-chemical attributes in dragon fruit under Lucknow condition.

Keywords: Dragon fruit, FYM, NPK, Bio-fertilizers and Physico-chemical characters.

INTRODUCTION

Dragon fruit (*Hylocereus undatus* L.) is a cactus plant, belonging to family Cactaceae. Recently, dragon fruit introduced as super fruit in India is considered to be a promising and remunerative fruit crop. Fruit has very attractive colour and mellow mouth melting

pulp with black colour edible seed embedded in the pulp along with tremendous nutritive property which attracts the growers from different part of India to cultivate this fruit crop which is originated in Mexico and Central and South America (Britton & Rose, 1963; Morton, 1987 and Mizrahi et al. 1997).

Cite this article: Verma, R.S., Lata, R., Ram, R.B., Kumar, S., Verma, S.S., & Prakash, S. (2019). Effect of Organic, Inorganic and Bio-Fertilizers on Physico-Chemical Attributes of Dragon Fruit (*Hylocereus undatus* L.) under Lucknow Conditions, *Ind. J. Pure App. Biosci.* 7(6), 67-70. doi: <http://dx.doi.org/10.18782/2582-2845.7868>

It is a long day plant with beautiful night blooming flower that is nicknamed as “Noble Woman” or “Queen of the Night”. The fruit is also known as strawberry, pear, dragon fruit, pithaya, night blooming cereus, Belle of the night, Conderella plant and Jesus in the Cradle. Fruit is named as pitaya because of the bracts or scales on the fruit skin and hence the name of pitaya meaning “the scaly fruit”. It has ornamental value due to the beauty of their large flowers (25 cm) that bloom at night; they are creamy white in colour. It is considered as a fruit crop for future (Gunaseena & pushpakumara, 2006 and Gunaseena et al., 2006). Dragon fruit production is gaining and it is receiving more recognition as a crop. The fruit possesses medicinal properties. It is also known to prevent colon cancer and diabetes, neutralize toxic substances such as a heavy metal, reduce cholesterol and high blood pressure. However, very little information is available until now with regards use of bio-fertilizers in dragon fruits plants for which the present study was initiated to find out the alternative source of chemical fertilization.

MATERIALS AND METHODS

The present study was conducted at Botanical Garden, Department of Horticulture, Babasaheb Bhimrao Ambedkar University, Lucknow during the 2018-19. The experiment was laid out in Randomized Block Design (RBD) with 13 treatments and replicated thrice. Thus, there were total 39 plants. Rooted cuttings of 12-weeks- old plants were collected from M/s Anil Krishi Farm, Raipur, Chhattisgarh during the 30th June, 2018 and planted directly in the field on 1st July, 2018. This experiment is first attempt to cultivate dragon fruit under Lucknow conditions. Well rotten FYM @15 kg per pit and the recommended dose of fertilizers @ 200 g N, 250 g P₂O₅ and 100 g K₂O per plant were applied at the time of planting and rest half of K₂O was applied after 8 months of planting. The various treatments comprising of organic manure (FYM), inorganic (NPK) and bio-fertilizers (Azotobacter and PSB). were as follows: T₁ Water spray, T₂ FYM, T₃ NPK (100%), T₄ Azotobacter, T₅ PSB, T₆ FYM

+NPK (50%), T₇ FYM + NPK (75%), T₈ FYM + NPK + (50%)+ Azotobacter, T₉ FYM + NPK (75%) +Azotobacter, T₁₀ FYM + NPK (50%) + PSB , T₁₁ FYM + NPK (75%) + PSB , T₁₂ FYM + NPK + (50%) + Azotobacter + PSB , T₁₃ FYM + NPK + (75%) +Azotobacter +PSB. Observations recorded on fruit length, fruit width, fruit weight, edible portion, Skin colour, pulp colour and TSS respectively were analysed statically.

RESULTS AND DISCUSSION

A perusal of data in Table:1 shows that significant response in the maximum length of fruit (25.03 cm) was noted with applications of FYM + NPK (75%) +Azotobacter +PSB (T₁₃) followed by (23.17 cm) with applications of FYM + NPK (50%) +Azotobacter +PSB (T₁₂) in comparison to control (18.02 cm) was recorded under control. (T₁).

The results clearly revealed that maximum width of fruit (21.56 cm) was noted with under the treatment of FYM + NPK (75%) +Azotobacter +PSB (T₁₃) followed by (20.41cm) with under the treatment of FYM + NPK (50%) +Azotobacter +PSB (T₁₂) in comparison to control (16.57 cm) was under the treatment control. (T₁).

The maximum weight of fruit (572.33g) was noted with applications of FYM + NPK (75%) +Azotobacter +PSB (T₁₃) followed by (447.33 g) with applications of FYM + NPK (50%) +Azotobacter +PSB (T₁₂) in comparison to control (281.00 g) was recorded under control (T₁).

The evident from data (Table-1) maximum edible portion (91.33) was noted with under the treatment of FYM + NPK (75%) +Azotobacter +PSB (T₁₃) followed by (90.33) with under the treatment of FYM + NPK (50%) +Azotobacter +PSB (T₁₂) in comparison to control (82.33) was under the treatment control. (T₁).

The colour of pulp in dragon fruits varied from red colour and the colour of skin in dragon fruits varied from pink colour were recorded under the Luck now in dragon fruits. The evident from data (Table-1) maximum TSS (14.00 °Brix) was noted with applications of FYM + NPK (75%) +Azotobacter +PSB

(T₁₃) followed by (12.46 °Brix) with applications of FYM + NPK (50%) +Azotobacter +PSB (T₁₂) in comparison to

control (9.88 °Brix) was recorded under control. (T₁).

Table 1: Effect of organic, inorganic and bio-fertilizers on physico-chemical attributes of dragon fruit (*Hylocereus undatus* L.) under Lucknow conditions

| S. No. | Treatment | Length of fruits (cm) | Width of fruits (cm) | Weight of fruits (g) | Edible portion (%) | Skin colour | Pulp colour | TSS (°Brix) |
|-----------------|-------------------------------------|-----------------------|----------------------|----------------------|--------------------|-------------|-------------|--------------|
| T ₁ | (Control) | 18.02 | 16.57 | 281.00 | 82.33 | Pink | Red | 9.88 |
| T ₂ | FYM | 19.51 | 16.77 | 328.33 | 88.00 | Pink | Red | 10.18 |
| T ₃ | NPK (100%) | 19.66 | 17.03 | 316.32 | 84.66 | Pink | Red | 11.19 |
| T ₄ | Azotobacter | 16.86 | 17.56 | 369.00 | 90.00 | Pink | Red | 11.46 |
| T ₅ | PSB | 19.06 | 17.42 | 299.00 | 86.66 | Pink | Red | 11.11 |
| T ₆ | FYM +NPK (50%) | 18.77 | 18.91 | 317.00 | 88.33 | Pink | Red | 10.79 |
| T ₇ | FYM + NPK (75%) | 18.57 | 18.61 | 338.33 | 84.33 | Pink | Red | 10.55 |
| T ₈ | FYM + NPK + (50%) + Azotobacter | 20.44 | 18.88 | 379.66 | 83.33 | Pink | Red | 10.53 |
| T ₉ | FYM + NPK (75%) +Azotobacter | 20.18 | 17.90 | 372.33 | 82.66 | Pink | Red | 10.86 |
| T ₁₀ | FYM + NPK (50%) + PSB | 19.61 | 17.14 | 348.00 | 85.66 | Pink | Red | 11.22 |
| T ₁₁ | FYM + NPK (75%) + PSB | 21.06 | 16.96 | 372.34 | 86.00 | Pink | Red | 10.82 |
| T ₁₂ | FYM + NPK +(50%) + Azotobacter +PSB | 23.17 | 20.41 | 447.33 | 90.33 | Pink | Red | 12.46 |
| T ₁₃ | FYM + NPK +(75%) +Azotobacter +PSB | 25.03 | 21.56 | 572.33 | 91.33 | Pink | Red | 14.00 |
| SEm± | | 1.022 | 0.392 | 21.22 | 1.283 | - | - | 0.472 |
| CD at 5% | | 3.000 | 1.152 | 62.31 | 3.766 | - | - | 1.387 |

CONCLUSION

On the basis above findings, it is be concluded that use of organic, inorganic resources and bio-fertilizers drastically enhanced: length of fruit, width of fruit, weight of fruit, edible portion, pulp colour, skin colour and TSS of dragon fruit respectively.

REFERENCES

Anonymous & Perween, T. (2017). Thesis entitled “Studies on the effect of nutrient application in vegetative and reproductive phenology of dragon fruit” submitted to the Bidhan Chandra Krishi Viswavidyalaya, Mohanpur west Bengal, India. 29-44.

Britton, N.L., & Rose, J.N. The Cactaceae: Description and Illustration of Plants of the Cactus Family, Dover, New York. USA. 1963; 1(2):183-195.

Barbeau, G. (1990). La pitahaya rouge, un nouveau fruit exotique. *Fruits*. 45, 141-174.

Shankaraswamy, J., & Neelavathi, R. (2015). (dragon an edible cactus fruit). *Indian*

Horticulture, bio-monthly magazine 60, 9-10.

- Jaafar, R.A., Rahman, A.R.B.A., Mahmod, N.Z.C., & Vasudevan, R. (2009). Proximate analysis of dragon fruit (*Hylocereus polyrhizus*). *Amer. J App. Sci*. 6(7), 1341-1346.
- Luders, L., McMahon, G. (2006). The pitaya or dragon fruit (*Hylocereus undatus*). Agnote 778. No: D42. Department of Primary Industry, Fisheries and Mines, Northern Territory Government, Australia,
- Morton, J. (1987). Cactaceae: strawberry pear and related species. In: *Fruits of Warm Climates*, Ed., Miami, and Fl, 347-348.
- Mizrahi, Y., Nerd, A., & Nobel, P.S. (1997). Cacti as a crop. *Hort. Rev.* 18, 291-320.
- Metz, C., Nerd, A., & Mizrahi, Y. (2000). Viability of pollen of two fruit crop cacti of the genus *Hylocereus* is affected by temperature and duration of storage, *Hort. Sci.* 35, 22-24.

- Verma et al.** *Ind. J. Pure App. Biosci.* (2019) 7(6), 67-70 ISSN: 2582 – 2845
- Pushpakumara, D.K.N.G., Gunasena, H.P.M., & Kariyawasam, M. (2006). Flowering and fruiting phenology, pollination agents and Breeding system in *Hylocereus* spp. (dragon fruit). Proc Peradeniya University Research Sessions. Sri Lanka. 11, 15.
- Verma, R.S., Lata, R., Ram, R.B., Verma, S.S., & Prakash S. (2019). Effect of organic, inorganic and bio-fertilizers on vegetative characters of dragon fruit (*Hylocereus undatus* L.) plant. *The Pharma Innovation Journal* 8(6), 726-728.