



Effect of Plant Growth Regulators on Physiological and Morphological Parameters of Papaya (*Carica papaya* L.)

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Papaya (*Carica papaya* L.) is a vastly used tropical fruit crop due to its nutritional properties, economic properties, and it is a much valued crop as it grows throughout the year. But there are many environmental and physiological factors which affect the growth, reproduction, fruit, and yield of papaya. Therefore, to increase the productivity of papaya, many PGRs are used such as auxins, gibberellins, cytokinins, ethylene, and growth retardants based upon the physiological factors such as photosynthesis, transpiration, nutrient absorption, respiration, and different enzymatic actions. And it also affect the morphological characteristics such as the size of the fruit, reproduction, leaf area, plant height, and also the yield of papaya. This becomes a very important aspect regarding the use of PGRs at the right stage and at the right concentration, which would eventually increase the growth, yield, and quality of the fruit of papaya.

Keywords: Papaya, Plant Growth Regulator, Physiological Parameters, Morphological Parameters, Fruit Quality, Yield

Introduction

Papaya (*Carica papaya* L.) of family Caricaceae is a short-lived tropical fruit crop. Due to its cultivation advantages, it is widely grown in India because of its high productivity and bearing nature, uses in fresh consumption, and in many value-added products. It is rich in many vitamins like A, C, antioxidant proteolytic enzyme papain, and calcium, which makes it nutritionally and economically important. Despite having many cultivation advantages, it also faces many physiological and morphological challenges like flower drop, fruit drop, poor fruit set, uneven growth, poor shelf life, irregular flowering, leading to a decrease in the quality and yield of papaya. So here, PGRs can play a major role in growth, yield, and development of papaya.

Classification of plant growth regulators used in papaya

Growth promoters

Auxin: NAA, IAA, 2,4 D

Function: Reduce fruit drop, enhance root growth and also increase fruit set.

Gibberellins: GA3

Function: Delay senescence, increase height and also fruit size.

Cytokinins: BA, Kinetin

Function: It delays leaf senescence, which increases cell division.

Ethylene:

Function: It determines fruit ripening and sex expression.

Growth Retardants: Paclobutrazol, CCC: Function: Reduces excessive vegetative growth and improves flowering.

Physiological Properties

Plant growth regulators help in photosynthesis by increasing the chlorophyll content. Auxin and gibberellins increase nutrient uptake and translocation of nutrients. Growth regulators like ethylene increase respiration and induce the ripening process, while growth retardants reduce respiration.

Effect on Morphological Properties

Plant growth regulators include gibberellins, which increases plant height; cytokinins, which increases leaf area, and ethylene and auxin, which improves sex expression and flowering. Conclusion PGRs play a very important role in growth, development, yield, and the quality of papaya. It should be applied in proper concentration and at an appropriate stage for better effectiveness. It is also essential for sustainable production of papaya.

References

1. Devoghal, S. V., and Kulwal, L. V. (2012). Effect of plant growth regulators on growth and yield of papaya. *Asian Journal of Horticulture*, **7**(2): 491–494.
2. Kaur, N., Gill, M. S., and Bali, S. K. (2013). Effect of growth regulators on flowering and fruiting in papaya. *Indian Journal of Horticulture*, **70**(3): 345–348.
3. Singh, D. B., and Maurya, A. N. (2016). Response of papaya to plant growth regulators. *International Journal of Agriculture Sciences*, **8**(10): 1203–1207.
4. Taiz, L., Zeiger, E., Møller, I. M., and Murphy, A. (2017). Plant Physiology and Development. Sinauer Associates.
5. Bose, T. K., and Mitra, S. K. (1996). Fruits: Tropical and Subtropical. *Naya Prakash*, pp. 512–520 .