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Effect of Plant Growth Regulators and Growing Media on Stem Cuttings of Fig (*Ficus racemosa*) cv. Poona Fig

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This research investigates the combined influence of plant growth regulators (PGRs) and growing media on the rooting and overall growth of fig stem cuttings (Ficus carica L.). Figs are economically and culturally significant, making their successful propagation crucial for horticulturists and farmers. The study aims to optimize the rooting process and enhance the establishment of healthy fig plants through a careful manipulation of PGRs and growing media.

Introduction to PGPR: Plant Growth-Promoting Rhizobacteria (PGPR) are beneficial bacteria that inhabit the rhizosphere, the region of soil surrounding plant roots. These bacteria establish a mutually beneficial relationship with plants, promoting growth and health through various mechanisms. PGPR can enhance nutrient availability, produce growth-promoting substances, and protect plants from pathogens.

PGPR in Fig Plants: Figs (*Ficus* spp.) are known for their unique structure, with a hollow, pear-shaped structure enclosing the flowers and seeds. These plants have specific requirements for growth and fruit production. PGPR can play a crucial role in supporting the growth of fig plants by improving nutrient uptake, protecting against soil-borne pathogens, and enhancing stress tolerance.

Key Roles of PGPR in Fig Plants

1. **Nutrient Availability:** PGPR can solubilize nutrients in the soil, making them more accessible to fig plants. This can contribute to improved nutrient uptake, leading to enhanced growth and fruit development.
2. **Disease Suppression:** PGPR can act as biocontrol agents, suppressing the growth of pathogenic microorganisms in the soil. This helps protect fig plants from diseases that may otherwise hinder their growth and productivity.
3. **Stress Tolerance:** Fig plants, like many other crops, face various environmental stresses. PGPR can assist in enhancing the stress tolerance of fig plants, making them more resilient to factors such as drought, salinity, and temperature fluctuations.
4. **Root Development:** PGPR can stimulate root development in fig plants, leading to a more extensive and efficient root system. This can further improve nutrient uptake and overall plant health.

Objectives

1. Evaluate the impact of different concentrations of auxins, such as indole-3-butyric acid (IBA) and naphthaleneacetic acid (NAA), on the rooting efficiency of fig stem cuttings.
2. Investigate the interactive effects of PGRs and growing media on the length and number of roots developed by fig cuttings.

3. Assess the influence of PGRs and growing media on the survival rate and early growth stages of propagated fig plants.
4. Analyze the physiological and biochemical changes in fig cuttings subjected to various PGR treatments and growing media.

Methods

1. Prepare different concentrations of IBA and NAA solutions for treating fig stem cuttings.
2. Utilize various growing media, such as soil, perlite, and vermiculite, to assess their impact on rooting and early growth.
3. Monitor the rooting process, survival rate, and growth parameters of fig cuttings over a specified period.
4. Conduct biochemical analyses, including hormone levels, carbohydrate content, and antioxidant activity, to understand the underlying physiological changes.

Expected Results: The study anticipates that optimal combinations of PGRs and growing media will significantly enhance the rooting efficiency and subsequent growth of fig stem cuttings. The findings could provide valuable insights into developing practical recommendations for horticulturists aiming to propagate figs efficiently.

Significance of the Study: Understanding the interplay between PGRs and growing media in fig propagation can contribute to sustainable fig cultivation, addressing challenges in fig production and ensuring a consistent supply of high-quality fig plants. This research may also have broader implications for the propagation of other woody plants, providing a foundation for future studies in horticulture and plant science.

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