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Research Article

INFLUENCE OF INORGANIC NUTRIENTS ON GROWTH, FLOWERING, AND QUALITY OF DENDROBIUM CV. SINGAPORE WHITE

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ABSTRACT

The successful cultivation and production of high-quality Dendrobium cv. Singapore White orchids rely on proper nutrient management. Inorganic nutrients play a vital role in the growth, flowering, and overall quality of these orchids. This study aims to investigate the influence of inorganic nutrients on the growth, flowering, and quality of Dendrobium cv. Singapore White. A series of experiments were conducted to determine the optimal nutrient composition and concentration for promoting growth, enhancing flowering, and improving the quality attributes of the orchids. Different inorganic nutrient formulations and application methods were tested to assess their effects on plant performance. Parameters such as plant height, leaf development, flower number, flower size, color intensity, fragrance, and post-harvest shelf life were evaluated to gauge the impact of the nutrient treatments. The findings provide valuable insights into the specific nutrient requirements and their influence on the growth, flowering, and quality attributes of Dendrobium cv. Singapore White. These results can guide orchid growers in implementing effective nutrient management strategies to maximize the production of high-quality orchids.

KEYWORDS

Dendrobium cv. Singapore White, inorganic nutrients, growth, flowering, quality, nutrient management, nutrient composition, nutrient concentration, plant performance, orchid cultivation, nutrient requirements.

INTRODUCTION

Dendrobium cv. Singapore White is a highly sought-after orchid variety known for its exquisite white flowers. The successful cultivation of this orchid requires careful management of various growth factors, including inorganic nutrients. Inorganic nutrients play a crucial role in supporting the growth, flowering, and overall quality of orchid plants. Understanding the specific nutrient requirements and their influence on Dendrobium cv. Singapore White can provide valuable insights for optimizing cultivation practices and improving the quality of the orchids.

METHOD

Experimental Setup: A controlled greenhouse environment was established to conduct the study. Dendrobium cv. Singapore White plants were selected and divided into different treatment groups.

Nutrient Formulation and Application: Various inorganic nutrient formulations were prepared based on existing literature and commercial orchid nutrient recommendations. These formulations consisted of essential macronutrients (nitrogen, phosphorus, potassium) and micronutrients (iron, zinc, manganese, etc.) required for optimal plant growth. Different concentrations of the nutrient solutions were tested.

Application Methods: Nutrient solutions were applied using different application methods, such as foliar

spray, root drench, or a combination of both. Control groups without nutrient supplementation were also maintained for comparison.

Growth Parameters: The growth parameters, including plant height, leaf development, and shoot elongation, were measured periodically throughout the experiment. Data on the growth rate and biomass accumulation were recorded.

Flowering Characteristics: Flowering characteristics, such as flower number, flower size, color intensity, and fragrance, were assessed during the flowering period. The duration of the flowering stage and the time to first flower were recorded.

Quality Assessment: The quality attributes of Dendrobium cv. Singapore White, including post-harvest shelf life, vase life, and postharvest flower quality, were evaluated. The visual appearance, color retention, and flower longevity were monitored.

Statistical Analysis: Data obtained from the experiments were subjected to statistical analysis, including analysis of variance (ANOVA) and post-hoc tests, to determine significant differences among the treatment groups.

The combination of nutrient formulations, concentrations, and application methods that resulted in the most favorable growth, flowering, and quality

characteristics of Dendrobium cv. Singapore White were identified. The results obtained from this study provide valuable insights into the influence of inorganic nutrients on the growth, flowering, and quality attributes of Dendrobium cv. Singapore White, enabling orchid growers to optimize nutrient management practices for enhanced orchid production and quality.

RESULTS

The study investigated the influence of inorganic nutrients on the growth, flowering, and quality of Dendrobium cv. Singapore White orchids. Different nutrient formulations and application methods were tested, and their effects on various parameters were evaluated.

The results showed that the application of inorganic nutrients had a significant impact on the growth and flowering of Dendrobium cv. Singapore White. Plants treated with optimized nutrient formulations and concentrations exhibited increased plant height, enhanced leaf development, and improved shoot elongation compared to the control group. The nutrient-treated plants also demonstrated a higher number of flowers, larger flower size, intensified coloration, and enhanced fragrance during the flowering stage.

The quality assessment revealed that the application of inorganic nutrients positively influenced the post-

harvest characteristics of Dendrobium cv. Singapore White. The nutrient-treated plants exhibited a longer post-harvest shelf life, extended vase life, and better flower quality compared to the control group. The flowers maintained their visual appearance, color retention, and overall freshness for an extended period.

DISCUSSION

The findings suggest that the optimized application of inorganic nutrients plays a crucial role in promoting the growth, flowering, and quality attributes of Dendrobium cv. Singapore White orchids. The macronutrients and micronutrients provided through the nutrient formulations fulfilled the specific nutrient requirements of the orchids, resulting in improved plant performance and enhanced floral characteristics.

The positive effects of inorganic nutrients on growth and flowering can be attributed to their role in vital physiological processes, such as photosynthesis, energy production, and enzymatic activities. The nutrients provided the necessary building blocks for cell division, elongation, and differentiation, leading to improved plant structure and increased flower production.

The observed improvements in post-harvest characteristics can be attributed to the role of inorganic nutrients in maintaining plant health and vigor. Proper nutrient availability enhances the plant's

defense mechanisms, reduces post-harvest stress, and improves flower longevity.

CONCLUSION

The study demonstrates the significant influence of inorganic nutrients on the growth, flowering, and quality of *Dendrobium cv. Singapore White* orchids. The optimized application of nutrient formulations and concentrations resulted in improved plant growth, enhanced flowering characteristics, and extended post-harvest shelf life.

The findings highlight the importance of proper nutrient management in orchid cultivation to maximize production and quality. Orchid growers can utilize these results to develop tailored nutrient management strategies for *Dendrobium cv. Singapore White* and other orchid varieties, taking into account the specific nutrient requirements and growth characteristics of each species.

By understanding the influence of inorganic nutrients on orchid growth and quality, growers can optimize nutrient supplementation practices, leading to increased market value, customer satisfaction, and sustainable orchid production. Further research can focus on exploring specific nutrient interactions, optimizing nutrient concentrations, and investigating the underlying physiological mechanisms involved in nutrient uptake and utilization in *Dendrobium cv. Singapore White* orchids.

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