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Humic acid enhances growth, development, and nutrient absorption in the Zambesi lily cultivar

Seda Bice, Onur Sefa Alkaç, Sezer Şahin

¹ Faculty of Agriculture, Department of Soil Science and Plant Nutrition,
Tokat Gaziosmanpaşa University, Tokat, Türkiye

² Faculty of Agriculture, Department of Horticulture, Tokat Gaziosmanpaşa
University, Tokat, Türkiye

³ Faculty of Agriculture, Department of Soil Science and Plant Nutrition,
Tokat Gaziosmanpaşa University, Tokat, Türkiye

Abstract

Humic acid, an environmentally friendly substance, directly or indirectly affects plant growth, and it is vital in various biological, physical, and chemical processes. In this study, humic acid was applied to lily plants at two-week intervals after plant emergence by three methods: soil (3.5 L da⁻¹ and 7.5 L da⁻¹), foliar (1.75 L da⁻¹ and 3.75 L da⁻¹) and soil + foliar combination (3.5 L da⁻¹ + 1.75 L da⁻¹). The effects of these treatments on plant growth, development, and nutrient uptake were investigated in soilless culture. The soil humic acid application was found to be more effective than foliar application, and increasing humic acid doses were significantly associated with increased vegetative weight of lily plants. The humic acid application was conducted twice at two-week intervals after the plants reached approximately 20 cm height. The applications were as follows: control, 3.5 L da⁻¹ from soil, 7 L da⁻¹ from soil, 1.75 L da⁻¹ foliar, 3.5 L da⁻¹ foliar, and 3.5 L da⁻¹ from soil + 1.75 L da⁻¹ foliar. Harvesting of the plants began when at least two of the lower candles showed color. The soil application of 3.5 L da⁻¹ humic acid gave superior leaf number, stem thickness, and full flower diameter results. Meanwhile, 7.5 L da⁻¹ soil application showed better plant height, bud length, and branch weight results. Regarding nutrient uptake, the soil application of 3.5 L da⁻¹ humic acid significantly increased nitrogen and potassium uptake. The study concluded that the soil application of humic acid is more favorable than foliar application, and exceeding a 3.5 L da⁻¹ humic acid dose is unnecessary. Soil application of 3.5 L da⁻¹ of humic acid significantly increased nitrogen and potassium uptake. Therefore, two different doses of humic acid applied to soil have shown the best performance in terms of plant development parameters in the Zambesi variety of the lily plant.

Keywords: bulb, cut flower, *Lilium*, soilless agriculture, vegetative