

Effectiveness of K₂SiO₃ on growth and physiobiochemical changes of banana seedlings grown under tropical climate as influenced by application frequency

ABSTRACT

Slow growth rate of tissue-cultured banana seedling's performance and high post-transplanting mortality rate are commonly due to low rate mineral content in the soil, climate change and soil-borne disease. This study aimed to evaluate the effects of potassium silicate (K₂SiO₃) on growth, physio-biochemical changes on Berangan banana seedlings grown under tropical climate conditions. The experiment was conducted under a rain shelter and all treatments were arranged in a randomized complete block (RCBD) design. The plants were soil drenched with K₂SiO₃ at constant 0.0901 M by 25 mL/plant after two weeks of transplanting with different frequencies application: 0-day interval (DI) served as control, 7 DI (12×), 15 DI (6×) and 30 DI (3×) throughout three months experimental period. Results showed that K₂SiO₃ (13% SiO₂, 20% K₂O) applied on healthy banana seedlings at 15 days interval significantly improved morphological growth trait (plant height, pseudo-stem diameter size, total leaf area, root length, and dry matter biomass) and physiological traits characters, but reduced proline and MDA content in plant tissues of banana. Hence, the results confirmed that each banana seedlings that received K₂SiO₃ at optimum frequency rate (15DI) had successfully enhanced the growth performance with better quality of Berangan banana seedlings at commercial-scale production.

Keyword: Banana; Silicon; Potassium; Silicate; Growth; Disease