



Effectiveness of Zeolite [LTA] amendment in improving the growth of cherry tomato (*Solanum lycopersicum*) and its physicochemical properties of soil

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Abstract

In the agriculture sector, optimizing the yield becomes the main purpose in this industry which can be achieved by introducing zeolite which acts as a soil amendment in the plant. To achieve this purpose, the study analyzed the effectiveness of the synthesis of zeolite LTA amended in the soil to increase the growth characteristics of cherry tomatoes and the physicochemical properties of the soil. Zeolite LTA is a synthetic zeolite characterized by a unique crystalline structure, possessing a high cation exchange capacity that enhances nutrient retention, moisture retention, and soil structure improvement. For the method of study, seven different treatments including three control treatments with no zeolite added and four treatments with zeolite added per plant in 1000 g of soil were analyzed to determine the optimum ratio of soil and fertilizer. The implementation of the Least Significant Difference (LSD) post-hoc test ($P \leq 0.05$) enables the effectiveness of measurement of all plant treatments towards the plant growth and physicochemical analysis of soil. The plant growth results, including plant height, number of leaves, and stem width diameter, at harvest 1, 2, and 3 revealed that the 6gZ amended in soil has a higher significant difference towards the other treatments. Regarding cherry tomato weight, 6gZ exhibits 18.31% heavier compared to the control height, 12.9% heavier compared to the control low, and 18.51% heavier compared to 4gZ. Additionally, 6gZ has the greatest disparity in plant height percentages when compared to the control standard, with a difference of 26.17%. For physical analysis of soil (water content capacity, soil moisture, soil organic content) and chemical analysis (total available nutrient), 6gZ also gives a higher significant effect than other treatments. In conclusion, analysis from all results performance experiments indicates that 6gZ was capable of increasing the yield of plants.

Keywords Zeolite LTA · Cherry tomato · Soil amendment · Physicochemical · Growth

Introduction

Tomatoes are classified as plant-vegetable fruits because they belong to the Solanaceae family [1]. According to the most recent production data [2] China, India, Turkey, and the United States are the world's top four tomato-producing countries. In Malaysia, Kelantan Lodging (597 hectares), Pahang (1206 hectares), Perak (150 hectares), and Sabah (134 hectares) are the four main states that produce the preponderance of tomatoes [3]. Solanaceae is one of the most valuable plant families for vegetables and is high in production [4]. The shade net home shield condition prevents the crop from being potentially damaged in weather conditions [5]. The five stages of growth that a tomato goes through are germination and early growth with initial leaves (between

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