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EFFECT OF SAGO BARK BIOCHAR APPLICATION ON *Capsicum annuum* L. var. *Kulai* GROWTH AND FRUIT YIELD

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ABSTRACT

Applying biochar in crop farming or agriculture activity generally increases productivity through improved soil fertility and water holding capacity. However, there is a lack of empirical data on the effects of sago bark waste-derived biochar on the growth media of *Capsicum annuum* L. This work, reported the effect of sago bark biochar and acid-base treated sago bark biochar on *Capsicum annuum* L. var. *Kulai* growth media fertility. The plant growth study was carried out using completely random design experimental layouts with five replicates and 8 treatments at various biochar application rates (0.5,1.5, & 3.0%, w/w). Results showed that plant grown with 1.5% sago bark biochar has the highest number of the leaf (122.90). Plant with 1.5% acid-base treated sago bark biochar showed a significantly (p<0.05) higher number of flower buds (1.90) and stem height (69.00 cm) during 4 months of the vegetative period. Meanwhile, plants with 3% acid-base treated sago bark biochar obtained the highest yield of fruit fresh weight (67.64 g). In general, acid-base treated sago bark biochar application increase the yield of *Capsicum annuum* L. var. *Kulai*.

Key words: Chili, completely randomized design, crop yield, Kulai, sago bark, soil fertility

INTRODUCTION

Chili is among the most popular vegetables in Asia including Malaysia. This vibrant red color vegetable has its level of heat and is usually used in various cuisines, in dried and powdered forms, or even in flakes. *Capsicum annuum* L. var. *Kulai* originated in South America but is favored in Asia (Khandaker *et al*., 2017). According to the Food and Agriculture Organization of the United Nations [FAO] (2019), the total harvested area of chili in the world was 1,990,926 hectares, with Malaysia roughly covering only 0.14% (2,843 hectares) of the worldwide area. Total chili production in Malaysia has been decreasing over time, with 27,555 tonnes produced in 2019 compared with 59,775 tonnes in 2013 (FAO, 2019). Agriculture and Agro-based industry stated that approximately 300,000 tonnes of chili per year had been consumed by Malaysians between January and July 2018 (Daros, 2019). The average chili production in Malaysia is still very low, and it is necessary to increase crop productivity to meet the current demand for chili.

According to the Department of Statistics Malaysia, chili production had the greatest Import Dependency Ratio (IDR) and Self Sufficiency Ratio with an estimation of 73.6 and 30.8% respectively. In 2019, 2,370 tonnes were produced, and high demand has prompted more farmers to plant chili (Mahidin, 2019). Excessive use of inorganic fertilizers which are mostly made from synthetic materials, provides rapid nourishment for plant development but increases farming costs and results in soil degradation (Khandaker *et al*., 2017).

Therefore, biochar is used as a soil amendment to enhance soil fertility and it improves growth media by increasing soil pH, enhancing soil aeration, and changing the soil structure due to changes in physicochemical properties (Ajema, 2018). Chemical activation treatments for biochar have offered greater improvement in surface area and porosity development, and have further increased the sorption capacity of biochar (Sahin *et al*., 2017; Tan *et al*., 2017; Zhao *et al*., 2017). Biochar could be a promising material for boosting acid soil productivity due to its liming effect, water and nutrient retention capability, and carbon sequestration capacity (Berek, 2019). The modification process of biochar is important to study the enhancement of physical and chemical properties

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