

RINGKASAN

Tanaman aren (*Arenga pinnata* Merr.) merupakan tanaman yang memiliki banyak manfaat. Namun, tanaman aren belum banyak dibudidayakan secara massal. Pertumbuhan vegetatif merupakan fokus utama dalam upaya peremajaan tanaman aren. Penelitian ini memiliki tujuan mengetahui pengaruh pemberian biochar dan pupuk N-P-K berbagai dosis, serta interaksinya terhadap pertumbuhan dan respon fisiologis tanaman, serta jumlah koloni mikroba tanah. Pengaplikasian biochar dan pupuk N-P-K berbagai dosis diharapkan berpengaruh signifikan terhadap pertumbuhan dan respon fisiologis tanaman, serta jumlah koloni mikroba tanah.

Penelitian dilaksanakan di *screenhouse* kebun percobaan, Laboratorium Agronomi & Hortikultura, Laboratorium Tanah, dan Laboratorium Agroekologi, Fakultas Pertanian, Universitas Jenderal Soedirman. Kegiatan penelitian dilaksanakan selama 6 bulan pada bulan Juli – Desember 2023. Rancangan penelitian yang digunakan adalah *split plot* dengan dua faktor yaitu, biochar yang terdiri atas 0 g/tanaman (B_0), 200g/tanaman (B_1), dan 400g/tanaman (B_2), sedangkan faktor kedua yaitu dosis pupuk N-P-K yang terdiri dari 0 % dosis rekomendasi (P_0), 50% dosis rekomendasi (P_1), dan 100 % dosis rekomendasi (P_2). Terdapat 9 kombinasi perlakuan dengan setiap perlakuan dilakukan 3 ulangan. Variabel pertumbuhan meliputi tinggi tanaman, diameter batang, jumlah daun, luas daun, dan berat kering tanaman. Variabel respon fisiologis tanaman meliputi aktivitas nitrat reduktase (ANR), serapan N dan P, serta kadar klorofil daun. Variabel lainnya meliputi jumlah dan karakterisasi koloni mikroba. Data yang didapatkan dianalisis menggunakan uji sidik ragam yang dilanjutkan dengan uji DMRT dengan $\alpha = 5\%$.

Hasil penelitian menunjukkan pengaplikasian 200 g biochar/tanaman berpengaruh signifikan terhadap diameter batang. Pengaplikasian 400 g biochar/tanaman berpengaruh signifikan terhadap serapan N dan tinggi tanaman. Peningkatan tersebut karena biochar dapat memperbaiki sifat fisik dan kimia tanah sehingga dapat mengefisiensikan penyerapan unsur hara. Sedangkan, pengaplikasian 0 g pupuk N-P-K berpengaruh signifikan terhadap serapan N dan serapan P. Pengaplikasian 50 % dosis pupuk N-P-K rekomendasi berpengaruh signifikan terhadap jumlah daun tanaman. Penurunan dosis tersebut karena kandungan unsur hara pada tanah dapat mencukupi kebutuhan tanaman, sedangkan pupuk dengan dosis yang lebih tinggi mengakibatkan penyerapan unsur hara terganggu.

SUMMARY

The sugar palm (Arenga pinnata Merr.) is a plant that has many benefits. However, sugar palm plants have not been widely cultivated massively. Vegetative growth is the main focus in efforts to rejuvenate sugar palm plants. This research aims to determine the effect of applying various doses of biochar and N-P-K fertilizer, the interactions between biochar and N-P-K fertilizer on plant growth and biochemical responses, and the number of soil microbial colonies.

The research was carried out in the screenhouse of the experimental garden of the Faculty of Agriculture, Jenderal Soedirman University, Agronomy & Horticulture Laboratory, Soil Laboratory, and Agroecology Laboratory, Faculty of Agriculture, Universitas Jenderal Soedirman. Research activities were conducted over a 6 months in July – December 2023. The research design was a split plot, with two factors, namely biochar consisting of 0 g/plant (B0), 200g/plant (B1), and 400g/plant (B2), and the second factor consisting the N-P-K fertilizer dose which consists of 0% of recommended dose (P0), 50% of recommended dose (P1), and 100% of recommended dose (P2). There were 9 treatment combinations with 3 repetitions for each treatment. Growth variables, including plant height, stem diameter, number of leaves, leaf area, and plant dry weight, were observed. Plant physiological response variables, including nitrate reductase (ANR) activity, N and P uptake, and leaf chlorophyll levels, were observed. Additional variables included the number and characteristics of microbial colonies. The data obtained were analyzed using anova followed by Duncan's Multiple Range Test with $\alpha = 5\%$.

The results show that the application of 200 g biochar/plant has the most significant effect on stem diameter. Application of 400 g biochar/plant significantly affects N uptake and plant height. This increase occurs because biochar can improve the physical and chemical properties of the soil, allowing it to absorb nutrients efficiently. The application of 0 g of N-P-K fertilizer significantly effects on N uptake and P uptake. Application of 50% of the recommended dose of N-P-K fertilizer significantly affects the number of plant leaves. The reduction in dosage is due to the nutrient content in the soil being sufficient to meet the plant's needs, while higher dosages of fertilizer result in impaired nutrient absorption.