# RINGKASAN

Kopi merupakan salah satu komoditas perkebunan yang cukup berpotensi dibudidayakan, terutama pada proporsi luas lahannya. Luas lahan tanaman kopi di Indonesia pada tahun 2020 mencapai 1.242,8 ha, meningkat pada tahun 2021 menjadi 1.279,6 ha, dan tahun 2022 mencapai 1.285,8 ha. Berdasarkan produksi kopi yang telah ada, dapat dilihat bahwa produksi kopi semakin meningkat setiap tahunnya, meskipun peningkatan produksi kopi tersebut tidak terlalu signifikan. Tujuan penelitian ini adalah mengetahui pengaruh pemberian biochar dan pupuk N-P-K dengan dosis yang berbeda terhadap pertumbuhan tanaman kopi robusta, mengetahui pengaruh pemberian biochar dan pupuk N-P-K dengan dosis yang berbeda terhadap respon biokimia tanaman kopi robusta dan mengetahui interaksi pemberian biochar dan pupuk N-P-K dengan dosis yang berbeda terhadap respon pertumbuhan dan biokimia tanaman kopi robusta.

Penelitian ini dilaksanakan di lahan pertanaman kopi Desa Sikapat, Kecamatan Sumbang, Kabupaten Banyumas seluas 1.350 m$^2$ dengan jarak tanam 5 m x 5 m pada ketinggian 400 mdpl, Laboratorium Agronomi dan Hortikultura Fakultas Pertanian, Laboratorium Ilmu Tanah dan Sumber Daya Lahan Fakultas Pertanian dan Laboratorium Riset Universitas Jenderal Soedirman. Penelitian ini dilaksanakan pada September 2023 sampai dengan Mei 2024. Rancangan percobaan yang digunakan adalah Rancangan Acak Kelompok (RAK) yang terdiri atas dua faktor. Faktor pertama adalah biochar yang terdiri dari $B_0$ = tanpa biochar, $B_1$ = 100 g biochar dan $B_2$ = 150 g biochar. Faktor kedua adalah pupuk N-P-K yang terdiri dari $P_0$ = tanpa pupuk N-P-K, $P_1$ = 65 g pupuk N-P-K (25 g urea, 20 g TSP, 20 g KCl) dan $P_2$ = 130 g pupuk N-P-K (50 g urea, 40 g TSP, 40 g KCl).

Pengamatan pertumbuhan tanaman kopi robusta yang dilakukan yaitu tinggi tanaman, diameter batang dan jumlah daun. Pengamatan biokimia tanaman kopi robusta yang dilakukan yaitu kehijauan daun, kandungan klorofil, kandungan prolin, aktivitas nitrat reduktase, serapan N dan serapan P. Data pengamatan dianalisis menggunakan analisis sidik ragam dan dilanjutkan dengan *Duncan Multiple Range Test* pada taraf kesalahan 5%. Hasil penelitian menunjukkan pemberian biochar dosis 100 g/tanaman memberikan pengaruh nyata terhadap jumlah daun. Pemberian biochar dosis 150 g/tanaman memberikan pengaruh nyata terhadap tinggi tanaman dan diameter batang. Pemberian pupuk N-P-K memberikan pengaruh nyata terhadap tinggi tanaman. Pemberian biochar dosis 150 g/tanaman memberikan pengaruh nyata terhadap kehijauan daun. Pemberian pupuk N-P-K dosis 135 g/tanaman memberikan pengaruh nyata terhadap serapan N. Terdapat interaksi pada perlakuan tanpa biochar dan pupuk N-P-K dosis 130 g/tanaman terhadap variabel serapan P.

# SUMMARY

Coffee is one of the plantation commodities that has the potential to be cultivated, especially in terms of the proportion of its land area. The area of coffee plantations in Indonesia in 2020 reached 1,242.8 ha, increasing in 2021 to 1,279.6 ha, and in 2022 reaching 1,285.8 ha. Based on existing coffee production, it can be seen that coffee production is increasing every year, although the increase in coffee production is not very significant. The purpose of this study was to determine the effect of biochar and N-P-K fertilizer with different doses on the growth of robusta coffee plants, to determine the effect of biochar and N-P-K fertilizer with different doses on the biochemical response of robusta coffee plants and to determine the interaction of biochar and N-P-K fertilizer with different doses on the growth and biochemical response of robusta coffee plants.

This research was carried out in the coffee plantations of Sikapat Village, Sumbang District, Banyumas Regency covering an area of 1,350 $m^2$ with a planting distance of 5 m x 5 m at an altitude of 400 meters above sea level, the Agronomy and Horticulture Laboratory of the Faculty of Agriculture, the Soil Science and Land Resources Laboratory of the Faculty of Agriculture and Research Laboratory Jenderal Soedirman University. This research was carried out from September 2023 to May 2024. The experimental design used was a Randomized Group Design (RAK) which consisted of two factors. The first factor is biochar which consists of $B_0$ = no biochar, $B_1$ = 100 g biochar and $B_2$ = 150 g biochar. The second factor is N-P-K fertilizer which consists of $P_0$ = without N-P-K fertilizer, $P_1$ = 65 g N-P-K fertilizer (25 g urea, 20 g TSP, 20 g KCl) and $P_2$ = 130 g N-P-K fertilizer (50 g urea, 40 g TSP, 40 g KCl).

Observations on the growth of robusta coffee plants were conducted on plant height, stem diameter and number of leaves. Biochemical observations of robusta coffee plants were conducted on leaf greenness, chlorophyll content, proline content, nitrate reductase activity, N absorption and P absorption. Observation data were analyzed using analysis of variance and continued with Duncan Multiple Range Test at a 5% error rate. The results showed that the administration of biochar at a dose of 100 g/plant had a significant effect on the number of leaves. The administration of biochar at a dose of 150 g/plant had a significant effect on plant height and stem diameter. The administration of N-P-K fertilizer had a significant effect on plant height. The administration of biochar at a dose of 150 g/plant had a significant effect on leaf greenness. The administration of N-P-K fertilizer at a dose of 135 g/plant had a significant effect on N absorption. There was an interaction between the treatment without biochar and N-P-K fertilizer at a dose of 130 g/plant on the P absorption variable.