

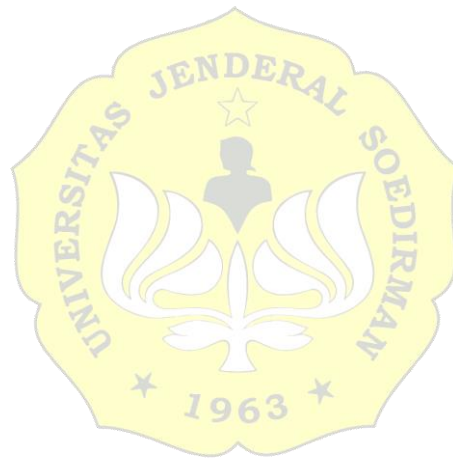
RINGKASAN

Inceptisol merupakan tanah yang tersebar luas dengan total 37% dari luas daratan di Indonesia. Di Pulau Jawa, *Inceptisol* memiliki intensitas pengelolaan yang sudah intensif. Kecamatan Kertasari, Kabupaten Bandung, Jawa Barat merupakan salah satu daerah dengan pertanian yang intensif dan memiliki potensi kerusakan tanah yang tinggi karena adanya penurunan kemampuan tanah dalam menahan air. Biochar dan arang aktif merupakan jenis pembenah tanah organik yang dapat meningkatkan beberapa sifat fisik dan kimia *Inceptisol*. Kedua jenis pembenah tanah ini dibuat dari limbah pertanian yang melimpah yaitu sekam padi dan Tandan Kosong Kelapa Sawit (TKKS). Proses pembuatan kedua pembenah tanah memiliki kesamaan yaitu pembakaran pirolisis atau dengan sedikit oksigen agar menghasilkan banyak karbon dan berbagai unsur hara untuk tanaman. Biochar sekam padi kemudian diperkaya silika agar mengubah P tidak larut menjadi P tersedia bagi tanaman, sedangkan arang TKKS diaktivasi dengan ammonium sulfat agar permukaannya lebih luas.

Penelitian dilaksanakan di Laboratorium KST Samaun Samadikun BRIN, Kota Bandung dan Laboratorium Kimia Tanah dan Nutrisi Universitas Padjajaran, Sumedang. Penelitian dilaksanakan bulan Agustus-November 2023. Rancangan percobaan yang digunakan dalam penelitian yaitu Rancangan Acak Lengkap dengan non-faktorial sebanyak 11 taraf dengan rincian, biochar diperkaya silika setara 0 ton/ha PT1D0, biochar diperkaya silika setara 1,25 ton/ha PT1D1, biochar diperkaya silika setara 2,5 ton/ha PT1D2, biochar diperkaya silika setara 3,75 ton/ha PT1D3, biochar diperkaya silika setara 5 ton/ha PT1D4, biochar diperkaya silika setara 6,25 ton/ha PT1D5, arang aktif TKKS setara 1,25 ton/ha PT2D1, arang aktif TKKS setara 2,5 ton/ha PT2D2, arang aktif TKKS setara 3,75 ton/ha PT2D3, arang aktif TKKS setara 5 ton/ha PT2D4, dan arang aktif TKKS setara 6,25 ton/ha PT2D5. Pembenah tanah masing-masing diinkubasi kedalam pot plastik berisi sampel *Inceptisol* selama 14 hari, kemudian dianalisis sifat fisik dan kimia tanahnya yaitu kapasitas memegang air, pH H₂O, daya hantar listrik, C-organik, N-total, rasio C/N, P-tersedia, KTK, dan K-tersedia dalam tanah.

Hasil penelitian dengan uji ANOVA (*Analysis of Variance*) menunjukkan bahwa biochar sekam padi diperkaya silika dan arang aktif TKKS berpengaruh nyata pada parameter kapasitas memegang air, pH H₂O, P-tersedia, dan tidak berpengaruh nyata pada parameter daya hantar listrik, C-organik, N-total, kapasitas tukar kation, dan K-tersedia. Setelah data dianalisis dengan regresi, didapatkan hasil bahwa dosis optimum yang dapat digunakan untuk *Inceptisol* di Kertasari menggunakan biochar diperkaya silika untuk meningkatkan kapasitas memegang air sebesar 4,92 ton/ha, meningkatkan C-organik sebesar 5,73 ton/ha, dan meningkatkan kapasitas tukar kation sebesar 2,51 ton/ha, sedangkan pada arang aktif TKKS untuk meningkatkan kapasitas memegang air sebesar 1,7 ton/ha,

meningkatkan C-organik sebesar 0,125 ton/ha, dan meningkatkan kapasitas tukar kation sebesar 1,05 ton/ha.



SUMMARY

Inceptisol is a widespread soil, covering 37% of the land area in Indonesia. On Java Island, Inceptisol has intensive agriculture management. There is an area in Kertasari, Bandung, West Java, with intensive agriculture and a high potential for soil damage due to a decrease in the soil's ability to hold water. Biochar and activated charcoal are organic soil conditioners that can improve some of Inceptisol's physical and chemical properties. These two soil conditioners are from abundant agricultural waste: rice husks and Oil Palm Empty Fruit Bunch (OPEFB). These soil conditioners have something in common: pyrolysis-burning or using limited oxygen and high heat, producing lots of carbon and various plant nutrients. Rice husk biochar is then enriched with silica to convert insoluble P into P available for plants. At the same time, OPEFB's charcoal is activated with ammonium sulfate to provide a larger surface area.

The research was executed at the KST Samaun Samadikun BRIN Laboratory, Bandung, and the Soil Chemistry and Nutrition Laboratory at Padjadjaran University, Sumedang. The research was accomplished in August-November 2023. The experimental design used in this research is a non-factorial, Completely Randomized Design (CRD) method with 11 levels consisting of silica-enriched biochar equivalent to 0 tons/ha as PT1D0, silica-enriched biochar equivalent to 1.25 tons/ha as PT1D1, silica-enriched biochar equivalent to 2.5 tons/ha as PT1D2, silica-enriched biochar equivalent to 3.75 tons/ha as PT1D3, silica-enriched biochar equivalent to 5 tons/ha as PT1D4, silica-enriched biochar equivalent to 6.25 tons/ha as PT1D5, OPEFB's activated charcoal equivalent to 1.25 tons/ha as PT2D1, OPEFB's activated charcoal equivalent to 2.5 tons/ha as PT2D2, OPEFB's activated charcoal equivalent to 3.75 tons/ha as PT2D3, OPEFB's activated charcoal equivalent to 5 tons/ha as PT2D4, and OPEFB's activated charcoal equivalent to 6.25 tons/ha as PT2D5. Each soil amendment was incubated in a plastic pot containing Inceptisol samples for 14 days, then the physical and chemical properties of the soil were analyzed of water holding capacity, pH H₂O, electrical conductivity, C-organic, N-total, C/N ratio, P-available, CEC, and K-available in the soil.

The results of research using the ANOVA (Analysis of Variance) test show that silica-enriched rice husk biochar and OPEFB's activated charcoal have a significant effect on the parameters of water holding capacity, pH H₂O, P-available, and have no significant effect on the parameters of electrical conductivity, C-organic, N-total, cation exchange capacity, and K-available. After the data was analyzed using regression, the results showed that the optimum dose that can be used for Inceptisol in Kertasari uses silica-enriched biochar to increase water holding capacity by 4.92 tonnes/ha, organic C by 5.73 tonnes/ha, and cation exchange capacity by 2.51 tonnes/ha. In comparison, OPEFB's activated charcoal increases water holding capacity by 1.7 tonnes/ha, organic C by 0.125 tonnes/ha, and cation exchange capacity by 1.05 tonnes/ha.