

**Potensial Redoks *Anthraquic Typic Epiaquepts*
pada Aplikasi *Biochar* dan Bahan Organik**

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ABSTRAK

Pengupasan *topsoil* dalam penambangan industri batu bata menyebabkan hilangnya C-Organik dalam tanah, permasalahan penggunaan tanah bekas lahan tambang batu bata yang disawahkan menyebabkan perubahan elektrokimia: penurunan Eh, perubahan pH tanah dan daya hantar listrik. Tujuan dari penelitian ini adalah mempelajari dinamika perubahan Eh, pH, dan EC dan bentuk tersedia Fe dan Mn selama proses penggenangan pada tanah sawah. Penelitian dilakukan di Desa Mayungan, Potorono, Banguntapan, Bantul, Yogyakarta pada bulan Desember 2018-Mei 2019. Bahan penelitian yang digunakan: 5.5 kg tanah dicampur dengan 35.2 g/kg tanah *biochar* tempurung kelapa, *biochar* sekam padi, dan kotoran sapi. Selama 56 hari penggenangan dilakukan pengukuran pH(H₂O) tanah:ekstrak air 1:2.5, menggunakan pH meter, potensial redoks menggunakan Eh meter, dan daya hantar listrik menggunakan EC meter pada air permukaan tanah dan tanah. Hasil penelitian menunjukkan bahwa potensial redoks air permukaan tanah -36.87 mV hingga -12.83 mV dan tanah kecuali perlakuan *biochar* tempurung kelapa dan sekam padi +6.67 mV dan +2.23 mV (oksidatif) cenderung menurun (reduktif) pada semua perlakuan. Nilai pH air permukaan tanah pH 7.21 hingga pH 7.50 dan tanah pH 6.78 hingga pH 6.97 cenderung meningkat menuju netral. Nilai EC (kategori sangat rendah) air permukaan tanah cenderung menurun 109.81 μ S/cm hingga 197.70 μ S/cm dan tanah meningkat kecuali perlakuan pupuk kandang sapi 237.67 μ S/cm. Hubungan Eh-pH menggunakan *HSC chemistry* 6.0 menunjukkan bahwa bentuk Fe dan Mn selama 56 hari Penggenangan air permukaan dan tanah adalah: Fe (OH)₃ (mengendap), Mn²⁺, Mn₃O₄, dan Mn(OH)₂.

Kata kunci: Bahan organik, *Biochar*, Eh, Tambang batu bata, dan Tanah Sawah.

Redox Potential of *Anthraquic Typic Epiaquepts* on Application Biochar and Organic Material

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ABSTRACT

The loss of topsoil in brick industry caused in the loss of C-organic in the soils, using this post mining brick industry as paddy soil it may caused in electrochemical changes: decreasing of Eh, changes in pH and electrical conductivity. The present research was to study of dynamics of changes in Eh, pH, EC and knowing available form of Fe and Mn after waterlogging. This research was conducted in Mayungan Village, Potorono, Banguntapan, Bantul, Yogyakarta in Desember 2018-May 2019. The material used in research were 5.5 kg soils mixed with 35.2 g/kg soils of coconut shell of biochar, rice husk biochar, and cow manure. During 56 days of waterlogging soil and water were carried out pH(H₂O) of the soil:water extract of 1: 2.5, using pH meter, redox potential using Eh meter, and electrical conductivity using EC meter. The results showed that values of redox potential on surface water were -36.87 mV to -12.83 mV and soil (except treatment with coconut shell biochar and rice husk +6.67 mV and +2.23 mV (oxidative) tend to decreased (reductive) in all treatments. The pH value of surface water pH 7.21 to pH 7.50 and soil pH 6.78 to pH 6.97 tend to increase toward neutral range. And EC values were (non saline) of surface water tend to increased 109.81 $\mu\text{S}/\text{cm}$ to 197.70 $\mu\text{S}/\text{cm}$ and in soil were increased to all treatments except with cow manure 237.67 $\mu\text{S}/\text{cm}$. Plotting the model of the Eh-pH relationship using HSC chemistry 6.0 resulted that the available form of iron and manganese ions for 56 days of waterlogging were as follows: Fe (OH)₃, Mn²⁺, Mn₃O₄, and Mn (OH)₂.

Keywords: Biochar, Brick Industry, Eh, Organic material, and Paddy soils.