

RINGKASAN

Padi (*Oryza sativa* L.) merupakan komoditas pangan utama di Indonesia dan menjadi sumber karbohidrat pokok bagi sebagian besar masyarakat. Permintaan beras terus meningkat seiring pertumbuhan penduduk. Namun, secara nasional, produksi padi mengalami penurunan. Kecamatan Karangmoncol, Kabupaten Purbalingga, merupakan wilayah pertanian potensial di DAS Serayu Tengah, dengan luas sawah sekitar 1.430,70 ha, di mana 60% di antaranya merupakan sawah irigasi. Unsur hara sulfur dan C-organik tanah merupakan komponen penting dalam menjaga kesuburan tanah dan mendukung pertumbuhan padi. Di wilayah Kecamatan Karangmoncol, informasi mengenai sebaran unsur sulfur dan C-organik tanah dan hubungannya dengan hasil tanaman padi masih terbatas, sehingga penelitian ini perlu dilakukan untuk mendukung pengelolaan kesuburan tanah secara tepat dan berkelanjutan. Penelitian ini bertujuan untuk: (1) mengetahui sebaran status unsur hara sulfur dan C-organik di lahan sawah DAS Serayu Tengah, Kecamatan Karangmoncol, (2) menganalisis hubungan antara status sulfur dan C-organik tanah terhadap hasil tanaman padi, dan (3) memberikan rekomendasi pemupukan sulfur dan bahan organik berdasarkan status kesuburan tanah.

Penelitian ini dilakukan dengan melalui pendekatan lapangan dan laboratorium. Metode yang digunakan adalah metode survei dengan teknik *purposive random sampling* pada 15 titik sampel. Sampel tanah diambil pada kedalaman 0–25 cm dan 25–50 cm, kemudian dianalisis sifat kimianya, terutama kandungan sulfur-tersedia dan C-organik yang dilaksanakan di lahan sawah pertanaman padi di wilayah DAS Serayu Tengah Kecamatan Karangmoncol, Kabupaten Purbalingga. Analisis tanah dilakukan di laboratorium Tanah/Sumberdaya lahan Fakultas Pertanian, Universitas Jenderal Soedirman, Purwokerto. Variabel yang diamati yaitu pH H₂O, pH KCL, DHL (Daya Hantar Listrik), potensial redoks, Sulfur-tersedia, C-organik, Na-dd, Kejenuhan Basa, dan Hasil tanaman padi.

Berdasarkan hasil penelitian, kandungan sulfur tersedia pada tanah sawah di Kecamatan Karangmoncol berkisar antara 312,8 ppm hingga 852,6 ppm, yang seluruhnya tergolong dalam kategori sangat tinggi. Sementara itu, kandungan karbon organik (C-organik) tanah berada pada kisaran 1,91% hingga 2,86%, yang diklasifikasikan dalam kategori sedang. Analisis korelasi menunjukkan bahwa terdapat hubungan positif yang signifikan secara statistik antara kandungan sulfur tersedia dan hasil tanaman padi yaitu sebesar $r = 0,014$ dan $R^2 = 0,0763$, yang mengindikasikan bahwa ketersediaan sulfur merupakan faktor pembatas penting terhadap produktivitas tanaman padi di wilayah penelitian. Sebaliknya, meskipun hubungan antara kadar C-organik dengan hasil tanaman padi menunjukkan korelasi positif, hubungan tersebut belum signifikan secara statistik yaitu sebesar $r = 0,214$ dan $R^2 = 0,0805$. Berdasarkan temuan tersebut, disusun rekomendasi pemupukan spesifik lokasi yang memperhatikan kebutuhan unsur hara dan status kesuburan tanah, dengan anjuran penambahan pupuk organik yaitu kompos dan jerami sebanyak 4,67 ton/ha dan 3,11 ton/ha untuk meningkatkan kadar C-organik serta mendukung perbaikan kesuburan tanah di Kecamatan Karangmoncol.

SUMMARY

Rice (*Oryza sativa* L.) is a major food commodity in Indonesia and a staple carbohydrate source for most people. Demand for rice continues to increase along with population growth. However, nationally, rice production has decreased. Karangmoncol District, Purbalingga Regency, is a potential agricultural area in the Central Serayu Watershed, with a rice field area of approximately 1,430.70 ha, of which 60% are irrigated. Sulfur and soil organic matter are important components in maintaining soil fertility and supporting rice growth. In Karangmoncol District, information on the distribution of soil sulfur and organic matter and their relationship to rice yields is still limited, so this study is necessary to support proper and sustainable soil fertility management. This study aims to: (1) determine the distribution of sulfur and organic matter status in rice fields in the Central Serayu Watershed, Karangmoncol District, (2) analyze the relationship between soil sulfur and organic matter status and rice yields, and (3) provide recommendations for sulfur and organic fertilizer application based on soil fertility status.

This research was conducted through field and laboratory approaches. The method used was a survey method with purposive random sampling technique at 15 sample points. Soil samples were taken at a depth of 0–25 cm and 25–50 cm, then analyzed for their chemical properties, especially the content of available sulfur and organic C carried out in rice paddy fields in the Central Serayu Watershed area, Karangmoncol District, Purbalingga Regency. Soil analysis was carried out in the Soil/Land Resources laboratory of the Faculty of Agriculture, Jenderal Soedirman University, Purwokerto. The variables observed were pH H₂O, pH KCL, DHL (Electrical Conductivity), redox potential, available sulfur, organic C, Na-dd, Base Saturation, and rice crop yield.

Based on the research results, the available sulfur content in rice paddy soil in Karangmoncol District ranges from 312.8 ppm to 852.6 ppm, all of which are classified as very high. Meanwhile, the organic carbon (C-organic) content of the soil is in the range of 1.91% to 2.86%, which is classified as medium. Correlation analysis shows that there is a statistically significant positive relationship between the available sulfur content and rice yield, namely $r = 0.014$ and $R^2 = 0.0763$, which indicates that sulfur availability is an important inhibiting factor for rice productivity in the study area. Conversely, although the relationship between C-organic content and rice yield shows a positive correlation, the relationship is not statistically significant, namely $r = 0.214$ and $R^2 = 0.0805$. Based on these findings, site-specific fertilization recommendations were compiled that take into account nutrient requirements and soil fertility status, with recommendations for the addition of organic fertilizers, namely compost and straw, amounting to 4.67 tons/ha and 3.11 tons/ha to increase organic C levels and support soil fertility improvements in Karangmoncol District.