



RICE PRODUCTIVITY AND GREEN HOUSE GASSES EMISSION ON RAINFED RICE AS AFFECTED BY CONTROLLED RELEASE FERTILIZER AND BIOCHAR APPLICATION

GAGAD RESTU PRATIWI, Dr. Ir Eko Hanudin, MS.; Dr. Ir. Benito Heru Purwanto, MP. M.Agr.Sc.; Dr. Keiichi Hayash
Universitas Gadjah Mada, 2021 | Diunduh dari <http://etd.repository.ugm.ac.id/>

RICE PRODUCTIVITY AND GREEN HOUSE GASSES EMISSION ON RAINFED RICE AS AFFECTED BY CONTROLLED RELEASE FERTILIZER AND BIOCHAR APPLICATION

Gagad Restu Pratiwi
15/389875/SPN/00572

Agriculture Science Program, Soil Science, Agriculture Faculty

ABSTRAK

Peningkatan kesuburan tanah dan pengurangan emisi gas rumah kaca adalah beberapa bidang utama untuk produksi padi tadah hujan di Indonesia. Penelitian ini dirancang untuk mengevaluasi pengaruh kombinasi pupuk lepas terkendali (CRF) dan biochar sekam padi (RHB) melalui dua sistem tanam, gogo rancah dan walik jerami. Percobaan lapangan di stasiun dilakukan di Jakenan, Jawa Tengah, Indonesia menggunakan rancangan acak kelompok lengkap dengan tiga ulangan dan ukuran plot 5m x 6m. Pembinaan tanaman dilakukan melalui penyemaian langsung untuk gogo rancah dan pindah tanam untuk walik jerami. RHB diterapkan pada tingkat 0, 5, 10 t.ha⁻¹, dan CRF Urea (kandungan N 42%) diterapkan pada tingkat 0; 142,5; 285 kg ha⁻¹. Dosis anjuran nasional NPK diberikan berturut-turut 266 kg ha⁻¹, 125 kg ha⁻¹ dan 100 kg ha⁻¹ dalam bentuk urea (46% N), SP36 (36% P₂O₅), KCl (60% K₂O). sebagai kontrol. Aplikasi CRF 250 kg.ha⁻¹ meningkatkan beberapa sifat agronomi yaitu kehijauan daun, jumlah anakan, serapan hara, komponen hasil dan hasil dari kedua sistem padi tadah hujan yang diuji jika dibandingkan dengan dosis rekomendasi urea konvensional (F1). Sedangkan penurunan dosis CRF dari 250 menjadi 125 kg.ha⁻¹ disebabkan oleh kesamaan tingkat kehijauan daun, jumlah anakan, serapan hara, komponen hasil dan hasil dari kedua sistem padi tadah hujan yang diuji jika dibandingkan dengan F1. Dosis N mampu turun hingga 50% dari F1 bila digunakan CRF, tanpa efek negatif terhadap komponen pertumbuhan, hasil, dan hasil dari kedua sistem padi tadah hujan yang diuji. Hasil penelitian juga menunjukkan bahwa perlakuan RHB 5-10 ton.ha⁻¹ dapat meningkatkan SOC pada tanah dengan C organik rendah, namun masih belum menurunkan metana dan Nitrous oxide pada kedua sistem sawah tadah hujan yang diuji.

Kata kunci : biochar sekam padi, pupuk Nitrogen lambat lepas, sawah tadah hujan, emisi gas rumah kaca

ABSTRACT

Improvement of soil fertility and reduction of greenhouse gas emission are some of the key areas for rainfed rice production in Indonesia. This study was designed to evaluate the combined effect of controlled release fertilizer (CRF) and rice husk biochar (RHB) through two planting system, gogo rancah and walik jerami. An on-station field experiment was conducted in Jakenan, Central Java, Indonesia using randomized complete block design with three replications and plot size of 5m x 6m. Crop establishment was done through direct seeding for gogo ranacah and transplanting for walik jerami. RHB was applied at a rate of 0, 5, 10 t.ha⁻¹, and CRF Urea (42% N content) was applied at a rate of 0; 142.5; 285 kg ha⁻¹. National recommended dosage of NPK was applied 266 kg ha⁻¹, 125 kg ha⁻¹ and 100 kg ha⁻¹ in a form of urea (46% N), SP36 (36% P₂O₅), KCl (60% K₂O), respectively as a control. The application of 250 kg.ha⁻¹ CRF was increased some agronomy traits i.e. leaf greenness, tiller number, nutrients uptake, yield components and yield of both rainfed rice systems tested if compared to recommendation dosage of conventional urea (F1). Meanwhile, reduction of CRF dosages from 250 to 125 kg.ha⁻¹ were caused similar levels of leaf greenness, tiller number, nutrients uptake, yield components and yield of both rainfed rice systems tested if compared to F1. The N dosage was able to decrease upto 50% from F1 when used CRF, without negative effects on growth, yield, and yield components of both rainfed rice systems tested. The results also indicated that 5 - 10 ton.ha⁻¹ of RHB treatments could be increased SOC in soil with low organic C, but still had not decreased methane and Nitrous oxide in both rainfed rice systems tested.

Keyword : rice-husk biochar, Nitrogen controlled release fertilizer, rainfed rice, green house gases emission