AKTIVITAS MIKROORGANISME TANAH DAN PRODUKSI TANAMAN GANDUM (*Triticum aestivum* L) PADA INCEPTISOL YANG DIPERLAKUKAN DENGAN KOMPOS JERAMI PADI PLUS TITHONIA DAN PUPUK BUATAN

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PADANG

2017

AKTIVITAS MIKROORGANISME TANAH DAN PRODUKSI TANAMAN GANDUM (*Triticum Aestivum*. L) PADA INCEPTISOL YANG DIPERLAKUKAN DENGAN KOMPOS JERAMI PADI PLUS TITHONIA DAN PUPUK BUATAN

ABSTRAK

Penelitian ini dilakukan di Alahan Panjang, Kabupaten Solok, Provinsi Sumatra Barat, mulai Mei 2015 hingga Januari 2016. Analisis tanah dan tanaman dilakukan di Laboratorium Kimia dan Biologi Tanah Fakultas Pertanian Universitas Andalas Padang. Penelitian ini bertujuan untuk mempelajari peningkatan aktivitas mikroorganisme tanah yang diperlakukan dengan pemberian kombinasi kompos jerami padi plus titonia dan pupuk buatan yang berperan dalam penyediaan unsur hara yang membantu dalam pertumbuhan tanaman dan produksi gandum. Rancangan yang digunakan adalah Rancangan Acak Kelompok (RAK) yang terdiri dari 6 perlakuan dan 3 ulangan. Perlakuan yang diberikan terdiri dari A : Pupuk buatan 1 rekomendasi, B : 7,5 ton/ha kompos, C : 7,5 ton/ha kompos + pupuk buatan 0,25 rekomendasi, D : 7,5 ton/ha kompos + pupuk buatan 0,50 rekomendasi, E : 7,5 ton/ha + pupuk buatan 0,75 rekomendasi, F : 7,5 ton/ha + pupuk buatan 1 rekomendasi. Pengamatan sifat kimia tanah (pH H_2O (1:2) dan pH KCl (1:2), Al-$_{dd}$, P-tersedia, C-Org, N-Total dilakukan pada awal sebelum diperlakukan dan setelah inkubasi kapur dan pengamatan biologis tanah (biomassa C mikroorganisme tanah, total populasi bakteri dan jamur tanah, respirasi CO_2 mikroorganisme tanah, total populasi bakteri pelarut fospat, total populasi bakteri pemfiksasi nitrogen, dan produksi fitohormon IAA) selama pertumbuhan tanaman. Pengamatan terhadap tanaman meliputi tinggi tanaman, jumlah anakan total (JAT), angkutan hara tanaman (N, P, dan K), bobot kering gabah (BKG), bobot kering jerami (BKJ), serta bobot 1000 biji. Data tanah dianalisis berdasarkan tabel kriteria dan ada yang diolah secara statistik dengan uji F, jika berbeda nyata dilanjutkan dengan uji DNMRT taraf 5%. Hasil penelitian menunjukkan bahwa penambahan 7,5 ton/ha kompos meningkatkan biomassa C mikroorganisme tanah, total populasi bakteri dan jamur tanah, serta respirasi tanah, total populasi bakteri pelarut fospat, total populasi pemfiksasi nitrogen, dan pengujian produksi fitohormon IAA. Kombinasi kompos 7,5 ton/ha dengan pupuk buatan 0,25 rekomendasi merupakan kombinasi yang terbaik untuk mendapatkan nilai terbaik bagi populasi dan aktivitas mikroorganisme tanah. Namun demikian perlakuan 7,5 ton/ha kompos + pupuk buatan 0,75 rekomendasi merupakan kombinasi pupuk yang optimum bagi pertumbuhan dan hasil tanaman gandum yang ditunjukkan oleh rata-rata tinggi tanaman, jumlah anakan total, angkutan hara (N, P, dan K), bobot kering gabah, bobot kering jerami, dan bobot 1000 biji.

Kata kunci : kompos, pupuk buatan, aktivitas mikroorganisme, tanaman gandum

SOIL MICROORGANISM ACTIVITIES AND WHEAT PLANT PRODUCTION (*Triticum Aestivum*. L) IN INCEPTICOLS THAT AFFECTED BY PADDY STRAW COMPOST PLUS TITHONIA AND SYNTHETIC FERTILIZER

ABSTRACT

This research was conducted in Alahan Panjang, Solok regency, West Sumatra province, from May 2015 to January 2016. Analysis of soil and plants were conducted at the Laboratory of soil Chemistry and Department of Soil Sciences Faculty of Agriculture, University of Andalas Padang. This research aimed to study the increased activity of soil microorganisms that were treated with a combination of rice straw compost of Tithonia and inorganic fertilizers to provide plant nutrients for improving plant growth and grain production. The research design used was a randomized block design (RDB) consists of 6 treatments and three replications. They are: A; 1 recommendation artificial fertilizers, B; 7.5 tons / ha of compost, C; 7.5 ton / ha of compost + fertilizers artificial 0.25 recommendation, D; 7.5 ton / ha of compost + fertilizers artificial 0,50 recommendation, E; 7.5 ton / ha of compost + fertilizers artificial 0.75 recommendation, F; 7.5 ton / ha of compost + artificial fertilizers 1 recommendation. We analyzed soil chemical properties such as (pH H_2O (1: 2) and pH KCl (1: 2), exchangeable aluminium, available-phospor, organic-carbon, total-nitrogen before and after treatment and incubation with lime and biological observations of biomass carbon soil microorganisms, the total population of bacteria and soil fungi, respiration CO_2 soil microorganisms, total bacterial population solvents phosphate, nitrogen fixation bacteria, and the production of phytohormones indole acetic acid (IAA) during plant growth. the observation of plant height, number of tillers total (JAT), transport of plant nutrients (N, P, and K), dry weight of grain (BKG), dry weight of straw (BKJ), as well as the weight of 1000 seeds. Data were analyzed based on the table of criteria and statistically analyzed with F test wise level of 5% DNMRT test. Results showed that the addition of 7.5 tonns / ha of compost increased soil microorganism biomass C, total population of soil bacteria and fungi, as well as soil respiration, solvent phosphatase total bacterial population, nitrogen fixation bacteria, and production testing phytohormones IAA. The combination of compost 7.5 ton/ha with 0.25 fertilizers recommendation was the best combination to increase population and activity of soil microorganisms. However, treatment with 7.5 ton/ha compost + 0.75 fertilizers recommendation was the optimum combination for the growth and yield of wheat shown by the average plant height, number of total tillers, transports nutrients (N, P, and K), dry weight of grain, straw dry weight, and the weight of 1000 seeds.

Keywords: compost, fertilizers, soil microorganisms activities, wheat plants