ISSN : 1410 - 08431

GUNA WIDYA SEWAKA NAGARA

GEMA AGRO

JURNAL PERTANIAN VOL. XVI No. 36 | MARET2016

FAKULTAS PERTANIAN
UNIVERSITAS WARMADEWA

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Pengantar Redaksi

Penerbitan jurnal ilmiah di suatu lembaga Perguruan Tinggi merupakan suatu tuntutan akademis yang tak bisa dihindarkan lagi. Sebagaimana diketahui bahwa pendidikan tinggi menyandang tiga tugas utama yaitu: *pertama,* tugas pengembangan bidang pendidikan dan pengajaran; *kedua,* melaksanakan tugas pengabdian ke masyarakat; dan ketiga tugas melakukan penelitian.

Dosen sebagai Sivitas Akademika merupakan sumber daya yang dituntut untuk memiliki kemampuan yang lebih dari masyarakat biasa karena kapasitasnya yang lebih intens berinteraksi dengan ilmu pengetahuan. Hal tersebut sudah sepatutnya mampu mengaktualisasikan kompetensinya bukan sekedar kegiatan penelitian, tetapi mampu untuk menulis hasil penelitian tersebut dalam media publikasi seperti : **Jurnal Ilmiah Gema Agro.**

Pada penerbitan Jurnal GAMA AGRO Volume XVI Nomor 36 Maret, Tahun 2016. Kami menyajikan artikel-artikel menarik seperti : Bioremediasi Tanah Tercemar Logam Berat Timbal (Pb) Menggunakan Tanaman Hias Dikombinasi Dengan Kompos, Respon Pertumbuhan Dan Hasil Jamur Tiram (*Pleurotus Sp*) Terhadap Media Tumbuh Dan Dosis Pupuk Phonska, Biochar And Compost Effect On The Growth And Yield Of Sweet Corn, Aplikasi Pupuk Organik Cair (Biourine) Pada Tanaman Pakcoy*(Brassica Rapa L.),* Peningkatan Kualitas Dan Keamanan Pangan Tradisional Pedetan Di Kabupaten Jembrana, Pengaruh Beberapa Bahan Baku Pupuk Organik Cair Dan Konsentrasi Terhadap Pertumbuhan Dan Hasil Tanaman Sayur Hijau *(Brasica Junceae* L), Kenyamanan Kandang Dan Produksi Karkas Ayam Broiler Dengan Kecepatan Kipas Angin Yang Berbeda, Respon Tanaman Kacang Merah Varietas Kelinci Pada Jarak Tanam Dan Dosis Pupuk Agrodyke, Karakteristik Mikrobiologis Dan Biokimiawi Selama Fermentasi Kecap Ikan Lemuru (*Sardinella Longiceps*), Motivasi Peternak Dalam Menghasilkan Dan Memasarkan Pedet Sapi Bali, Manajemen Dan Produktivitas Sapi Bali Induk Kelompok Simantri Di Bali Pada Topografi Berbeda, Pengaruh Pemberian Pupuk Biourin Dengan Dosis Yang Berbeda Terhadap Pertumbuhan Kacang Pinto (*Arachis Pintoi)*, Serta artikel artikel lainnya yang tidak kalah menariknya. Semua artikel yang dimuat pada Jurnal GEMA AGRO ini telah ditelaah dan diseleksi oleh Penyunting ahli yang kompeten.

Melalui tulisan-tulisan yang dipublikasikan dalam jurnal ilmiah Gema Agro, diharapkan Fakultas Pertanian Universitas Warmadewa dapat memberikan sumbangsih pemikiran sebagai hasil kajian keilmuannya ke tengah masyaarakat, Yang pada akhirnya dapat berkontribusi positif bagi permasalahan dan kesejahteraan bangsa, sekaligus merupakan media informasi keberadaan Fakultas Pertanian itu sendiri di tengah-tengah dunia perguruan tinggi lainnya.

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BIOCHAR AND COMPOST EFFECT ON THE GROWTH AND YIELD OF SWEET CORN

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ABSTRAK

This study aims to determine the effect of treatment doses of biochar and compost on the growth and yield of sweet corn. The experiment was conducted using a randomized block design with nested experiment, where factor nested dose for each type of fertilizer. Factors treatment consists of two types of fertilizers that biochar and compost with 3 levels dose and a control for comparison. The composition of the treatment is: without treatment doses of biochar 5 tonnes / ha, biochar dose of 10 tonnes / ha, compost dose of 7.5 tons / ha and a dose of compost 15 tons / ha. The results showed that the weight of the economic results of the corn crop is the highest cobs wet weight was obtained at doses of biochar 5 tonnes / ha of 338.33 g, an increase of 23.44% when compared to the untreated 274.17 g. Cob wet weight of compost obtained at doses of 7.5 tonnes / ha of 336.67 g increased by 22.80% when compared to the untreated 274.17 g.

Keywords— biochar, compost, sweet corn

I. INTRODUCTION

Biochar is a carbon-rich material derived from biomass such as wood and waste products of processing plants that are heated in a container with little or no air [5]. Biochar has been known to increase the quality of the soil and used as an alternative to land pembenah [4]. Provision of biochar to the soil has the potential to increase the levels of C-soil, water and nutrient retention in the soil and increase crop yields of corn.

All organic matter added to the soil significantly increased range of functions is no exception soil retention variety of nutrients essential for plant growth [6]. Biochar is more effective to restrain nutrient availability to plants than other organic materials.

In Indonesia the potential use of organic materials such as biochar derived from the incomplete combustion of crop residues and compost derived from animal manure is quite large, but the organic material is not fully utilized as a soil fertilizer. Biochar is useful as an important tool for improving food security and diversity of plants in regions with poor soil nutrients, organic material shortages, and lack of water and nutrients. Biochar also improve water quality and quantity, and increase the ability of soil to provide nutrients for plants [3]. Provision of biochar to soil can improve the availability of potassium, phosphorus, total N, soil cation exchange capacity (CEC), and crops and can reduce the risk of leaching of nutrients, especially potassium and nitrogen [2].

Biochar as organic materials that are difficult to decompose (recalcitrant) is one alternative to accelerate the improvement of the quality of soil in the drylands, particularly the physical properties of soil. With the increasing quality of the physical properties of the soil will affect the increase of living microorganisms in the soil and the change in the chemical properties provide the nutrients needed for plant crop production can be improved. Recalcitrant nature of biochar in the soil can provide beneficial effects during the growing season in some of the land, therefore do not need to biochar was applied to each planting season as the application of manure, compost and fertilizers. Biochar can be given in stages depending on the target application rate, availability of backup biochar and soil management systems. Beneficial effects of the application of biochar to the soil will increase over time, and this needs to be considered when dividing the application all the time [1].

The influence of biochar on crop productivity depends on the amount of use. Research has shown that administration of 4-8 tons of biochar per hectare increase crop productivity by 20-220%, depending on the commodity cultivated [4].

Biochar treated soil 10 tonnes / ha can raise soil pH of 6.78 becomes 7.40, up 9.14% [7]. Results of research in polybags showed that biochar utilization of waste bamboo dose of 10 tonnes / ha significant effect on plant height and wet weight total corn crop

[8]

This study aims to determine the effect of treatment doses of biochar and compost on the growth and yield of sweet corn. The hypothesis is by administering various doses of biochar and compost level will be obtained the highest results.

II. METHODS

Thisresearchwasconductedattheexperimental field of the Faculty of Agriculture, University of Udayana, Denpasar Bali. The experiments carried out from June to September 2014. The material used is sweet corn seed varieties Bonanza F1, biochar made from bamboo processed waste pyrolysis and compost "Simantri" made from raw cow dung.

The experiment was conducted using a randomized block design with nested test patterns (nested experiment), which nested dose factors for each type of fertilizer. Factors treatment consists of two types of fertilizers that biochar and compost with 3 levels dose and a control (no treatment) as a comparison. The composition of the treatment is: without treatment (D0), doses of biochar 5 tonnes / ha, biochar dose of 10 tonnes / ha, compost dose of 7.5 tons / ha and a dose of compost 15 tons / ha. Thus there are 4 treatment with 1 control, in order to obtain 5 treatments in each replication. Each treatment was repeated 3 times so that the required 15 units of the experiment.

Parameters measured were plant height, number of leaves, wet weight of cob, stover wet weight, dry weight oven stover The collected data were analyzed by analysis of variance followed by test least significant difference (LSD).

III. RESULTS AND DISCUSSION

Significant effect of treatment type and dose of fertilizer to the observed variables are presented in Table 1. According to Table 1 it can be seen that the treatment of the type of fertilizer showed no real effect (P≥0,05) of all observed variables. Treatment between biochar doses significantly (P <0.05) to very significant (P <0.01) for all the variables observed except for the number of leaves that do not affect the real (P≥0,05). Compost dose treatment significantly (P <0.05) on plant height, wet weight of cob, and wet weight stover but did not significantly affect the number of leaves and dry weight oven stover

TABLE 1 SIGNIFICANCE AND INFLUENCE OF FERTILIZER DOSE OF VARIABLE OBSERVABLE

Variabel	Treatment		
	Type of Fertilizer	Dose Biochar	Dose Compost
1. Plant height (cm)	ns	*	*
2. Leaves number (helai)	ns	ns	ns
3. Cob Wet Weight (g)	ns	*	*
4. Weight wet stover (g)	ns	**	*
5. Oven dry weight of stover (g)	ns	*	ns

A. High Crop

Results of analysis of variance Table 1 shows that between fertilizer treatment had no significant effect on plant height, but the treatment dose and dose biochar compost significant effect on plant height. The average height of the plants for treatment of type and dose of fertilizer can be seen in Table 2.

Table 2 shows that the maximum plant height biochar obtained at a dose of 10 tonnes / ha as high as 256.33 cm were not significant doses of biochar 5 tonnes / ha 254.50 cm, but significantly different from the untreated 236.42 cm. Compost dosage of 7.5 tonnes / ha gave maximum plant height 254.33 cm were not significant to the treatment of 15 tons / ha 247.75 cm, but significantly different from the untreated 236.42 cm.

TABEL 2 AVERAGE OF VARIABEL ALL FOR TREATMENT AND DOSE OF FERTILIZER

Treatment	Plant Height (cm)	Leaves Number (Strand)	Weight of Wet Cobs (g)	Weight Wet Stover (g)	Dry Oven weight of Stover (g)
Type fertilizer					
Biochar	249,08 a	13,72 a	307,14 a	1379,44 a	284,79 a
Compost	246,17 a	13,92 a	317,64 a	1298,33 a	263,28 a
LSD 5%	-	-	-	-	-
Dose Biochar					
0 ton/ha	236,42 b	13,50 a	274,17 b	1200,00 b	229,63 b
5 ton/ha	254,50 a	14,17 a	338,33 a	1580,00 a	339,00 a
10 ton/ha	256,33 a	13,50 a	308,92 ab	1358,33 a	285,73 ab
Dose Compost					
0 ton/ha	236,42 b	13,50 a	274,17 b	1200,00 b	229,63 a
7,5 ton/ha	254,33 a	14,25 a	336,67 a	1295,00 ab	259,30 a
15 ton/ha	247,75 ab	14,00 a	342,08 a	1400,00 a	300,90 a
LSD 5%	13,94	0,90	43,33	143,54	80,28
KK (%)	4,50	2,57	2,13	2,57	2,13

Description: The same letter behind the average value in the same column, showed no significant difference in the level of LSD 5%

B. *Leaves Number*

Results of analysis of variance showed that the treatment between the type and dose of fertilizer did not significantly affect the number of leaves of plants (Table 1). The average number of leaves of the plant because of treatment type and dose of fertilizer can be seen in Table 2. Table 2 shows that the maximum amount of plant leaves biochar obtained at a dose of 5 tonnes / ha as high as 14.17 strands were not significant doses of biochar 10 ton / ha and without treatment each with a value of 13.50 strands. Compost dosage of 7.5 tonnes / ha gave maximum plant leaf number of different strands 14.25 unreal to the treatment of 15 tons / ha 14.00 untreated strands and strands 13.50.

C. *The Weight of Wet Cobs*

The results of analysis of variance showed that the treatment between the types of fertilizers did not significantly affect the cob wet weight, but treatment doses of biochar and compost significantly affect the cob wet weight (Table 1). The average weight of wet cobs for treatment type and dose of fertilizer can be seen in Table 2. Table 3 shows that the highest weight of wet cobs biochar obtained at a dose of 5 tonnes / ha as high as 338.33 g were not significant doses of biochar 10 ton / ha 308.92 g, but significantly different from the untreated 274.17 g. Dosage of compost 15 tons / ha gave the highest wet weight of 342.08 g cobs are not significant to the treatment of 7.5 ton / ha of 336.67 g, but significantly different from the untreated weight of 274.17 g.

d. *Wet stover weight*

The variance analysis results showed that among the types of fertilizers did not significantly affect stover plant wet weight, but the treatment dose was highly significant biochar and compost doses significantly affect stover wet weight (Table 1). The average weight of the wet stover for treatment type and dose of fertilizer can be seen in Table 2. Table 2 shows that the highest wet weight stover biochar obtained at a dose of 5 tons / ha by 1580.00 g were not significant doses of biochar 10 ton / ha 1358.33 g, but significantly different from the untreated 1200.00 g. Dosage of compost 15 tons / ha gave the highest stover wet weight of 1400.00 g are not significant to the treatment of 7.5 tons / ha by 1295.00 g, but significantly different from the untreated weight of 1200.00 g.

e. *Oven Dry Weight Stover*

The variance analysis results showed that among types of fertilizer and compost dose did not significantly affect stover oven dry weight of the plant, but the dosage of biochar significantly affected stover oven dry weight (Table 1). The average dry weight oven stover for treatment type and dose of fertilizer can be seen in Table 2. Table 2 shows that the highest stover oven dry weight was obtained at doses of biochar 5 tonnes / ha of 339.00 g were not significant doses of biochar 10 ton / ha of 285.73 g, but significantly different from the untreated 229.63 g. Dosage of compost 15 tons / ha gave the highest stover oven dry weight of 300.90 g which is not significant to the treatment of 7.5 ton / ha of 259.30 g, but significantly different from the untreated weight of 229.63 g.

F. *Effect of Biochar on Sweet Corn Crop*

Wet weight is the weight of economic output cob corn crop, of the results showed that the highest weight of wet cobs biochar obtained at a dose of 5 tonnes / ha of 338.33 g, an increase of 23.44% when compared to the untreated 274.17 g (Table 2 and Figure 1).

The high weight of wet cobs at doses of biochar 5 tonnes / ha allegedly caused biochar as organic materials that are difficult to decompose will last a long time in the ground and able to improve the physical properties of the soil in the long term so that the soil fertility can be maintained. Soil fertility can be improved by biochar that soil porosity, water holding capacity, CEC, C-organic, nutrients and microbial activity in the soil

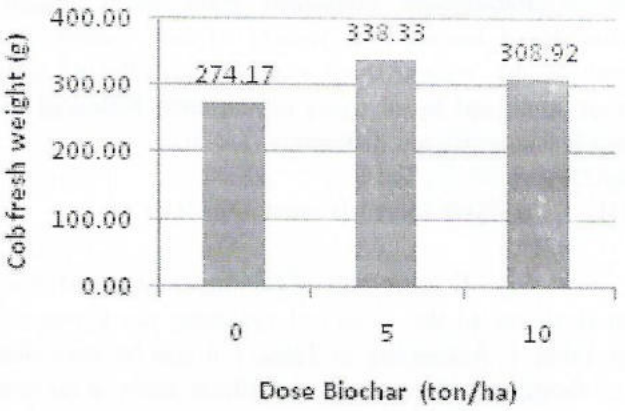

Fig 1. Relationship dosing biochar to average cob wet weight

F. *Effect of Compost on Sweet Corn Crop*

Based LSD Table 2 it can be seen that the treatment doses of 7.5 and 15 tonnes / ha were not significantly different on the cob wet weight, while the lowest value obtained in the control (no treatment).

The results showed that the weight of the wet cob compost obtained at doses of 7.5 ton / ha of 336.67 g increased by 22.80% when compared to the untreated 274.17 g (Figure 2). The high weight of wet

cobs at doses of biochar 5 tonnes / ha of compost may be related to the condition of the media can provide fertile ground for growth due to the decomposition of organic matter which way can improve the physical, biological, and chemical soil, such as; increase soil water retention capacity of the larger, improved soil structure and porosity, as substrates for soil microorganisms, and as a source of N as well as an increase in CEC

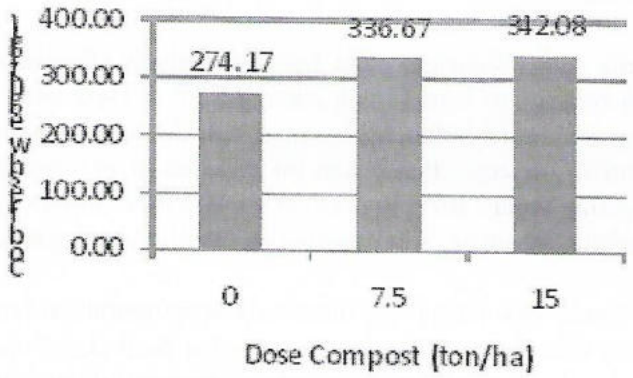

Fig 2. Relationship dosing compost to average cob wet weight

IV. CONCLUSION

Treatment fertilizer showed no real effect on all the variables observed. Inter-dose treatment biochar significantly to very significantly affected all variables observed except for the number of leaves that effect is not real. Dosage of compost significantly affected plant height, weight of wet cobs, and the wet weight stover but did not significantly affect the number of leaves and dry weight oven.

Dosage of 5-10 tonnes / ha biochar give an average value wet weight best cobs. Heavy economic output of the corn crop is the highest cobs wet weight was obtained at doses of biochar 5 tonnes / ha of 338.33 g, an increase of 23.44% when compared to the untreated 274.17 g Dosage of 7.5-15 tons / ha gave an average value wet weight best cobs. The highest wet weight cob compost obtained at a dose of 7.5 ton / ha of 336.67 g increased by 22.80% when compared to the untreated 274.17 g.

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