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Fermented Kasgot and SP 36 Fertilizer as Inputs for Purple Corn Cultivation in Ultisol Soil

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ABSTRACT

The purpose of this research was to determine the effect of fermentation kasgot and SP-36 fertilizer on purple corn in Ultisol soil. The research was carried out in the Screenhouse Food and Horticulture Corps Seed Agency, Bojong Village, Kembaran District, Banyumas Regency, from February to July 2022. The experiment used Randomized Block Design (RBD) with 2 treatments and 3 replications. The treatments were fermentation kasgot fertilizer with 3 levells, namely kasgot without fermentation, kasgot fermented with EM4, and kasgot fermented with *Trichoderma sp*.; and the second treatments were dose of SP-36 fertilizer with 3 levells, namely 50 kg/ha, 75 kg/ha, 100 kg/ha. The result showed that fermentation kasgot with EM4 increased wet crop weigth to 9,03% and wet seeds weight by corncob to 27,56%, while fermented kasgot with *Trichoderma sp.* increased dry seeds weight by corncob to 29,13%. SP-36 fertilizer effect in corncob diameter and P uptake in plant. Dose of 50 kg/ha increased corncob diameter to 6,58% and P uptake in plant to 23,03%. There was significant interaction between fermented kasgot with EM4 and SP-36 fertilizer dose by 50 kg/ha that increased dry plant weight to 36,98%.

Keywords: kasgot, fermentation, purple corn, SP-36 fertilizer

INTRODUCTION

Household trash generation continues to rise along with population growth, posing significant environmental and health risks, particularly in urban areas (Purnamasari and Khasanah 2022; Iqbal *et al.* 2021). The growing usage of unsustainable food and feed production, which generates significant volumes of organic waste, is having an impact on the environment, health, economy, and food security. As a result, an organic waste management strategy that is both cost effective and environmentally responsible is required. The use of black soldier flies (*Hermetia illucent*, BSF) as a bioconversion agent for organic waste, such as food scraps and cattle manure, to produce nutrient-rich animal feed and organic matter is becoming increasingly popular (Surendra and Kuehnle, 2019). Black soldier fly larvae, often known as maggots, may consume and grow on organic garbage because the nutrient content of organic waste meets their nutritional requirements (Widyastuti and Sardin 2021). This bioconversion technique is a novel and sustainable approach to organic waste management, producing organic elements that aid agricultural cultivation activities (Monita *et al*. 2017). BSF culture at the larval or maggot stage has the potential to quickly consume organic garbage and create waste in the form of residual media mixed with BSF larval feces, known as frass. Biomass from maggot byproducts can still be used in agriculture as an organic fertilizer known as *kasgot* (meaning former maggot) (Fauzi *et al.* 2022). Kasgot is animal feces derived from BSF larvae. Raw animal manure has not released nutrients from organic carbon bonds, allowing microorganisms to interfere with plant nitrogen uptake (Ernawati *et al*. 2018), and it is thought to still contain plant-damaging infections (Nurdin *et al*. 2023).

The effect of animal manure fermentation on plants has not been extensively studied, however fermented coffee grounds fertilizer with EM4 yields higher plant height, leaf count, wet weight, and dry weight in Brazilian spinach than non-fermented coffee grounds (Teatrawan *et al*. 2022). Fermented organic fertilizer at 10 tons/ha can minimize the use of inorganic fertilizers by 50% while providing the greatest results for soybean plants in terms of the number of effective root nodules, dry weight of roots, and weight of 100 seeds (Hidayah *et al*. 2021). According to these parameters, kasgot must be fermented with EM4 and *Trichoderma* sp. before being used as fertilizer, which is predicted to reduce the need for inorganic fertilizers. EM4 and *Trichoderma* sp. will break down organic materials and use kasgot as an energy source, making nutrients

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available to plants (Dini *et al*. 2020). The use of kasgot can help in the cultivation of a variety of agricultural goods. One of these is purple glutinous corn. Purple corn is a product that farmers can grow on dry soil, has higher nutritional value than regular corn, with 74.56% carbohydrates, 9.01% protein, 3.98% fat, 5.77% amylose, and 51.92 g anthocyanins per gram (Podesta *et al*. 2021). Purple corn is advantageous to human health and helps prevent diseases such as obesity, diabetes, cancer, and coronary heart disease. As people become more aware of its health benefits, demand for purple corn is increasing (Tumei *et al*. 2018). Corn is an adaptable crop in dry land, allowing purple corn farming to meet consumer demand on suboptimal grounds.

Ultisol soil is one of the sub-optimal options for corn cultivation, has various concerns that can limit plant growth (Kasno 2019). Soil chemistry obstacles include acidic to very acidic soil reactions (pH 3.10–5), low to very low organic C (0.13–1.12%), low total N (0.09–0.18%), low macronutrients such as P, K, CEC), and alkaline saturation (Prasetyo and Suriadikarta 2006; Syahputra *et al*. 2015; Gusnidar *et al*. 2019). The addition of organic matter to Ultisol soil can improve fertility. Atmaja *et al*. (2017) found that adding chicken manure compost at a rate of 10–15 tons/ha increased plant height, crown dry weight, root dry weight, plant P uptake, and flowering age, as well as increasing soil P-availability, pH, and decreasing Al-cec in Ultisol soil. Furthermore, SP-36 fertilization in Ultisol soil can improve phosphorus content and provide as a nutrient support for corn plant cultivation (Rangkuti *et al*. 2018).

Based on this description, it would be interesting to conduct research on the fermentation process of kasgot as an organic matter and the application of SP-36 fertilizer to the cultivation of purple corn in Ultisol soil. The purpose of this study was to examine the effect of fermeted kasgot and SP36 fertilizer interaction on the growth and yield of purple glutinous corn crops in Ultisol soil.

METHODS

Research Site

This study was a field experiment took place from February to July 2022 in the Screenhouse of the Food Crops and Horticulture Seed Center in Bojongsari Village, Kembaran District, Banyumas Regency, at an elevation of 75 m above sea level.

Experimental Design

The experiment was set up using a Group Random Design with 2 factors and triplicates. Kasgot fermentation and an SP-36 fertilizer dosage were utilized as the treatment. Fermented kasgot has three levels: (1) unfermented kasgot, (2) kasgot fermented with EM4, and (3) kasgot fermented with *Trichoderma* sp.. The SP-36 fertilizer dose was divided into 3 levels: (1) 50 kg/ha, (2) 75 kg/ha, and (3) 100 kg/ha.

Kasgot Fermentation

The kasgot utilized was the byproduct of maggot cultivation at the Rempoah Baturraden TPST in Banyumas Regency. The remaining kasgot from the organic waste was fermented with EM4 and *Trichoderma* sp. Level 1: Kasgot without fermentation, Level 2: Kasgot fermented with EM4, up to 4 kg by giving EM4 up to 16 mL and water up to 800 mL, then placed in a plastic bucket, and Level 3: Kasgot up to 4 kg fermented with *Trichoderma* sp. in the form of powder up to 80 g and water up to 320 mL. The materials were then fermented for 7 days in a closed plastic container. On the fourth day, the containers were opened to check the temperature and sprayed with 500 mL of water to maintain humidity and accelerate the decomposition process.

Purple Corn Cultivation

The screenhouse measures 5 m × 6 m; the planting distance was 20 cm × 50 cm. Ultisol soil was packed in 20 cm × 40 cm polybags. The fundamental fertilizer utilized was kasgot fertilizer fermented at a rate of 10 tons per hectare. The next fertilizers utilized were urea 300 kg/ha, KCl 100 kg/ha, and SP-36, depending on treatment provided at the ages of 14 and 42 days after planting (DAP). Plant management includes watering, weeding, intensive pest and disease control. Harvesting was done at the age of 65 DAP by picking corn and pulling plants from the ground. Next, the plants were washed, cut, and sundried for 7 days. After that, the corn kernels were peeled and oven-dried together with the plants at 70 °C for 3 days.

Observation Variables

Variables observed include plant height, number of leaves, stem diameter, plant wet weight, plant dry weight, cob length with cob, cob weight with corhusk, cob diameter with cornhusk, seed wet weight per cob, seed dry weight per cob, plant tissue uptake, and P-available of the soil. The observation data was analyzed using the Anova test, and the treatment differences were evaluated using the DMRT (Duncan's Multiple Range Test) at a 5% level.

RESULTS AND DISCUSSION

Kasgot Composition with the Addition of Various Activators

The process of decomposing organic waste into feed and BSF cultivation media yields derivative products in the form of organic matter known as kasgot (former maggot), however because the decomposition process mimics the diet and brief life cycle of insects, it is not mature. Various treatments can be used to speed up the composting process, including reversal and the addition of activators with different microorganisms. To compare the quality of the compost produced, the following is the result of the nutrient content of kasgot with the addition of activators (Table 1). Kasgot fermented with EM4 and *Trichoderma* sp. lasted 7 days. The macronutrient composition of kasgot was examined in the Land Resources Laboratory of the Faculty of Agriculture at Jenderal Soedirman University. The investigation revealed that the bacteria used for kasgot fermentation might reduce the C/N ratio, increasing nutritional availability and stabilizing pH. The level of C-organic drops due to bacteria that break down carbon bonds and convert them into other nutrients. The high concentration of kasgot is responsible for the elevated N-total. The drop in P-total is due to organic matter holding sufficient nitrogen availability that is not compensated for by phosphate availability, making it a limiting factor for bacteria in decomposing organic matter. The pH lowered, but it remains alkaline due to the high ammonia content (Walidaini *et al*. 2016).

Effective Microorganism-4 (EM-4) is a mixed inoculant of microorganisms (Lactobacillus, yeast, photosynthetic bacteria, Actynomycetes, and cellulose-degrading fungi) that can speed up the maturity of organic fertilizers during the breakdown of organic materials. EM-4 microorganisms ferment organic materials under semi-aerobic and anaerobic conditions at temperatures ranging from 40 to 50°C (Kurniawan *et al*. 2013; Kusuma *et al*. 2017). Badrus (2015) also stated that the higher the concentration of EM-4 blended in the composting process, the greater the content produced. As a result, the addition of bacteria as activators alters the nutrient content of compost.

Trichoderma works as a decomposer in the composting process, breaking down organic materials like cellulose into glucose molecules. It also has the advantage of being an environmentally friendly biofungicide (Soesanto *et al*. 2009). As a decomposer, *Trichoderma* spp. helps digest organic materials, making nutrients more available for plant growth (EPA 2000; Viterbo *et al*. 2007). This fungus can produce organic acids that lower soil pH, such as glycinic, citric, or fumaric acid, as well as solubilize phosphates, micronutrients, and mineral cations including iron, manganese, and magnesium, which are advantageous to plant metabolism (Saba *et al*. 2012).

Effect of Fermented Kasgot and SP36 Fertilizer Dose on the Growth and Yield of Corn Crops

Fermented kasgot impacts the growth of purple glutinous corn plants, specifically the plant's wet weight, although the dose of SP-36 fertilizer has no effect on plant growth (Table 2). The fermented kasgot and the application of SP-36 fertilizer had no effect on

Table 1 Kasgot composition

Soil properties	Unfermented kasgot	Fermented kasgot with EM4	Fermented kasgot with *Trichoderma* sp.
pH H_2O	8.60	8.28	7.99
C-organik (%)	12.06	8.74	8.11
N-total (%)	2.12	7.02	4.21
C/N ratio	5.69	1.24	1.93
P-total	1.87	0.77	0.76
P-available (ppm)	14.11	16.06	14.87

Remarks: Results of analysis of the nutrient composition of kasgot in various decomposition techniques (Soil and Land Resources Laboratory, Faculty of Agriculture, 2022).

Table 2 Effect of kasgot fermentation and SP-36 fertilizer on the growth of purple corn plants

Treatment	Observed variable				
	PH harvest (cm)	NL 8 WAP (g)	SD 8 WAP (mm)	Fresh wt. (g)	Dry wt. (g)
Kasgot Fermentation					
No fermentation	251.2	13.2	23.7	316.2b	73.9
Fermented with EM4	263.9	13.8	23.8	347.6a	81.9
Fermented with *Trichoderma* sp.	259.1	13.2	23.4	321.7b	73.8
F_{calc}	0.9	2.33	0.55	3.88*	1.13
F_{table}	3.63	3.63	3.63	3.63	3.63
SP-36 Fertilizer Dose (kg/ha)					
50	258.3	13.7	23.9	334.3	83.6
75	256.2	13.4	23.7	327.1	75.2
100	259.7	13.1	23.3	324.2	70.8
F_{calc}	0.07	1.63	1.15	0.37	2.2
F_{table}	3.63	3.63	3.63	3.63	3.63

Remarks: The numbers followed by the letters were significantly different in the variables and the same treatment showed a significant difference in the 5% DMRT test. PH = Plant Height, WAP = week after planting; NL = Number of Leaves, SD = Stem Diameter, FW= Fresh weight and DW= Dry wet plant height. Tomasoa (2019) found that fermented solid fertilizer containing EM4 had no influence on the height of corn plants, which averaged 162.08 cm. Cahyana *et al*. (2021) demonstrated that increasing the dose of SP-36 had a significant effect on the height of hybrid corn plants in ultisol soil at the age of 8 WAP (week after planting), with the best yield at a dose of 300 kg/ha and an average of 273 cm. Organic fertilizers have a gradual release, causing plants to absorb nutrients more slowly and inefficiently. The administration of phosphate fertilizer has a greater impact on the generative phase than the vegetative phase, hence the phosphate fertilizer dose has no significant effect on plant height (Ichsan *et al*. 2017).

The fermented kasgot and the application of SP-36 fertilizer had no effect on the number of leaves. Tomasoa (2019) found that fermented solid fertilizer containing EM4 had no significant influence on the number of corn leaves, with an average of 12.77. Cahyana *et al*. (2021) found that increasing the dose of SP-36 had no effect on the number of leaves on hybrid corn plants in Ultisol soil, with an average of 13.73 leaves. The number of leaves in corn plants is regulated by type and variety, therefore it is rather consistent, but fertilizers and the environment merely stimulate leaf growth (Oktaviani *et al*. 2020). Corn plants can produce anywhere from 8 to 48 leaves, depending on the type and variety (Nanda *et al*. 2017).

The diameter of the stem is not affected by the fermented kasgot and SP-36 fertilizer. Tomasoa (2019) reported that fermented solid fertilizer with EM4 had no significant effect on the diameter of corn stalks with an average of 15.85 cm. Cahyana *et al.* (2021) showed that an increase in the dose of SP-36 had a significant effect on the diameter of hybrid corn stalks in Ultisol soils at the age of 8 WAP with the best results at a dose of 300 kg/ha and an average of 29.6 mm. Organic fertilizers, in addition to being affected by bioactivators, are also affected by certain compost substrates that can affect the diameter of corn stalks. The diameter of the stem is not only genetically influenced but also affected by phosphate fertilizer with high doses (Cahyana *et al.* 2021).

Fermented kasgot influences the yield of purple glutinous corn crops, specifically the wet weight of seeds per cob and the fresh weight of seeds per cob, whereas the dose of SP-36 fertilizer influences the yield, specifically the diameter of the cob with the husk and the absorption of P by plant tissue (Table 3). The length of the cob with cornhusk is unaffected by the fermented kasgot or SP-36 fertilizer. Podesta *et al*. (2021) discovered that solid organic fertilizer containing EM4 had no discernible effect on the length of cobs with cornhusks. Cahyana *et al*. (2021) demonstrated that increasing the SP-36 dose had no influence on the length of cornhusks in hybrid corn grown in Ultisol soil, with an average of 22.36 cm. The length of the cob is regulated by both external factors like fertilizer application and internal elements such as heredity. Organic and phosphate fertilizers can alter seed development in plants, but genetics can also influence corn cob length (Cahyana *et al*. 2021). The fermented kasgot and SP-36 fertilizer had no effect on the weight of cobs with cornhusk. Podesta *et al*. (2021) found that solid organic fertilizer containing EM4 had little influence on cob weight with the cornhusk. Cahyana *et al*. (2021) found that increasing the dose of SP-36 had no effect on the weight of cobs with cornhusk in hybrid corn on ultisol soils, which averaged 189.41 g. Genetics and fertilization determine the weight of husk. Genetic factors have a greater impact on corn cob weight than the availability of organic or phosphate fertilizers (Cahyana *et al*. 2021).

Fermented kasgot and SP-36 fertilizer had little effect on the final soil's P availability. According to Like *et al*. (2017), *Trichoderma* fertilizer had a significant

Table 3 Effect of kasgot fermentation and SP-36 fertilizer on purple corn crop yield

Treatment	Observed variables						
	LCC (cm)	WCC (g)	DCC (mm)	FSC (g)	DWC (g)	PA (ppm)	FPA (ppm)
Kasgot fermentation							
K0	18.8	166.7	43.6	80.9b	30b	0.72	6.15
K1	18.9	179.6	44.4	111.7a	38ab	0.74	5.97
K2	18.8	172.4	44	104.4a	42.3a	0.81	6.05
F_{calc}	0.03	1.97	0.86	6.72*	4.71*	0.51	0.45
F_{table}	3.63	3.63	3.63	3.63	3.63	3.63	3.63
Dose of SP-36 fertilizer							
P1	18.9	178.2	46.2a	101	38	0.89a	5.81
P2	18.9	171.6	42.8b	99.2	36.3	0.69b	6.13
P3	18.6	169	43.1b	96.8	36	0.68b	6.23
F_{calc}	0.29	1.08	18.25*	0.12	0.14	3.67	2.63
F_{table}	3.63	3.63	3.63	3.63	3.63	3.63	3.63

Remarks: The numbers followed by the letters were significantly different in the variables and the same treatment showed a significant difference in the 5% DMRT test, K0 = no fermentation, K1 = fermented with EM4, K2 = fermented with *Trichoderma* sp., P1 = 50 kg/ha, P2 = 75 kg/ha, P3 = 100 kg/ha, LCC = Length of cob with cornhusk, WCC = Weight of cob with corhusk, DCC = Diameter of cob with cornhusk, FSC = Fresh weight of seeds per cob, DWC = dry weight of seeds per cob, PA = Absorption of P, and FPA = final P-available.

influence on P-available soil in ultisol soil, yielding 11.3 ppm whereas the control yielded only 9.3 ppm. Rangkuti *et al*. (2018) demonstrated that the application of SP-36 fertilizer had a significant influence on P-available in Ultisol soils, with the best treatment yielding 10.47 ppm at a dose of 150 kg/ha and the control yielding just 6.38 ppm. P-available soil has no visible effect because it is directly absorbed by plants, reducing P-availability in soil (Nasution *et al*. 2014). Phosphorus is a highly reactive element that is only available for plant absorption in a narrow region near neutral pH. In acidic soils, P forms low-soluble molecules with Al and Fe. As a result, even if the total amount of P in the soil is considerable, it is not always available for plant absorption. This is also why adding P fertilizer to acidic soils like Ultisol does not considerably boost phosphate availability because much of the added P is bound by Al and Fe, leaving only a small amount available for plant absorption (Fahrunsyah 2021).

Effect of Fermented Kasgot on Corn Crop Yield

Fermented kasgot affects the plant's wet weight. Fermented kasgot with EM4 significantly increased plant wet weight by 9.03% when compared to unfermented kasgot (Figure 1). Arifiati *et al*. (2017) found that fermented solid fertilizer containing EM4 had a significant influence on the fresh weight of corn plants, yielding 546.9 g and outperforming the control by 47.29%. Organic matter added by EM4 can increase nutrient availability in the metabolic process, promoting the formation of proteins, enzymes, hormones, and carbohydrates during photosynthesis, thereby increasing cell division in the formation of plant tissues, such as plant wet weight (Setiyono 2018). The fermented kasgot affects the wet weight of the seeds per cob, with the containing EM4 enhanced the fresh weight of the seeds per cob by 27.56% over unfermented kasgot (Figure 2). Fermented solid fertilizer with EM4 significantly increased the fresh weight of mung bean seeds by 239.58% compared to the control. Organic fertilizers containing EM4 can

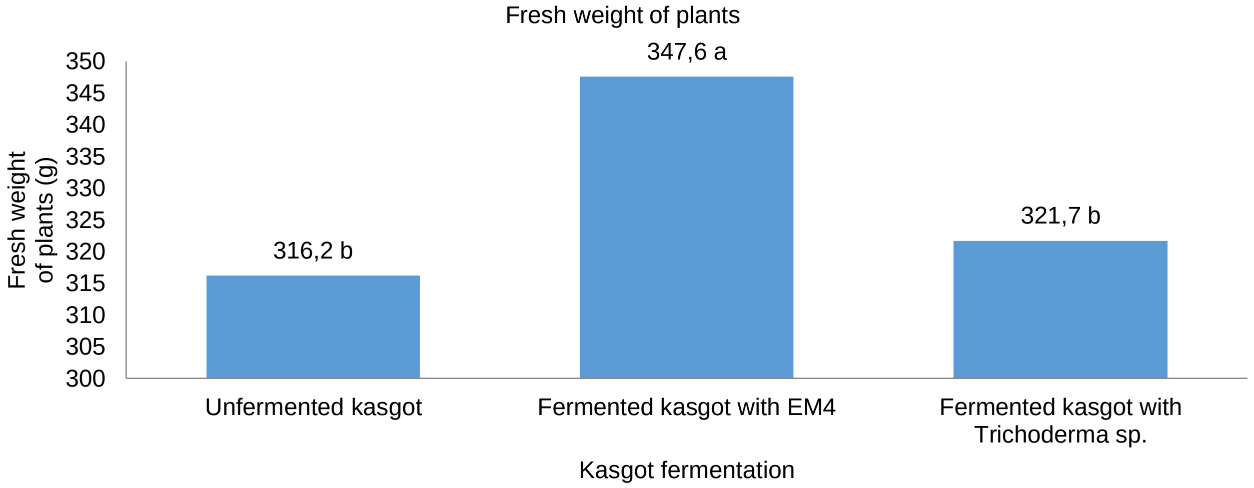

Figure 1 Effect of kasgot fermentation on the fresh weight of plants.

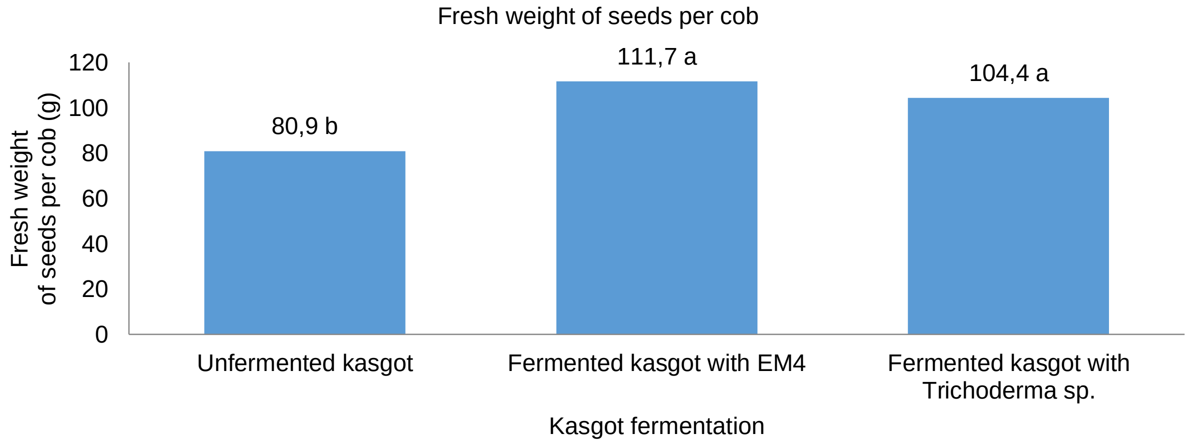

Figure 2 Effect of kasgot fermentation on the wet weight of seeds per cob.

boost the availability of nutrients such as phosphorus, causing nutrient absorption rates to achieve their maximum and influencing seed wet weight (Zuhrufah *et al*. 2015).

Fermented kasgot affects the dry weight of the seeds per cob. Adding *Trichoderma* sp. increased the dry weight of seeds per cob by 29.13% over unfermented kasgot (Figure 3). Yeri *et al*. (2024) found that fermented solid fertilizer containing mycotricho increased the dry weight of peanut seeds by 50.15% when compared to the control. *Trichoderma* sp. can infect plant roots, increasing phosphate absorption and influencing seed dry weight (Yakti *et al*. 2019).

Effect of SP-36 Fertilizer on Corn Crop Yield

SP-36 fertilizer affects the diameter of the husked cob. The SP-36 dose of 50 kg/ha resulted in a larger cob diameter of 6.58% as compared to the recommended dose (100 kg/ha) (Figure 4). Cahyana *et al*. (2021) discovered that increasing the dose of SP-36 had no influence on the diameter of husked cobs in hybrid corn plants grown on Ultisol soils, which averaged 45 mm. Phosphate fertilizer impacts cob diameter, which determines corn kernel output. The reduction in SP-36 fertilizer dose by up to 50% can be attributed to organic fertilizers meeting phosphate element requirements (Khumairah *et al.* 2020).

SP-36 fertilizer alters P absorption in plant tissues. The SP-36 dose of 50 kg/ha increased plant P uptake by 23.03% when compared to the recommended dose of 100 kg/ha (Figure 5). Arafat *et al*. (2016) found that SP-36 fertilizer had a significant effect on P absorption in corn plants, with the optimal dose of 150 kg/ha yielding 0.27 g/plant and the control yielding 0.16 g/plant. Plants absorb P-available soil directly; hence its presence influences plant P absorption. Organic fertilizers can offer P-available nutrients that are taken by plants, reducing phosphate element fulfillment from SP-36 fertilizer by up to 50% (Nasution *et al*. 2014).

Effect of Fermented Kasgot Interaction and SP-36 Fertilizer Dose on Dry Weight of Corn Plants

Fermented kasgot with EM4 and a 50% dose of SP-36 fertilizer influenced plant dry weight. This demonstrates that kasgot fermented with EM4 can minimize the need of SP-36 fertilizer by 50% (Table 4). The dry weight of plants interacts with fermented kasgot and SP-36 fertilizer. Fermented kasgot with

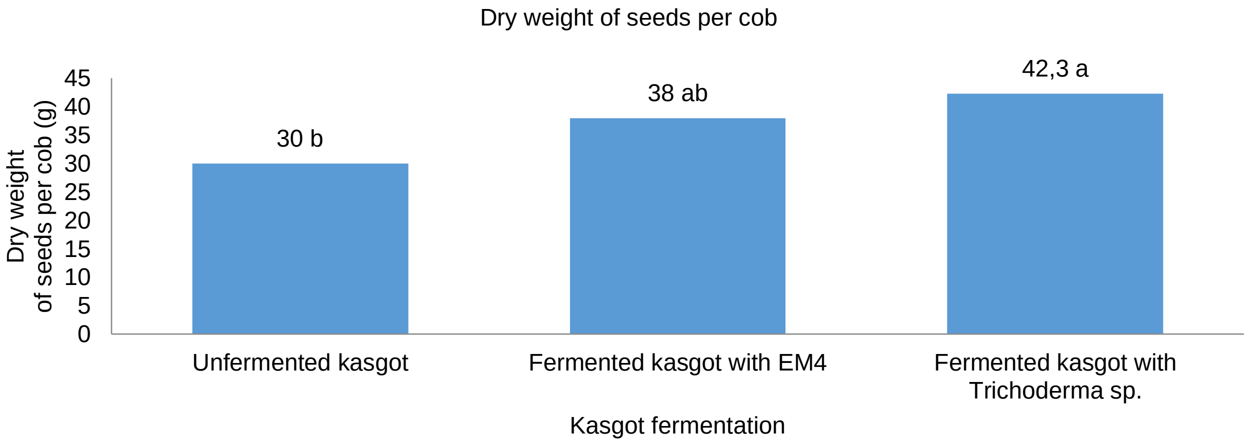

Figure 3 Effect of kasgot fermentation on dry weight of seeds per cob.

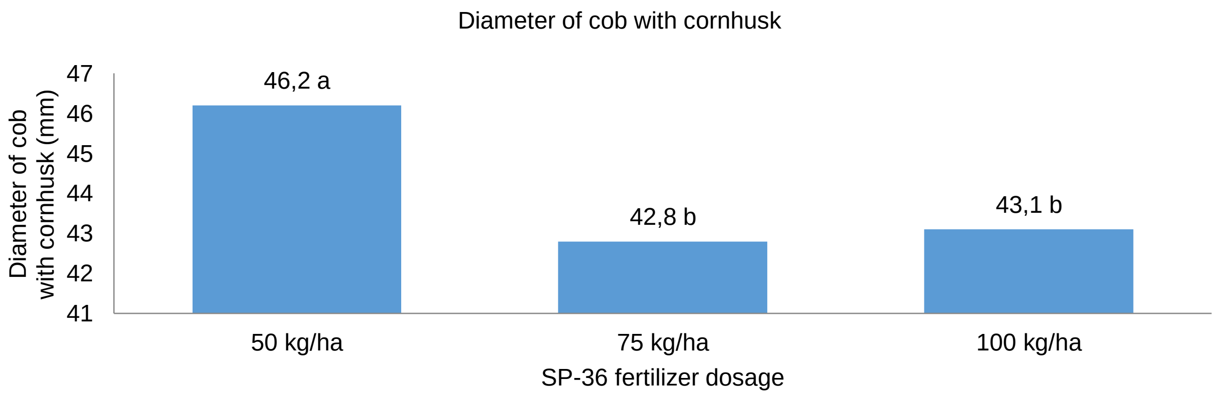

Figure 4 Effect of SP-36 fertilizer on the diameter of cob with cornhusk.

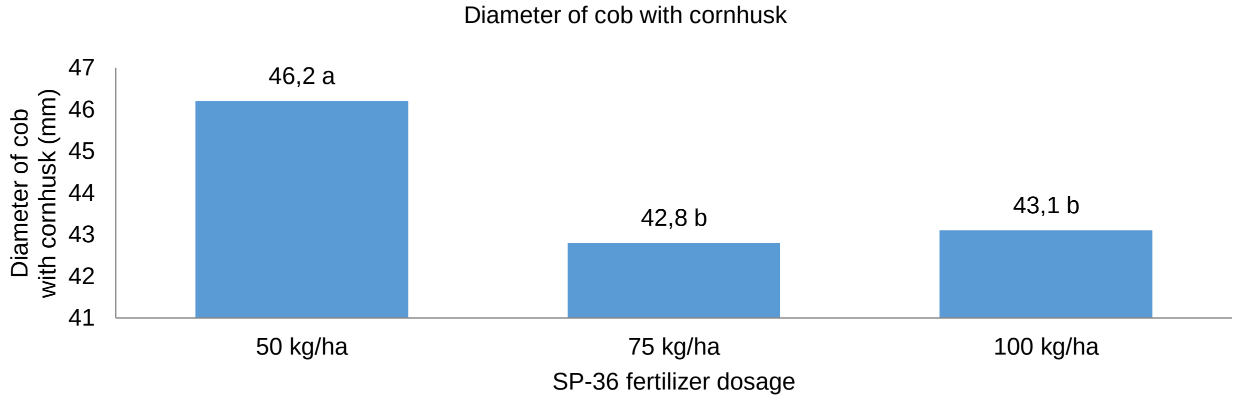

Figure 5 Effect of SP-36 fertilizer on P-uptake of plant tissues.

Table 4 Interaction of fermented kasgot and SP-36 fertilizer on dry weight of purple corn plants

Treatment	Dry weight of plant		
	Dose of SP-36 (%)		
Kasgot fermentation	50	75	100
No fermentation	75.00 B bc	81.33 B b	65.33 C c
Fermentation with EM4	103.67 A a	76.00 B b	66.15 C c
Fermentation with *Trichoderma sp*	72.10 B bc	68.33 C bc	81.05 B b
CV (%)	17.165		

Remarks: Numbers followed by different capital letters indicate significant differences in kasgot fermentation based on the 5% DMRT test. Numbers followed by different lower case letters indicate significant differences in dose of SP-36 based on the 5% DMRT test.

EM4 and a dose of SP-36 fertilizer of 50 kg/ha grew by 36.98% when compared to unfermented kasgot and a dose of 100 kg/ha. Fermentation of kasgot with EM4 has the greatest potential for raising the dry weight of plants in purple corn plants and can minimize reliance on organic fertilizers, particularly SP-36 fertilizers, by 50% (50 kg/ha).

There are numerous strategies to increase the quality of ultisol soil, including applying phosphorus fertilizer and adding organic fertilizers such as green manure, compost, or manure (Oesman 2017). Organic fertilizer fermented at a dose of 10 tons/ha has been shown to offer the best growth and yield on corn plants in ultisol soils (Atmaja *et al*. 2017), and it has also been shown to reduce the use of inorganic fertilizers by up to 50% (Hidayah *et al*. 2021). Organic fertilizers can meet plants' optimum nutrient needs, reducing surplus nutrients from inorganic fertilizers (Yosephine *et al*. 2021). Microorganisms in organic fertilizers also produce enzymes, which aid in the dissolution of nitrogen and phosphorus elements (Khairulya and Sudradjat 2016).

Phosphorus (P) is a macronutrient that contributes significantly to plant growth and development. Phosphorus deficit disrupts plant metabolic pathways (Chu *et al*. 2018). According to Khumairah *et al*. (2020), organic waste fermented by certain bacteria can supply the phosphate demands of corn plants in Ultisol soils, reducing the need for SP-36 to meet phosphate requirements.

CONCLUSION

Kasgot fermented with EM4 produced the greatest results in terms of fresh weight of plants and wet weight of seeds per cob, whereas kasgot fermented with *Trichoderma* sp. produced the best dry weight of seeds per cob. A 50% dose of SP-36 (50 kg/ha) produced the greatest results for husked cob diameter, and plant P-uptake. Kasgot fermented with EM4 interacts with a dose of SP-36 50% on the dry weight of plants, requiring kasgot to be fermented to increase plant effectiveness. Kasgot has been shown to reduce the need for inorganic fertilizers by up to 50%, particularly in purple corn plants in ultisol soil.

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