Applications of Bio-Liquid Organic Fertilizer (bio-lof) to Increase the Growth and Production of Corn (zea mays (l))

by Misfit Putrina

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Applications of Bio-Liquid Organic Fertilizer (bio-lof) to Increase the Growth and Production of Corn (*zea mays* (l))

Yulensri[1], Misfit Putrina[2] , Kresna Murti[3]

1. Department of Food Crops, Payakumbuh Agricultural Polytechnic, West Sumatera Jl. Raya Negara KM 7 Tanjung Pati, Telp. (0742) 7754192- (0752) 7750220.

2,3. Department of Estate Crops, Payakumbuh Agricultural Polytechnic.

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Abstract: To face global competition, Indonesia must be able to increase the competitiveness of agricultural products by reducing production costs, increasing quality and productivity and developing environmentally friendly technologies such as the application of liquid organic fertilizer combined with biological fertilizers (bio-lof) which can be functioned as organic fertilizers and biological fertilizers. Liquid Organic Fertilizer is produced using cow urine ingredients, Gliricedia and titonia leaves and coconut coir. While the biological fertilizer added is a consortium of bacteria *Serratia marcecens, Pseudomnas fluorescens* and *Bacillus thuringiensis*. The research aims to find out the bio-lof application technique to increase corn growth and production. The design used is factorial randomized block design (RBD) with 3 replications, where the P Factor (bio-lof concentration) with 4 levels, namely P1 = without bio-lof, P2 = 25% concentration, P3 = concentration of 50%, and P4 = concentration of 75%,. Factor W (application time) with 3 levels, namely W1 = treatment of seeds + when planting + age 3 weeks + age 6 weeks, W2 = treatment of seeds + every week, W3 = treatment of seeds + every 2 weeks, so that it is obtained 36 trial plots. Application of bio-lof to corn crops can increase the number of leaves and production of corn crops by 42.2% compared without bio-lof application. The results showed that the effective and efficient bio-lof application technique is to use a 50% concentration, which is applied to the seeds, when planting in the planting hole and is repeated every 2 weeks.

Key words: Bio-Liquid Organic Fertilizer (BIO-LOF), *Serratia marcecens*, *Pseudomnas fluorescens*, *Serratia marcecens*, *Pseudomnas fluorescens*, corn.

Corresponding author: Kresna Murti, Department of Estate Crops, Payakumbuh Agricultural Polytechnic.

1. Introduction

Corn is the second most important cereal crop after rice. Besides being used to meet the needs of food, animal feed, and corn oil, the corn commodity is currently being developed for bio-fuels. The increasing demand for corn has caused the price of corn to continue to improve, especially in the last two years (Sinar Tani Editor, 2010).

Research results from the Research center for Soil and Agro-climate Bogor reveal that most agricultural land in Indonesia has decreased in fertility due to the use of chemical fertilizers, so that their productivity decreases. Deteriorating soil conditions, causing fertilization to be carried out in an integrated manner by utilizing various types of fertilizers, namely inorganic, organic and biological fertilizers. Besides providing nutrients, organic fertilizers also act as a source of energy for soil organisms and improve soil physical properties and increase the efficiency of inorganic fertilizers (Irianto, 2010).

Bio-lof fertilizer is liquid organic fertilizer added with biological fertilizer. Combining liquid organic fertilizers with biological fertilizers will increase the effectiveness or benefits of lof fertilizers which act as organic fertilizers and biological fertilizers. Bio-lof used is processed by fermenting cow urine, chicken, cow and goat feces added with coconut husk and tithonia leaves. The nutrient content of Bio-lof is N; 0.196%, P2O5: 0.026%, Total K2O; 0.39% and a consortium of bacteria *Pseudomonas fuorescens, Serratia marcecens* and *Bacillus thuringiensis*. Population 1.244 x 108 CFU / ml. of *Ryzobacteria S. marcecens, B.thuringiensis, P. fluorescen* can act as plant growth promoting regulator (PGPR) because it is a phosphate solvent bacteria and produces auxin hormon, can be used as a disease control agent because it produces the enzyme chitinase, Protease and cellulase, can be used together because there is no competition when grown on one medium,, effective for controlling brown spot disease by *H. oryzae* udbatta disease by *E. oryzae* (Yulensri, et al. 2013). *P. fluorescens* can increase the availability of dissolved P in the soil with an increase in available P up to 97.4% (Yulensri, 2006). Application of *P. fluorescens* in compost can increase corn production by up to 200% and save the use of chemical fertilizers (SP36) by 100% (Yulensri et al, 2005).

Rhizo-bacteria can also play a dual role as plant growth promoters. The role of rhizo-bacteria as plant growth promoting regulators (PGPR) is one contribution of biotechnology in the effort to increase plant productivity. Various isolates from *Pseudomonas* spp., *Azospirillum* spp., *Azotobacter* spp., *Enterobacter* spp., *Bacillus* spp., And *Serratia* spp. Known to function as PGPR (*Thuar* et al. 2004 in Sutari, 2006).

The purpose of this study is to determine the effect of bio-lof on growth, production and nutrient content of soil and plants, as well as to determine efficient and effective bio-lof application techniques for corn.

2. Research Methods

This research was conducted in the laboratory and experimental field at Payakumbuh Agricultural Polytechnic, Harau District, Limapuluh Kota Regency, West Sumatra. Indonesia. The research was conducted from February to September 2019. The design used was a factorial randomized block design (4 x 3) with 3 replications, where the P factor (bio-lof concentration) with 4 levels, namely P1 = without bio-lof, P2 = 25% concentration, P3 = concentration of 50%, and P4 = concentration of 75%,. Factor W (time of application) with 3 levels, namely W1 = on seed treatment + at planting + age 3 weeks + age 6 weeks, W2 = on seed treatment + every week, W3 = on seed treatment + every 2 weeks, so we get 36 experimental plots. Bio-lof used are bio-lof from cow urine, Glicerida leaves, chicken, goat, and cow feces, *S. marcecens*, *B. thuringiensis* and *P. fluorescens* bacteria that have been formulated. Bio-lof is applied to soil and plants.

3. Results and Discussion

3.1. Observation result

3.1.1. Observation of plant vegetative growth

Vegetative growth of corn (plant height and number of leaves was carried out at the age of 70 days after planting (dap)) (Tables 1 and 2).

1. Plant height.

Table 1. The average plant height of corns using the Bio-lof application was 70 days after planting (cm)

Main time Concentration of Bio-LOF	Concentration of bio-lof				The main effect of concentration
	P1	P2	P3	P4	
W1	255.53 a	165.92 a	240.93 a	272.40 a	233.70 a
W2	261.30 a	250.83 a	256.20 a	264.93 a	250.07 a
W3	248.63 a	267.30 a	253.07 a	257.40 a	256.60 a
Effect of application time	255.16 a	250.07 a	250.07 a	264.91 a	

Different letters indicate a significant effect (p <0.05)

Bio-lof concentration and application time had no significant effect on the height of the corn plants where the plant height treated with bio-lof was not significantly different from the height of the plants not treated with bio-LOF (Table 1).

2. Number of leaves

Table 2. Average number of leaves of corn plants with bio-lof application aged 70 dap (sheet)

Main time Concentration of Bio-LOF	Concentration bio-lof				The main effect of concentration
	P1	P2	P3	P4	
W1	13.30 cd	13.50 bcd	12.63 e	14.20 a	13.57 a
W2	13.20 de	13.73 bcd	13.86 abc	13.86 abc	13.66 a
W3	13.40 bcd	13.40 bcd	12.63 a	13.96 ab	13.35 b
Effect of application time	13.30 b	13.54 b	13.27 b	14.01 a	

Different letters indicate a significant effect (p <0.05)

From Table 2, it can be seen that the concentration of bio-lof has a significant effect on the number of leaves of corn plants, the highest number of leaves is in the 75% concentration treatment and is significantly different according to the duncan test when compared to the treatment without bio-lof. The time of application also had a significant effect on the number of corn leaves, where the bio-lof application that was repeated every week and every two weeks was significantly different according to the Duncan test when compared to the bio-lof application which was only repeated during weeding.

3.1.2. *Observation of yield components and corn production.*

1. Observation of the weight of 100 corn kernels

Table 3. Average weight of 100 corn kernels with bio-lof application (grams)

Main time Concentration of Bio-LOF	Concentration of bio-lof				The main effect of concentration
	P1	P2	P3	P4	
W1	26.760 a	27.050 a	29.257 a	27.747 a	27.703 a
W2	29.103 a	22.957 a	28.050 a	29.387 a	27.374 a
W3	30.293 a	28.430 a	30.083 a	28.227 a	29.258 a
Effect of time application	29.130 a	26.146 a	29.130 a	28.453 a	

Different letters indicate a significant effect (p <0.05)

From Table 3 it can be seen that the application of bio-lof has no significant effect on the weight of 100 corn kernels. The concentration of bio-lof and time of application have not been able to increase the weight of 100 corn kernels.

2. Number of rows / cob

Table 4. Average number of rows / cobs of corn with bio-lof application (rows)

Main time Concentration of bio-lof	Concentration of bio-lof				The main effect of concentration
	P1	P2	P3	P4	
W1	15.433 a	16.000 a	15.300 a	15.757 a	15.623 b
W2	16.033 a	17.333 a	16.333 a	16.447 a	16.537 ab
W3	15.743 a	15.567 a	16.670 a	16.223 a	16.051 ab
Effect of time application	15.737 a	16.300 a	16.101 a	16.142 a	

Different letters indicate a significant effect (p <0.05)

From Table 4, it can be seen that the dosage of bio-lof application has no significant effect on the number of rows per cob of corn. Plants were treated by bio-lof had the number of rows per cob that was not significantly different from plants without treated by any bio-lof according to Duncan's test.

3. The number of grains per row of corn cobs

Table 5. Average number of grains per row of corn cobs with bio-lof application

Main time Concentration of bio-lof	Concentration of bio-lof				The main effect of concentration
	P1	P2	P3	P4	
W1	40.90 ab	31.00 b	40.46 ab	40.13 ab	38.12 a
W2	37.00 ab	34.00 ab	41.56 ab	42.30 a	38.71 a
W3	40.20 ab	40.23 ab	41.76 ab	42.10 a	41.07 a
Effect of time application	35.08 b	39.37 ab	41.267 a	41.51 a	

Different letters indicate a significant effect (p <0.05)

From Table 5, it can be seen that the application of bio-lof has a significant effect on the number of grains per row where the concentration of 75% bio-lof can increase the number of grains per row and is significantly different than without bio-lof. The timing of bio-lof application did not significantly affect the number of grains per row.

4. Production of corn crops

Table 6. Average corn production using the bio-lof application (tonnes / ha)

Main time Concentration of bio-lof	Concentration of bio-lof				The main effect of concentration
	P1	P2	P3	P4	
W1	11.077 a	9.003 a	12.10 a	12.027 a	11.05 a
W2	9.343 a	9.287 a	12.820 a	13.080 a	11.13 a
W3	9.000 a	11.727a	13.480 a	11.733 a	11.48 a
Effect of time application	10.06 b	10.06 b	12.80 a	12.28 ab	

Different letters indicate a significant effect (p <0.05)

From Table 6, it can be seen that the concentration of bio-lof has a significant effect on corn production, where the highest production is at the concentration of 50% and 75% of bio-lof, significantly different from the concentration of 25% and and without bio-lof. Bio-lof application can increase corn production by ± 42.2% compared to without applying bio-lof.

3.1.3 Observation of soil and plant nutrients

1. The pH value of corn soil with the bio-lof application

Table 7. Average soil pH values of corn crops with the bio-lof application

Main time Concentration of bio-lof	Concentration of bio-lof				The main effect of concentration
	P1	P2	P3	P4	
W1	5.03 a	4.50 a	4.40 a	4.33 a	4.5667 a
W2	4.76 a	4.64 a	4.34 a	4.35 a	4.5227 a
W3	4.68 a	4.56 a	4.22 a	4.28 a	4.4350 a
Effect of time application	4.82 a	4.56 ab	4.32 ab	4.32 b	

Different letters indicate a significant effect (p <0.05)

From Table 7, it can be seen that the application of bio-lof can increase the soil pH of corn crops where the 75% dose can increase the soil pH compared to the control. The timing of bio-lof application had no significant effect on soil pH.

Table 8. The average of Soil N, P, K at the aged of 60 days after planting of corn

Block/ Treatment	N Total (%) (Kjeldahl)	P (Bray2) P205 (PPM) (Spectrophotometry)	Total K20 (mg/100 gr) (Flamephotometry)
P1W1	0,52	96,9	58,9
P1W2	0,62	62,4	58,2
P1W3	0,59	34,4	55,2
P2W1	0,60	45,9	69,0
P2W2	0,58	49,2	64,1
P2W3	0,58	51,7	58,8
P3W1	0,58	79,6	62,4
P3W2	0,60	73,9	68,8
P3W3	0,58	87,8	66,4
P4W1	0,58	66,5	86,3
P4W2	0,56	54,2	76,5
P4W3	0,60	50,0	66,0

From Table 8, it can be seen that the highest content of soil N, P and K elements has high criteria based on PPT (1983).

Table 9. The average of leaves N, P, K at the aged of 60 days after planting of corn

Block/ Treatment	N Total (%) (Kjeldahl)	P (Bray2) P205 (ppm) (Spectrophotometry)	Total K20 (mg/100 gr) (Flamephotometry)
P1W1	2,63	0,225	1,42
P1W2	2,63	0,219	1,31
P1W3	2,64	0,223	1,36
P2W1	2,61	0,199	1,28
P2W2	2,63	0,226	1,33
P2W3	2,62	0,228	1,4
P3W1	2,63	0,227	1,31
P3W2	2,62	0,229	1,32
P3W3	2,63	0,233	1,41
P4W1	2,64	0,228	1,37
P4W2	2,62	0,229	1,33
P4W3	2,62	0,227	1,3

From Table 9, it can be seen that the nutrient content of N, P and K in corn leaves has high corn nutrient adequacy criteria.

3.2. Discussion

In observing the vegetative growth of plants, the bio-lof application had no significant effect on plant height but had a significant effect on the number of leaves, where the number of leaves with the bio-lof application was more than without bio-lof and was significantly different according to the duncan test. Although the height of the crop did not increase, there was an increase in the number of nodes on the stem so that the number of leaves increased because corn leaves appeared on each plant node. The increase in the number of leaves of this crop is closely related to the N nutrient in the soil and plant leaf tissue. The results of soil nutrient analysis showed that the soil N nutrient had high status (Table 8), the uptake of N nutrients in corn leaves was also high based on the N nutrient adequacy criteria in corn leaves, namely 2.6. According to Havlin et al., (2005), the adequacy of N nutrients for corn ranges from 2.6 to 4. According to Sutedjo (2008), N nutrients are generally indispensable for the formation or growth of plant vegetative parts such as leaves, stems and roots.

The bio-lof application had no significant effect on the weight of 100 corn grains and the number of rows of cobs but had a significant effect on the number of grains per row and the production of corn crops. Bio-lof application with a concentration of 50% and 75% can increase corn production compared to without bio-lof.

The increase in corn production is closely related to the vegetative growth of corn crops, where the application of bio-lof can significantly increase the number of corn leaves compared to without the application of bio-lof (Table 2). Increasing the number of plant leaves will cause photosynthetic activity is also increase so that photosynthetic results (photo synthate) also increase, which in turn, this photo synthate will be transferred to plant organs that are active in metabolic processes so that the growth of roots, stems, leaves and seeds is good which in turn affects plant production . Good plant growth in the vegetative phase will have a good effect on the generative phase (Mulyani, 2006). When viewed from the number of cobs, the application of bio-lof can also increase the number of kernels / cobs so that production also increases. Application of bio-lof with a concentration of 50% and 75% resulted in no significant difference in production, so it can be recommended that a good application concentration is 50%.

The high production of this plant is closely related to soil nutrient content, from observations (Table 8) it is known that the total soil N nutrient ranges from 0.52 to 0.65, based on the criteria for assessing soil fertility (PPT, 1983). had a high fertility criteria. The P2O5 nutrient content in the soil has a very high status because it is> 15, as well as the total K content of the soil which also has a very high status, namely> 50 (PPT, 1983). The high content of N, P and K nutrients in the soil both with bio-lof and without bio-lof treatment was due to all treatment plots at the time of planting provided with bio-compost of chicken manure which had a nutrient composition of N 1.56%, P2O5 nutrients 3.15% and K nutrient: 1.63%, and contains a consortium of bacteria *Serratia marcecens*, *Pseudomonas fluorescens* and *Bacillus thuringiensi* (Yulensri, 2018). These three consortified bacteria are bio-fertilizer bacteria that can dissolve phosphate and fix N from the air (Yulensri et al., 2016).

The soil pH of the research field for corn is low, ranging from 4.3 to 4.8 so that the soil is acidic, according to Havlin et.al, (2005). The optimum soil pH for corn growth ranges from 5.5 to neutral. This soil pH condition is closely related to the availability of nutrients, the maximum P availability in almost all soil types is at pH 6.5. Even though the soil pH in the experimental field was low, the uptake of P nutrients was still running well, this was due to the role of the three bacteria *Serratia marcecens*, *Pseudomonas fluorescens* and *Bacillus thuringiensi* contained in bio-compost and bio-lof which were applied as phosphate solubelizing bacteria (phospho bacterin) (Yulensri, et al. 2016).). Rhizo-bacteria that promote plant growth from the *Bacillus* spp. Group and *Pseuddomonas* spp. has been reported to be able to dissolve phosphate (Faccini et al, 2004) while PGPR from the *Serratia* spp. group able to increase nitrogen fixation (Bai et al, 2003). The increase in dissolved P concentrations in the soil is due to the presence of organic acids released by phospho-bacterins such as succinic, propionic, butyric acid, formic, oxalate and citrate which can release P bonds by clay, aluminum, iron or calcium so that they become unavailable to plants, even though the soil condition is very

good (Soepardi, 1983 in Miza 2009). in acidic or alkaline soil conditions so that the use of phosphate solubelizing bacteria can make the application of artificial fertilizers to plants more efficient. Tisdalle, (1985) in Premono (1994) explained that phospho-bacterin was able to increase P uptake and plant tissue dry weight by up to 30%. The effectiveness of P-solvent microorganisms is not only due to their ability to increase P availability, but also due to their ability to produce several growth regulators, especially by microorganisms that live on the root surface (rhizo-plane).

4. Summary

The results of the study can be concluded that;

1. Application of bio-lof to corn crops can increase the number of leaves and production of corn crops by 42.2% compared without BIO-LOF application.
2. The effective and efficient bioPOC application technique is to use a 50% concentration, which is applied to the seeds, when planting in the planting hole and is repeated every 2 weeks.

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References

Bai Y, Zhou X, Smith DL (2003) Enhanced soybean plant growth resulting from co-inoculation of strains with Bradyrhizob ium japonicum. Crop Sci 43:1774–1781 62. Gomes AMA, Mariano RLR, Silve.

Faccini G, Garzon S, Martines M, Varela A. 2004. Evaluation of the affects of a dual inoculum of phosphate-solubilizing bacteria and *Azotobacter chroochoccum* in creolo potato (Papa"Criola") http://www.ag.auburn edu/argentina/pdfmanuscripts/estrada.pdf (28 Oktober 2004)

Havlin. J.L., Beaton, J.D., Tisdale, S.M. and Nelson, W.L. 2005. Potassium. In: Havlin, J.L., et al., Eds., Soil Fertility and Fertilizers, Pearson Prentice Hall, New Jersey, 199-218.

Irianto, G., 2010. Pemupukan Berimbang Saja Tidak Cukup. Sinar Tani Edisi 10-16 Maret 2010. Jakarta. 226 p.

Miza. 2009. Analisis kandungan unsur N dan P tebu transgenik PS-IPB 1 yang mengekspresikan gen fitase. IPB, Bogor

Premono, EM. 1994. Jasad renik pelarut fosfat pengaruhnya terhadap P tanah dan efisiensi terhadap pemupukan P tanaman tebu. Disertasi. Program Pasca sarjana IPB.

Pusat Penelitian Tanah. 1983. Terms of reference survei kapabilitas tanah no 22/1983. Bogor: Proyek Penelitian Pertanian Menunjang Transmigrasi (P3MT) Badan Penelitian dan Pengembangan Pertanian Departemen Pertanian RI, Jakarta

Redaksi sinar tani, 2010. https://docobook.com/respon-pertumbuhan-dan-produksi-tanaman-jagung.html. Akses 11 agustus 2020

Sutari,GAK. 2006. Perlakuan benih dengan agens biokontrol untuk pengendalian penyakit antraknosa pada cabai. Pascasarjana. IPB. Bogor. 67 p.

Sutedjo, M. M. 1992. Pupuk dan Cara Pemupukan. Rineka Cipta, Jakarta.

Yulensri, Agustamar, dan M. Putrina. 2013. Pengembangan *Serratia marcecens* SLK, Bacillus thuringiensis SB1 dan Pseudomonas fluorescens PYK indigenus sebagai pengendali penyakit bercak coklat dan peningkatan pertumbuhan bibit padi. Prosiding seminar Nasional Politeknik Pertanian Negeri Payakumbuh. ISBN 978-979-98691-3-5. Tanjung Pati.

Yulensri, Muflihayati, 2006. Uji keefektifan bakteri patogen serangga *Serratia* sp. (Bakteri merah) terhadap hama krop kubis *Crocidolomia binotalis* Zeller: Lepidoptera;Pyralidae. Laporan penelitian tidak dipublikasi. Politani Payakumbuh.

Yulensri, Fri Maulina, 2005. Pemanfaatan *Pesudomonas fluorescen* sebagai agen hayati dan pelarut posphat dengan jerami padi untuk meningkatkan produksi kacang tanah. Laporan penelitian tidak dipublikasi. Politeknik Politani Payakumbuh.

Yulensri, Agustamar, 2016. Penerapan pupuk organik padat dan cair pada budidaya padi organik metode SRI di Kanagarian Taram. Kab. Limapuluh kota. Prosiding seminar nasional membangun sektor perkebunan masa depan untuk meningkatkan produktivitas pertanian ISBN978=979=98699-7.

Yulensri, Putrina, M., Arneti. 2018. Investigation Potency *Serratia marcecens* Indigenoes in Controlling Udbatta Disease that is Caused by Ephelis oryzae at Invitro Test. https://eudl.eu/pdf/10.4108/eai.24-1-2018.2292407

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PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11