International Journal of Research in Agriculture and Forestry
Volume 2, Issue 6, June 2015, PP 27-34
ISSN 2394-5907 (Print) & ISSN 2394-5915 (Online)

Evaluation of Organic Fertilizer Application on Soybean in the Village Rubaru, District Sumenep, Madura Island

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ABSTRACT

The purpose of this study is to implement the organic agricultural system by using the decomposer fertilizer which was prepared from manure and Nodul Plus, for reducing use of chemical fertilizers. The study was conducted in the village Bunbarat, District Rubaru, Sumenep, with category of land suitability N (not suitable) to soybeans. The experimental design used was randomized with 21 combinations of treatment which was repeated 3 times. The results showed there were meaningful interactions between the application of organic fertilizers, N inorganic fertilizer and crop soybean variety Anjasmoro. The financial analysis recommends for using 1 $t.ha^{-1}$ decomposed of manure with half dosage of inorganic N fertilizer (50 $Kg.ha^{-1}$) to soybean on this soil types.

Keywords: organic fertilizer, soybean, evaluation

INTRODUCTION

The application of organic farming systems increasingly to be encouraged, along with a community awareness to produce quality food products are healthy and an environmentally safe. The cropping systems that reduce the use of inorganic fertilizer (chemical fertilizer) get a great attention to performed.As a substitute for the use of chemical fertilizers, it is used an organic fertilizer, an organic waste and livestock manure weathering. The advantage of using organic fertilizers, among others, can be prepared from available ingredients and cheap.

Lately, there is a circulating of biological agent that has the ability to accelerate the weathering process of organic matter, or better known as *biodecomposer*. Typically such materials contain of microbes that active to composting of organic matter and enriched with microbes that are able to provide nutrients for plants.

Naturally, the use of organic fertilizer/compost can improve soil properties and maintain the quality of soil fertility. This study aims to determine the effect of the use of organic fertilizer to produce soybean yield and to evaluate economic feasibility of its application.

MATERIAL AND METHOD

The research was conducted on dry land in the village Bunbarat, District Rubaru, Sumenep, locatedat 113°48'10"- 113°48'26" E and 7°50'10"- 7°56'41" latitude, in February-May2012.Based onavailable datathe last ten years, by using the Oldeman category, the region has category of type D-3 with average of rainfall 1,433 mm/year and had 69 rainy days per year, has a 4- wet month and 3- humid month and 5 dry months.

The study used randomized design with 21 treatment combinations were repeated 3 times. The trial combinations include: a) two kinds of organic fertilizer, b) 4 dosage of compost, and c) 3 dosage of

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inorganic N fertilizer (Table 1). Analysis of data was using ANOVA and be followed by Duncan Significant Difference Test 5% (Gomez and Gomez, 1993).

Table1. *The trial combination of compost and an organic fertilizer*

No	Code of Treatment	Fertilizer	Dosage of organic fertilizer (t. ha^{-1})	Dosage of an organic fertilizer (Kg. ha^{-1})		
				N	P	K
1	$O_0K_0A_0$	Manure/compost	0	0	50	50
2	$O_0K_0A_1$	Manure/compost	0	50	50	50
3	$O_0K_0A_2$	Manure/compost	0	100	50	50
4	$O_1K_1A_0$	Manure	1	0	50	50
5	$O_1K_1A_1$	Manure	1	50	50	50
6	$O_1K_1A_2$	Manure	1	100	50	50
7	$O_1K_2A_0$	Manure	2	0	50	50
8	$O_1K_2A_1$	Manure	2	50	50	50
9	$O_1K_2A_2$	Manure	2	100	50	50
10	$O_1K_3A_0$	Manure	3	0	50	50
11	$O_1K_3A_1$	Manure	3	50	50	50
12	$O_1K_3A_2$	Manure	3	100	50	50
13	$O_2K_1A_0$	NodulPlusCompost	1	0	50	50
14	$O_2K_1A_1$	NodulPlusCompost	1	50	50	50
15	$O_2K_1A_2$	NodulPlusCompost	1	100	50	50
16	$O_2K_2A_0$	NodulPlusCompost	2	0	50	50
17	$O_2K_2A_1$	NodulPlusCompost	2	50	50	50
18	$O_2K_2A_2$	NodulPlusCompost	2	100	50	50
19	$O_2K_3A_0$	NodulPlusCompost	3	0	50	50
20	$O_2K_3A_1$	NodulPlusCompost	3	50	50	50
21	$O_2K_3A_2$	NodulPlusCompost	3	100	50	50

Fertilizers were used are two kinds of organic fertilizer (manure and compost decomposers), Urea (N fertilizer), SP-36 (P fertilizer), and KCl (K fertilizer). Composting is done by using Nodul Plus decomposers. Seed variety used was Anjasmoro, with an ability to grow 90%. Soybean seed planted with dibble stick, the depth of 2-3 centimeters and use the spacing of 40 cm x 15 cm, 2 seeds/holes, on each plot with a size of 3.0 mx 2.5 m and is equipped with a drainage channel depth of 25-30 cm and a width of 20 cm. Organic fertilizer (compost) is given at the time of land preparation in accordance with the treatment. Urea fertilizer (according to treatment), SP-36 50 $kg.ha^{-1}$ and KCl 50 $Kg.ha^{-1}$ is given at the time of the old plants of 7-10 days after planting. Weeding is done 2 times that at the age of 3 and 6 weeks after planting.

The observations of this research are (1) the analysis of soil nutrient status before the trial, (2) height of plant, number of branches, number of pods/plant, number of seeds/plant, number of seeds/pod, number of root nodules and seed yield and (3) financial analysis.

RESULTS AND DISCUSSION

NodulPlus is a bio decomposer that its form is flour/powder which contains beneficial microbes. The quality test of this material has been carried out in the laboratory of Microbiology, Brawijaya University, Malang, East Java (Table 2). Based on the results of the quality test Nodul Plus found to be safe to use, because it does not contain pathogenic microbes of the type Escherichia coli and Salmonella sp, it contains the types of microbes decomposer in a population that meets the quality standard rules Permentan no. 70 in 2011. In a slightly acidic of pH (pH of soil 5.5), it was as a good medium for the growth of the decomposer fungus such Trichodermasp and as per gillussp in high enough quantities, respectively 4.1. 10^7cfu.$g^{-1}$of matter and 2.7. 10^7cfu.g^{-1} of matter.

NodulPlus also contains P solubilizing bacterial as much as 2.7. 10 cfu.g^{-1} matter and do not contain pathogenic bacteria (*Salmonella sp* and *Escherichia coli*). This is safety as a bioactive ingredient for use in composting of organic materials. The presence of the P solubilizing bacteria excrete of chemical compounds such as formic acid, acetic, propionic, lactic, glycolic, fumarate and succinate (Schinner, *et al*., 1996). The activity of P solubilizing bacterial was to cut of P chain is adsorbed on the land, will increase the availability of P naturally. Mechanisms of organic acids increase the

availability of soil P among others through organic anion compete with orthophosphate to the surface positively charged colloid (Nagarajah, *et al*, 1970; Lopez-Hernandez, *et al*., 1979); orthophosphate release of certain P metal bonding through the formation of metal-organic complexes (Earl, *et al*., 1979) and the modification of colloidal surface charge by organic ligands (Nagarajah, *et al*., 1970; Kwong and Huang, 1979).

Table2. *Results of Quality Analysis Decomposers NodulPlus*

Parameter	Result	Standard of Quality Permentan 70/2011	Method of testing
Total of live cell[*)] Fungi:			TPC [**)]
Trichoderma sp.	4,1 x 10^7	$\geq 10^5$ cfu.g^{-1} dry weight of matter	
*Aspergillus*sp.	2,7 x 10^7		
Pathogenesis	Negative	Negative	Infection on the host plant
Beneficial microbe : a. N fixed microbe b. P solubilizing microbe	- 2,7 x 10^7	10^3 cfu.g^{-1} dry weight of matter 10^3 cfu.g^{-1} dry weight of matter	- Pikovskaya medium
Kontaminan : *E. coli* *Salmonella*	0 0	max 10^3 MPN.g^{-1}or MPN.ml^{-1} max 10^3 MPN.g^{-1}or MPN.ml^{-1}	MPN-durhamandfurthertestingon*E. coli*medium MPN-durhamdanfurthertesting on *Salmonella*medium
Water content (%)	11,38	$\leq$ 35	Gravimetric
pH	5,5	5,0-8,0	pH H_2O, pH – meter

[*)] *types of bacteria were present in the bio fertilizer (manure specification)*

[**)]*Water content on the basis of the wet weight*

TPC = Total Plate Count

MPN = Most Probable Number

YMA = Yeast Manitol Agar

Theoretically, the soybean crop has grown among other requirements(1) grows at an altitude0-1500m above sea level and the optimumabout 650m above sea level, (2) the optimum temperature29,4^{o}C, (3) tolerance toshade<40 %, (4) able to adapt to the climatic area; optimum climate typeC1-2, D1-3andE1-2, (5) classified as short-day plants(<12 hours/day), (6) water consumptionreaches64-75cm/growing season or commensu rate with the bulk rain 200-300 mm/growing season, (7) is widely adaptable to soil fertile and friable, optimal pH6.2 to 7.0, Al saturation<20% and(8) for every ton of soybean nutrient transport more-no less than66kgN, 15.5kgP, 39.7kg of K, Mg7.5kgand 7kgS(Baharsjah, 1985;HallidayandTrenkel, 1992).

Tabel3. *Criteria of land suitability for soybean plants*

Characteristic	Level of land suitability			
	S_1 Very suitable	S_2 Suitable	S_3 Moderately Suitable	N Not Suitable
Temperature Average temperature^{o}C	23-28	29 - 30 22 – 20	21 - 32 19 – 18	> 32 < 18
Water availability Dry month (<75 mm) Average rainfall (mm.$year^{-1}$)	3 -7,5 1000-1500	7,6 - 8,5 1500-2500 1000-700	8,6 - 9,5 2500-3500 700-500	> 9,5 > 3500 < 500
Rootenvironmental Drainage Top soil texture[x)] Soil depth (cm)	Moderate-Good L, S,CL, SiL, Si, CL, SiCL > 50	Excessive SL, SC 30-49	Poor LS, SiC, C 15-29	Very poor G,S,Mass.C < 15
Nutrient retention CEC (me. 100 g^{-1}) pH	> 25 6,0 – 7,0	25 - 15 7,1 - 7,5	15 - 5 7,6 - 8,5	< 5 > 8,5

		5,9 – 5,5	5,4 - 5,0	< 20
Nutrient availability N total (%) P_2O_5available (Bray 4) (ppm) P_2O_5available (Olsen 3) (ppm) K available (me/100 g)	 > 1,0 - 0,5 > 50 > 15 0,8 - 0,4	 0,5 - 0,2 50 - 15 15 - 5 0,4 – 0,2	 0,2 - 0,1 < 15 < 5 0,2 -0,03	 < 0,1 < 5 < 2 < 0,03
Salinity, mmhos.cm^{-1} Sub soil	 < 2,5	 2,5 – 4	 4 – 8	 > 8
Slope of land (%)	0 – 5	5 – 15	15 – 20	> 20
Al saturation (Al/CEC) %	< 20	20 – 30	30 – 40	> 40

Source: *CSR-FAO, 1983; Landon, 1984*

x)Texture: Clay (C),Clay loam (CL), Loam (L), Sandy clay loam (SCL), Sandy clay (SC), Sandy loam (SL), Silt (Si), Silty clay (SiC), Silt loam (SiL), Sand (S), Gravels (G), Massive clay (Mass.C).

Land of research has soil texture sand with a pH of 5.9 (slightly acidic). Nutrient content of the soil at this location is extremely low with N content of 0.05%, organic-C of 0.51% and a K of 0.10 ppm. Similarly, the cation exchange capacity of 5.66 ppm, is low and demonstrates the ability of the soil to provide nutrients are also low (Syekhfani, 2010). In accordance with Table 2, such as soil conditions are categorized as land S3 or even N, which is not suitable for the soybean crop. To optimize this land, it takes the input of nutrients such as manure or compost.

nd = not detected

Manure and decomposer compost effect to physical growth of plants (in terms of a plant height and a number of productive branches). In the soybean plant height observations it appears of manure and compost decomposer at a dose of 1 t. ha^{-1} showed better growth than those not given. However, it appears that the higher the urea fertilizer is given, also looks better physical growth of soybean plants. This situation shows the condition of the soil is less fertile and giving organic material is only able to support the provision of inorganic fertilizers that are not easily leached and more available to be absorbed by plants on it. Function of organic fertilizer as a source of nutrients can't be followed at the beginning of this crop planting, but will be seen in the next planting season. The role of organic fertilizer on plant growth takes time for the decomposition process.

Table3. *Results of soil analysis before planting in the village Bunbarat, District Rubaru, Sumenep*

Parametre	Result	Dignity
Texture: Sand (%) Clay (%) Silt (%) Class	 88 5 7 -	 - - - Sand
pH : H_2O	5,9	slightly sour
C-organik (%)	0,51	extremely low
N-Total (%)	0,05	extremely low
C/N ratio	10,2	-
P-Olsen (ppm)	119	Moderate
K (cmol(+) kg^{-1})	0,10	Low
Na (cmol(+) kg^{-1})	nd	extremely low
Ca (cmol(+) kg^{-1})	2,70	Low
Mg (cmol(+) kg^{-1})	0,28	extremely low
CEC (cmol(+) kg^{-1})	5,66	Low

** Soil were analyzed by Laboratory of soil, Agricultural Technology Assessment Institute, East Java*

Rhizobium was generally regarded as microbial symbiotic partners of leguminous and mainly known for the role in the formation of nitrogen-fixing nodules (Antoun and Prevost 2005). Number of root nodules in all treatments still under the standard amount of effective root nodules (50 nodules/plant), and on this situation can actually act as a parasite to the host plant (Pasaribu, etal, 1989). This

suggests that the bacterium Rhizobiumless able to grow and form nodules on soybean crops in this land. The pH value of the soil which tends to sour is one barrier to growth and development of Rhizobium. The optimally growth of Rhizobium bacterial occurs at a temperature of25-30^{o}CandpHbetween6-7(Zuberer, 1990; Arimurti, et al., 2000; Ilyas *et al*. 2008).

Table4. *Results of measurements of plant height, number of branches and number of root nodules of soybean variety Anjasmoro in the district Rubaru, Sumenep*

No	Treatment	Plant height (cm)	Number of branch	Number of root nodules
1	$O_0K_0A_0$	50,00^{bc}	3,11^{ab}	6,67^{de}
2	$O_0K_0A_1$	54,56^{abc}	3,44^{ab}	3,00^{f}
3	$O_0K_0A_2$	64,00^{ab}	3,44^{ab}	9,67^{b}
4	$O_1K_1A_0$	56,22^{abc}	3,56^{ab}	7,33^{de}
5	$O_1K_1A_1$	54,00^{abc}	3,22^{ab}	10,00^{b}
6	$O_1K_1A_2$	57,44^{abc}	3,44^{ab}	6,00^{e}
7	$O_1K_2A_0$	47,22^{c}	3,67^{ab}	4,00^{f}
8	$O_1K_2A_1$	54,89^{abc}	3,33^{ab}	11,00^{b}
9	$O_1K_2A_2$	63,11^{abc}	3,89^{a}	8,00^{cd}
10	$O_1K_3A_0$	59,00^{abc}	2,67^{ab}	6,33^{de}
11	$O_1K_3A_1$	56,00^{abc}	3,89^{a}	7,00^{de}
12	$O_1K_3A_2$	56,78^{abc}	4,00^{a}	7,33^{de}
13	$O_2K_1A_0$	54,56^{abc}	4,00^{a}	9,67^{b}
14	$O_2K_1A_1$	54,33^{abc}	3,33^{ab}	10,33^{b}
15	$O_2K_1A_2$	59,67^{abc}	3,44^{ab}	7,00^{de}
16	$O_2K_2A_0$	50,44^{abc}	3,56^{ab}	4,33^{f}
17	$O_2K_2A_1$	52,89^{abc}	2,22^{b}	7,67^{de}
18	$O_2K_2A_2$	63,78^{abc}	3,67^{ab}	11,00^{b}
19	$O_2K_3A_0$	50,78^{abc}	3,22^{ab}	15,33^{a}
20	$O_2K_3A_1$	51,11^{abc}	2,56^{ab}	9,33^{bc}
21	$O_2K_3A_2$	64,44^{a}	2,56^{ab}	8,00^{cd}
CV (%)		14,50	23,92	10,86

The numbers followed the same letter in the same column are not significantly different at 5% of Duncan Significant Difference Test

The growing environment of Rhizobia bacteria does not only depend on the pH of the soil, but is also determined by other factors such as the content of chemical elements of land and natural microbial populations that exist on the land (Suharjo, 2001). Wedhastri and Widada (2000) states that of the Rhizobia strains urvival in the soil does not only lie in the tolerance of acidity, but should be able to grow in the soil environment and risosfer. This combination of properties can be considered as tolerance to soil acidity, not only tolerant of acidic pH alone. The number of nodule were less in number than the standard suggests that the bacterium Rhizobium soil is less developed in this environment or is not able to compete live with other types of microbes found on the land.

Table5. *Effect of organic fertilizer on the number of pods per plant, number of seeds per plant and seed yield per ha of soybean variety Anjasmoro in the district Rubaru, Sumenep*

No	Code of treatment	Number of pod /plant	Number of seed /plant	Dry seed yield (t.ha^{-1})
1	$O_0K_0A_0$	39,78^{h}	73,78^{j}	1,48^{f}
2	$O_0K_0A_1$	48,67^{fgh}	103,89^{efg}	2,46^{bcd}
3	$O_0K_0A_2$	48,44^{fgh}	97,22^{fgh}	2,37^{bcd}
4	$O_1K_1A_0$	56,11^{cdef}	106,67^{def}	1,67^{ef}
5	$O_1K_1A_1$	62,78^{bcd}	135,22^{a}	2,46^{bcd}
6	$O_1K_1A_2$	64,89^{abc}	120,67^{bc}	2,72^{ab}
7	$O_1K_2A_0$	47,00^{fgh}	88,44^{hi}	2,10^{de}
8	$O_1K_2A_1$	53,78^{efgh}	98,22^{gh}	2,64^{abc}
9	$O_1K_2A_2$	60,11^{bcde}	107,00^{def}	2,67^{abc}
10	$O_1K_3A_0$	53,89^{defg}	115,44^{cd}	2,50^{abcd}
11	$O_1K_3A_1$	54,33^{cdefg}	97,67^{fgh}	2,61^{abcd}
12	$O_1K_3A_2$	63,67^{bcd}	111,11^{cde}	2,18^{cd}
13	$O_2K_1A_0$	46,56^{fgh}	93,44^{ghi}	2,34^{bcd}
14	$O_2K_1A_1$	45,89^{fgh}	87,33^{hi}	3,00^{a}
15	$O_2K_1A_2$	47,44^{fgh}	85,11^{i}	2,45^{bcd}
16	$O_2K_2A_0$	44,67^{gh}	85,56^{i}	2,32^{bcd}
17	$O_2K_2A_1$	47,11^{fgh}	95,33^{ghi}	2,69^{abc}
18	$O_2K_2A_2$	69,00^{ab}	121,22^{bc}	2,69^{abc}
19	$O_2K_3A_0$	48,56^{fgh}	85,56^{i}	2,33^{bcd}
20	$O_2K_3A_1$	65,11^{abc}	128,00^{ab}	2,69^{abc}

21	$O_2K_3A_2$	74,56[a]	134,11[a]	2,80[ab]
CV (%)		10,50	5,55	10,92

The numbers followed the same letter in the same column are not significantly different at 5%of Duncan Significant Difference Test.

The impact of organic fertilizer and decomposer compost give quite different results in the formation of pods, but not so evident in the formation of seeds and seed yield of soybean. Similarly, the provision of urea fertilizer higher yield is also high grain yield. Shown in this study there was good interaction between the soil, organic fertilizers and inorganic N fertilizer in soybean seed yield.

Table6. *Financial analysis of application of organic fertilizers (NodulPlus compost) to soybean, in the village Rubaru, district Sumenep*

Code of treatment	Kind and dosage of fertilizer	Cost of fertilizer (Rp/ha)	Δ cost of fertilizer to standart (Rp/ha)	Seed yield ($t.ha^{-1}$)	Value of production (Rp/ha)	Δ production value to standard (Rp/ha)	Δ production value. - Δ cost of fertilizer (Rp/ha)
$O_0K_0A_0$	Urea : 0 $Kg.ha^{-1}$ OF : 0 $t.ha^{-1}$	-	(140.000)	1,48	8.140.000	(4.895.000)	-4.755.000
$O_0K_0A_1$	Urea : 50 $Kg.ha^{-1}$ OF : 0 $t.ha^{-1}$	70.000	(70.000)	2,46	13.530.000	495.000	565.000
***$O_0K_0A_2$* (standard)**	*Urea : 100 $Kg.ha^{-1}$* *OF : 0 $t.ha^{-1}$*	*140.000*	-	*2,37*	*13.035.000*	-	-
$O_1K_1A_0$	Urea : 0 $Kg.ha^{-1}$ manure : 1 $t.ha^{-1}$	250.000	110.000	1,67	9.185.000	(3.850.000)	-3.960.000
$O_1K_1A_1$	Urea : 50 $Kg.ha^{-1}$ manure : 1 $t.ha^{-1}$	320.000	180.000	2,46	13.530.000	495.000	315.000
$O_1K_1A_2$	Urea : 100 $Kg.ha^{-1}$ manure : 1 $t.ha^{-1}$	390.000	250.000	2,72	14.960.000	1.925.000	1.675.000
$O_1K_2A_0$	Urea : 0 $Kg.ha^{-1}$ manure : 2 $t.ha^{-1}$	500.000	360.000	2,10	11.550.000	(1.485.000)	-1.845.000
$O_1K_2A_1$	Urea : 50 $Kg.ha^{-1}$ manure : 2 $t.ha^{-1}$	570.000	430.000	2,64	14.520.000	1.485.000	1.055.000
$O_1K_2A_2$	Urea : 100 $Kg.ha^{-1}$ manure : 2 $t.ha^{-1}$	640.000	500.000	2,67	14.685.000	1.650.000	1.150.000
$O_1K_3A_0$	Urea : 0 $Kg.ha^{-1}$ manure : 3 $t.ha^{-1}$	750.000	610.000	2,50	13.750.000	715.000	105.000
$O_1K_3A_1$	Urea : 50 $Kg.ha^{-1}$ manure : 3 $t.ha^{-1}$	820.000	680.000	2,61	14.355.000	1.320.000	640.000
$O_1K_3A_2$	Urea : 100 $Kg.ha^{-1}$ manure : 3 $t.ha^{-1}$	890.000	750.000	2,18	11.990.000	(1.045.000)	-1.795.000
$O_2K_1A_0$	Urea : 0 $Kg.ha^{-1}$ NC : 1 $t.ha^{-1}$	300.000	160.000	2,34	12.870.000	(165.000)	-325.000
$O_2K_1A_1$	Urea : 50 $Kg.ha^{-1}$ PO NodulPlus : $t.ha^{-1}$	370.000	230.000	3,00	16.500.000	3.465.000	3.235.000
$O_2K_1A_2$	Urea : 100 $Kg.ha^{-1}$ NC : 1 $t.ha^{-1}$	440.000	300.000	2,45	13.475.000	440.000	140.000
$O_2K_2A_0$	Urea : 0 $Kg.ha^{-1}$ NC : 2 $t.ha^{-1}$	600.000	460.000	2,32	12.760.000	(275.000)	-735.000
$O_2K_2A_1$	Urea : 50 $Kg.ha^{-1}$ NC : 2 $t.ha^{-1}$	670.000	530.000	2,69	14.795.000	1.760.000	1.230.000
$O_2K_2A_2$	Urea : 100 $Kg.ha^{-1}$ NC : 2 $t.ha^{-1}$	740.000	600.000	2,69	14.795.000	1.760.000	1.160.000
$O_2K_3A_0$	Urea : 0 $Kg.ha^{-1}$ NC : 3 $t.ha^{-1}$	900.000	760.000	2,33	12.815.000	(220.000)	-980.000
$O_2K_3A_1$	Urea : 50 $Kg.ha^{-1}$	970.000	830.000	2,69	14.795.000	1.760.000	930.000

	[1] NC : 3 t.ha^{-1}						
$O_2K_3A_2$	Urea : 100 Kg.ha^{-1} NC : 3 t.ha^{-1}	1.040.000	900.000	2,80	15.400.000	2.365.000	1.465.000

Notes: *OF = organic fertilizer, NC = NodulPlus compost, Rp = Rupiah (the currencyinIndonesia),Price of Urea =Rp. 1.400.Kg^{-1}; Manure = Rp. 250.Kg^{-1}, decomposer NodulPlus : Rp. 50.000/ton pukan; soybean seed :Rp. 5.500.Kg^{-1}*

Results of benefit analysis of 21 treatment calculation of this study indicate that treatment $O_0K_1A_1$ is the most effective treatment performed (Table 6.). Result of the financial analysis is done at the price of soybean Rp 5,500. Kg^{-1}, the price of Urea: Rp. 1,400.Kg^{-1}; manure= Rp. 250.Kg^{-1}, and decomposers Nodul Plus: Rp. 50,000.piles^{-1}. Recommended for soybean acreage in the village Bunbarat, District Rubaru, Sumenep is to use NodulPlus compost 1 t.ha^{-1} and N inorganic fertilizer (urea) by 50 Kg.ha^{-1} (approximately half of standard application).

CONCLUSION

The application of NodulPlus compost can reduce of chemical fertilizers by 50% in sandy soil types that are less fertile. In this treatment will be produced as much as 3 t.ha^{-1} seed yield of soybean. The results of the financial analysis shows the application of NodulPlus compost by dosage 1 t.ha^{-1} and 50 kg urea.ha^{-1} gives the best results for the benefit of Rp 3,235,000if compared by the standard cultivation.

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