APPLICATIONS OF ORGANIC FERTILIZER AND SEED TREATMENT OF CABBAGE IN LOWLAND AREAS JAMBI PROVINCE

Aplikasi Pupuk Organik dan Perlakuan Benih Selada di Kawasan Dataran Rendah Provinsi Jambi

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ABSTRACT

Permintaan terhadap sayuran organik telah meningkat pesat sejalan dengan pekembangan informasi dan pengetahuan tentang perlunya mengkonsumsi makanan sehat. Teknologi pertanian organik baru saja diadopsi petani sayur di kota Jambi. Karena itu, petani sayur memerlukan bimbingan melalui percontohan dan penyampaian informasi teknologi. Riset aksi tentang sistem pertanian organik tanaman selada dilakukan di kota Jambi dari September hingga Februari 2007. Beberapa paket teknologi telah diterapkan dan diuji yaitu: perlakuan benih (tanpa dan dengan Nutrifam SD), pupuk organik (Bio-super active, Jus Bumi, Nutrifarm AG, Botani and Bokasi+manure+botani). Percobaan ditata dalam Rancangan Acak Kelompok dengan perlakuan faktorial dan pengaruhnya dianalisis dengan uji beda nyata Duncan (DNMR). Parameter pengamatan meliputi jumlah daun, luas daun, lebar tanaman, tinggi tanaman, biomassa tamanan, dan tingkat serangan hama dan penyakit. Hasil penelitian menunjukan bahwa perlakuan benih tidak berpengaruh nyata terhadap pertumbuhan tanaman. Pupuk organik bitani memberikan pengaruh nyata terhadap bobot tanaman (1,45 kg), tinggi tanaman (15,73 cm), luas daun (57,94 cm2) dan tingkat serangan hama/penyakit (8,67%. Sistem pertanian organik memiliki prospek sangat cerah untuk dikembangkan.

Kata kunci*: Selada, Propinsi Jambi , sistem pertanian organik*

INTRODUCTION

Jambi Province Municipality still has high potency of agriculture farming areas for developing some specific agriculture commodity. Some common agriculture commodity which is planted in this area such as: paddy and cereal crops (string bean, cassava, maize, yam, and peanut); and horticulture likes: cucumber, chickpea, eggplant, mustard, spinach, chilly, cabbage, tomato, rambutan, jackfruit, orange, Chico, papaya, banana and guava (Mugiyanto and Lutfi Izhar, 2007).

One of government food security program in Jambi municipality is applying organic agriculture systems of vegetable and paddy. This Program is reliable with current condition likes: population growth, economic development progress of Jambi, declining local income, increasing healthy life style awareness and high demand of organic vegetable product (Bappeda, 2005).

Paal Merah village, Sub district of Jambi Selatan, is the superior vegetable production center in Jambi municipality. However, only few farmers have tried to apply organic method in cultivating vegetable crop, and still facing problems like: unstable price of organic product, less availability of organic material, pest and disease occurrence. On that account, AIAT Jambi and Local Agriculture Institution of Jambi municipality, have working together

to socialize and assess organic system of vegetable crop and also introduce specific organic vegetable system to local farmer group based on ability of natural resources and its development prospect.

Cabbage is represent one of vegetable crop which have good potency to cultivate by organic vegetable technology method. Farmers in this area have high motivation to expand this crop because of efficient in input production and high product prices. Nevertheless, it burdened by the availability of specific organic agriculture technology in this location.

MATERIALS AND METHOD

Materials used in this research such as: cabbage seed from Panah Merah, some organic liquid fertilizers, effective microorganism, organic pesticide (mimba and *Beauverria basiana*), limited chemical fertilizer before planting time, animal manure, and less chemical pesticide application if required due to pest/disease incidence.

Research conducted in vegetable production centre, with farmer group "Sido Makmur", RT 11, Paal Merah village, Sub district of Jambi Selatan. Research design use some method likes: Participatory Rural Appraisal, Forum Group Discussion, field survey, primary data collection, collecting secondary data, and on-farm action research.

Research design had been used two factors as treatment: (1) ***seed treatment:*** without supplement (A0) and Nutrifarm SD (A1); (2) ***organic liquid fertilizer treatment***: Bio Super Active (B1), Juice Bumi (B2), Nutrifarm AG (B3), Botani (B4), and Bokasi+Botani (B5). Application of organic fertilizer was given weekly. Replication was done by as much 3 times at each 600 m^2 area. Research parameters are: number of leaf, Wide leaf canopy, crop high, crop diameter, crop weight and intensity of pest / disease occurrence. Production data was taken away from 2 m^2 area as crop sample. Data was analysis furthermore by DNMRT.

Farm preparation, plant preparation, seed treatment, planting time, crop cultivation, and harvest model were done based on ordinary technical land culture conducted by local farmer, like: planting distance was 60 c X 50 c, basis fertilizer application was NPK 200 kg/ha, re-watered 2 times daily, and harvested by sharp knife (Ichwan *et al.,* 1997; and Mugiyanto *et al*., 2006)

RESULTS

Paal Merah farmers have average land-ownership about 0,1 - 0,5 ha. The cropping pattern is usually applying multiple copping systems and some vegetable crop has cultivated gradually during a year. Vegetable that is most frequently cultivated by farmers such as: mustard, spinach and cress. Whereas, cabbage is represent one of the most vegetable which farmers like to cultivate due to good price and market demand.

Cabbage was planting in farmer land in which has chemical character like: comparison of sand : clay : loam is 36,51:51,26:12,23 in which generally dominated by Clay texture; pH H_20 is 4,9 (acid); C is 2,53 % (very low); Total N is 0,11 (very low); P Bray 1 (ppm) is 412,04 (high); and K extracts NH_4 Ac 1N pH 7 (me / 100 gr) is 0,2 (low). So that farmer's field needed an addition of fertilizer particularly Urea and KCL.

Some information of growth parameters, production data and number of cabbage which's damage by pest and disease incidence, was shown in the following Tables.

Table 1. Average of cabbage leaf number at various organic liquid fertilizer treatments and seed treatment in Paal Merah, Jambi, 2006.

Seed treatment	Organic Fertilizer Treatment					Average
	B1	B2	B3	B4	B5	
A0	13,93 abc	*14,77 a*	14,33 ab	14,20 ab	13,07 bc	14,19 a
A1	*14,00 abc*	13,57 bc	13,60 bc	*13,90 abc*	12,77 c	13,57 a
Average	13,97 a	14,17 a	13,97 a	14,05 a	12,92 b	

Number followed with the same letter is no different at level 5%

Table 2. Average of canopy (shoot area) of cabbage at various organic liquid fertilizer treatments and seed treatment in Paal Merah, Jambi, 2006

Seed treatment	Organic Fertilizer Treatment					Average
	B1	B2	B3	B4	B5	
A0	56,11 a	58,83 a	57,94 a	58,44 a	55,11 a	57,16 a
A1	56,50 a	55,56 a	56,50 a	56,61 a	56,00 a	56,43 a
Average	56,31 a	57,20 a	57,22 a	57,53 a	55,56 a	

Number followed with the same letter is no different at level 5%

Table 3. Average of crop high of cabbage at various organic liquid fertilizer treatments and seed treatment in Paal Merah, Jambi, 2006

Seed treatment	Organic Fertilizer Treatment					Average
	B1	B2	B3	B4	B5	
A0	14,56 a	14,55 a	14,80 a	14,88 a	14,55 a	14,65 a
A1	14,94 a	14,24 a	14,26 a	15,73 a	15,93 a	14,87 a
Average	14,75 a	14,40 a	14,53 a	15,31 a	14,74 a	

Number followed with the same letter is no different at level 5%

Tabel 4. Average of crop weigh of cabbage at various organic liquid fertilizer treatments and seed treatment in Paal Merah, Jambi, 2006

Seed treatment	Organic Fertilizer Treatment					Average
	B1	B2	B3	B4	B5	
A0	1,45 a	1,47 a	1,38 a	1,35 a	1,24 a	1,37 a
A1	1,23 a	1,34 a	1,48 a	1,36 a	1,39 a	1,38 a
Average	1,34 a	1,41 a	1,43 a	1,36 a	1,32 a	

Number followed with the same letter is no different at level 5%

Table 5. Average of Crop Ring Cycle of Cabbage at Various Organic Liquid Fertilizer Treatments and Seed Treatment in Paal Merah, Jambi, 2006

Seed treatment	Organic Fertilizer Treatment					Average
	B1	B2	B3	B4	B5	
A0	60,42 a	60,33 a	60,71 a	60,72 a	60,18 a	60,60 a
A1	57,99 b	60,64 ab	62,30 ab	62,67 a	62,28 ab	61,03 a
Average	59,21 a	60,49 a	61,51 a	61,70 a	61,23 a	

Number followed with the same letter is no different at level 5%

Table 6. Percentage of cabbage damage due to pest/disease incidence at various organic liquid fertilizer treatments and seed treatment in Paal Merah, Jambi, 2006.

Seed treatment	Organic Fertilizer Treatment					Average
	B1	B2	B3	B4	B5	
A0	3,72	11,11	11,11	3,72	7,39	7,41
A1	5,56	14,83	0,00	5,56	3,72	5,93
Average	4,64	**12,97**	5,56	*4,46*	5,56	

Number followed with the same letter is no different at level 5%

DISCUSSION

Treatment B2 (Juice Bumi) with no seed treatment was giving highest result on average number of cabbage leaf, although its result only significantly different with B5 (Bokasi+Botani) treatments. Whereas, Maximum number of cabbage leaf as a result by seed treatment revealed that treatment B1 (Bio-Super Aktiv) was also significantly different only with the treatment of B5. Both seed treatments were give no significant difference for all organic liquid fertilizer. This substance happens because all the organic fertilizer have contained micro and macro nutrient by which complete enough and quickly absorbed by cabbage (Hardiyanto, 2005; and Martino, 2006). According to Risema (1993) short-lived crop like vegetable require quickly release fertilizer in supply of nutrient needed by crop. Feasible dissimilarity was arising from fertilizer that combines from Bokasi and Botani (B5). It's because the combination of fertilizer has no done perfectly so its mixture gift oppositely respond to cabbage growth especially for root enlargement and nutrient absorption in the soil.

Performance of cabbage was being observed like canopy size (shoot area). It was given result that no significantly different from all treatment of organic liquid fertilization and seed treatment. This was happening due to affectivity of fertilizers were relatively equal. Macro nutrient content, micro nutrient, amino acid and mutual microorganism can be exploited well by cabbage (Parnata, 2004; and Anonimous, 2005).

Application of several organic liquid fertilizers at cabbage did not give the significantly different for average crop high and average crop weight. On the same manner, influence of seed treatment by Nutrifarm also did not give significantly different for those parameters. This phenomena was arise because nutrient content and growth hormone in those fertilizer can be absorb optimally by cabbage at specific environment in Jambi

(Anonimous, 2005 and Satya Jasa Caraka, PT. 2006)

Performance of crop ring circle tends to shown that no significantly different mainly at no seed treatment. Though, application of organic liquid fertilizer "Botany (B4)" was given result a significantly different from bio-super active (B1) and no significantly different from the other organic liquid fertilizer treatments. For temporary, all treatment tested for both organic fertilizer and seed treatment was shown no significantly different.

Percentage of cabbage damage due to pest and disease incidence tends to be minimized. Even, application of (B3) Nutrifarm AG organic liquid fertilizer and Nutrifarm SD in did not prove the existence of pest and disease symptom. Treatment of Nutrifarm SD at seed before planting time was diminishing the amount of pest and disease occurrence up to 1,48%. Organism incidence somehow was supported by technical cultivation and climate in which is often arise in early growth of cabbage (Edmond *et al.,* 1975). Some cabbage was spread out by insecticide Proclaim and fungicide Dithane-M45 with the minimum dosage to prevent the prevalence of organism continuously.

Some pests were commonly show aggression to cabbage such as: caterpillar tritip (*Plutella xylostella*) and *Crocidolomia binotalis*. Both pests were cutting growth point so that the bud was damaged and crop was not formed well (Siemonsma JS and K. Piluek, 1994). At the same time, disease which is generally attack cabbage was black rotten disease (*Xanthomonas campestris*) and soft rotten disease (*Erwinia carotovora*).

CONCLUSION

1. The development of cabbage lowland organic farming systems in Jambi municipality has good prospect, throughout organic liquid fertilizer application like Botany, Super Nutrifarm and Bio Super Aktiv.
2. There was no significant different in application some organic fertilizer and seed treatment for cabagge growth and production
3. Adjustment technology of bio-pesticide like Mimba and *Beauveria basiana*, and also seed treatment by Nutrifarm can reduce pest/disease occurrence and improve cabbage production.

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