International Journal of Agricultural Technology 2017 Vol. 13(7.3):2409-2414
Available online http://www.ijat-aatsea.com
ISSN 1686-9141

Utilization of Fermented Bioextract to Accelerate Growth of Cassava Cutting

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Teerapong Sarakham, Sarawut Anoree, Pongtawat Sriparang and Niachaporn Nabhadalung (2017) Utilization of Bioextract to Accelerate Growth of Cassava Cuttings. International Journal of Agricultural Technology 13(7.3): 2409-2414.

Utilization of fermented bioextract to accelerate growth of cassava cuttings was studied. Result showed that using of fermented bioextract had no affected on root length of cassava cutting at 30 and 45 days after cutting and no affected on height of cassava cutting at 45 days after cutting. However, using of fermented bioextract showed significantly increased in height of cassava cutting ($p<0.05$) at 30 days after cutting. The fermented bioextract showed significant increased in root number of cassava cutting ($p<0.05$) at 30 and 45 days after cutting. In addition, there was not significantly increased ($p>0.05$) in root length, number of roots and height of cassava cutting between the use of fermented bioextract and root growth accelerate substance. Applicaton of fermented bioextract from fish showed significantly highest and increased in root length, number of roots and height of cassava cutting. The result indicated that the use of fermented bioextract from fish could be used to substitute root growth accelerate substance for cassava cutting.

Keyword: Fermented bioextract, Cassava, Root growth, accelerate substance

Introduction

Cassava *(Manihot esculenta* Crantz) is considered one of the most important economic crops in Thailand. However, cassava is not a staple food for Thai people; it is a cash crop produced by small farmers. Nearly all the harvested roots are processed into dry chips and pellets for export as animal feed, as well as into starch, both for domestic use and export. About 80% of the production is exported. Major cassava production problems in Thailand are declining soil fertility, soil erosion and limited genetic diversity of the crop. Previous research conducted by the DOA has resulted in breeding and selection of high-yielding and high-starch content cultivars. Latin American germplasm provided by CIAT is now well incorporated into the whole breeding system.

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Agronomic practices, such as land preparation, stake selection and storage, planting method, planting time, fertilization, crop rotation, intercropping and weed control have been studied (Ratanawaraha *et a*l., 2012). Fermented bio-extract, a local wisdom, is a solution or mixture of organic residues and sweetener. In general, the dark brown paste from sugar industry or molasses is the sweetener. Its fermentation process is both aerobic and semi-anaerobic depended on the purpose of econdary metabolite uses. The advantage of using fermented bio-extracts is to reduce various chemicals for plant growth promoters and pest controls. These chemicals are harmful for farmers, environment and consumers (Somkiat, 2012). The fermented bioextract showed promote quality of plant yield. Mungkunkamchao (2013) found the application of fermented bioextract showed small increases in total plant dry weight, fruit number, fruit fresh weight and fruit dry weight, but significantly enhanced total soluble solutes of tomato fruit ($P < 0.01$). Kamla *et al*. (2012) was to investigate the benefit of bio-extract combined with organic fertilizers and alone as a nutrient source for crop biomass and yield. In a pot trial, addition of bio-extract alone at the local farmers' rate and frequency did not increase either biomass or yield of cowpea. However, in field and pot experiments, addition of bio-extract with organic fertilizers significantly increased plant top dry weight and yield above that obtained with organic fertilizer alone. Animal-based bio-extract gave larger and more consistent yield response than plant-based extract. Due to fermented extract showed promote plant growth and we need to use fermented bioextract usage compensed the chemical substance for soaking applied for cassava cropping, the effects of different fermented bioextract on root and plant growth of cassava cutting was to studied comparing with root accelerate substance for reduce chemical application in cassava production.

Materials and methods

The experiment was conducted at Buriram Rajabhat University during November 2012 to July 2013 and was designed into completely randomized design (CRD*)* five treatments and three replications namely 1) water 2) bioextract from cherry snail 3) bioextract from fish 4) bioextract from vegetable and fruit and 5) root growth accelerate substance (30 cc/ per 20 liters). Soil from cassava field was taken to dry and well mixed for experiment. The cutting of cassava was cut into 30 cm and then done soaking with 1:10 of each bioextract and 30cc per 20 liter accelerate substance according to the experimental treatment. After two hours, put cassava cutting into the plastic bag containing one kilogram soil. The cutting was watering to keep optimum moisture and allowed to grow for 45 days. Weeds were control by hand, no fertilizer and no pesticide application all experiment. Root length, root number

and plant height were collected and analyzed analyzed for Analysis of variance (ANOVA) and mean comparison of root length, root number and plant height were analysed by Duncan's New Multiple Range Test (DMRT) at 5% level of significance.

Results

The result of using fermented bioextract from cherry snail, fish and vegetable and fruit to promote growth of cassava cutting comparing with root accelerate substance was as following. Using of fermented bioextract and root accelerate substance had no effect on root length ($P>0.05$) at 30, 45 day after planting and showed no effects on plant height ($P>0.05$) at 45 day after planting. However, using of fermented bioextract and root accelerate substance showed significant root number ($P<0.05$) at 30 and 45 day after planting and plant height ($P<0.05$) at 30 day after planting (Table 1). The result showed that using fermented bioextract showed no effects on root length, root number and plant height comparing with accelerate substance. However, using of fermented bioextract from fish showed highest of root length ($P>0.05$), root number ($P<0.05$) and plant height ($P<0.05$) of cassava cutting.

Table 1 Root length, root number and plant height of cassava cutting using each bioextract

Treatment	Root length (cm)		Root number (cm)		Plant hight (cm)	
	30 day after cutting	45 day after cutting	30 day after cutting	45 day after cutting	30 day after cutting	45 day after cutting
1) Water	12	14	42 b	60 b	15 b	18
2) FB (cherry snail)	12	14	65 a	78 a	18 a	21
3) FB (fish)	11	16	62a	87 a	20 a	22
4) FB (veg.&fruit)	11	15	51 a	82 a	19 a	21
5) Acc. substance	10	15	62 a	79 a	20 a	21
F-test	ns	ns	*	*	*	ns
C.V. (%)	18.5	7.8	15.4	10.2	10.2	9.4

Means with different letter(s) in columns are significantly different at $P \leq 0.05$.
FB = Fermented bioextract, veg = vegetable, Acc. substance = root accelerate substance

Treatment 1

Treatment 2

Treatment 3

Treatment 4

Treatment 5

Figure 1. Root of cassava cutting when using water (T1)
Bioextract from cheery snail (T2) Bioextract from fish (T3)
Bioextract from vegetable and fruit (T4) and root accelerate substace (T5)

Discussion

The result indicated that soaking of cassava cutting with different bio-extract eg., cherry snail, fish, vegetable and fruit, before planting might be used as root accelerate substance for cassava cutting. Different bioextract contained different plant nutrient depending on agricultural residues or plant residues (Omsub, 2004) (Suwannakiri, 2005) (Land development department, 2007). Fermented bioextract from fish showed highest promote in root growth and in plant growth of cassava cutting following by fermented bioextract from vegetable and fruit, fermented bioextract from cherry snail. It might because of more macronutrient, micronutrient humic acid and plant hormone in fermented bioextract from fish than other (fermented bioextract from bioextract fish, cherry snail and herbs) (Omsub, 2004) (Land development department, 2007). Fermented bioextract form cherry snail, vegetables, fruit and herbs are found to contain same content of nitrogen, potassium, phosphorus, calcium and magnesium. For micrantrient in bioextract were found boron, manganese, iron, manganese, zinc and copper with showed the highest content of iron and manganese in there (Somkiat *et al*., 2005). And some substrates, such as soluble organic acids, amino acids, in the bio-extract play some important roles to stimulate soil microbial activities and enhance crop growth (Kamla *et al*., 2007). Inaddition Many plant hormone in fermented bioextract such as auxin, gibberillins and cytokinins, that might promote root growth (Suwannakiri, 2005) (Land development department, 2007). The fermented bioextract from vetgetable and friut contained plant hormone (auxin, gibberellin and cytokinin) more than other fermented bioextract (fish, cherry snail and herbs) (Omsub *et al*., 2004). It is suggested that we might use fermented bioextract from fish, vegetable and fruit for soaking cassava cutting to accelerate root growth due to high cassava yield. However, this study is only a study of fermented bioextract usage to compensed the substance for soaking applied by farmer. To reach cassava yield needs more future work.

Acknowledgement

The authors are thankful to the Faculty of Agricultural Technology, Buriram Rachasima Rajabhat University for supporting location.

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(Received 11 October 2017; accepted 25 November 2017)