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MANUFACTURE OF NPK LIQUID FERTILIZER FROM MARKET WASTE AND ITS UTILIZATION IN PREI ONION PLANTS (*Allium ampeloprasum var. Porrum L. J. Gayvar. Porrum L. J. Gay*) AND CAYENNE PEPPER (*Capsicum frustescens L.)* IN SINGGALANG - TANAH DATAR REGENCY AND PAUH DUO NAN BATIGO, SOLOK SELATAN REGENCY

* Abdul Razak[1 2], Des M[2], Wirdaningsih[2], Relsas Yogica[2], Fitra Arya Dwi Nugraha[2]

[1]Lecturer of Postgraduate Biology Education Program, Universitas Negeri Padang
[2]Lecturer of Biology Education Program, Universitas Negeri Padang
Email: ar710322@gmail.com

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ABSTRACT

The purpose of this service activity is to train 2 group partners in Nagari Singgalang, Tanah Datar Regency and Pauh Duo nan Batigo, Solok Selatan Regency to be able to process organic waste into compost or organic fertilizer There are also farmer group partners and women cultivators who take part in PKK activities in the village of Pauh Duo Nan Batigo in South Solok Regency to grow vegetables. They number less than 35. Methods of community service are as follows: socialization and coordination of related parties, providing compost houses, procurement tools, and materials, compost making training Results obtained: a group of capable partners has processed market organic waste into organic liquid compost PK in the two villages.
Keywords: NPK, waste, liquid fertilizer, prei onion, cayenne pepper

INTRODUCTION

In general, the condition of agricultural land in Indonesia has decreased fertility and land degradation and has experienced decreased productivity, especially intensified rice fields. The causes include 1) imbalance of essential nutrient levels in the soil, 2) drastic reduction and a deficit of nutrients; 3) Decreasing levels of soil organic matter; 4) shallow plough tread layer; 5) pollution by chemicals or wastes; 6) Reduced microbial population and activity; and 7) Salting/alkalizing land use (Hartatik *et al*, 2015).

In coastal areas, such as the west coast of Sumatra, it causes changes in soil physical and chemical properties (Sumarsono *et al*, 2006). These changes are exacerbated by the use of chemical fertilizers, which in the last thirty years have had an impact on reducing soil quality and fertility.

Chemical fertilizers have side effects due to their residue which is subject to several events or their fate is in three circumstances. Chemical fertilizer residues remaining in the soil can also move due to the flow of rainwater on the soil surface or this chemical fertilizer residue is lost to the atmosphere experiencing volatility. It also depends on the physical and chemical properties of the soil (FAO, 2019). The situation mentioned above causes agricultural land in a broad sense, such as rice fields, fields and ponds to experience

problems with decreased soil fertility which triggers the use of chemical fertilizers to increase in the case of Indonesia and developing countries, not the case with developed countries that have used organic fertilizers.

This situation also occurred in Nagari Singgalang in Tanah Datar Regency and Nagari Pauh Duo Nan Batigo in Solok Selatan Regency. The condition of the soil and the high price of chemical fertilizers make it difficult for farmers to increase income and productivity of agricultural products on dry land in the highlands such as in the two villages mentioned above. For this reason, training in making NPK organic liquid compost using the EM4 starter is important and useful for increasing crop productivity and farmers' income, as well as improving soil fertility conditions using EM4 bacteria. This is the purpose of implementing community service activities. This is according to the opinion of Murbandono (2000) that the use of compost can increase porosity, aeration, soil microorganism composition, increase soil binding capacity to water, prevent dry layers on the soil, save the use of chemical fertilizers as an alternative to chemical fertilizers which are multipurpose and multi-faceted. A possible alternative to chemical fertilizers is organic fertilizers that are liquid and solid. Organic fertilizers have a positive impact on soil and humans as consumers of agricultural products. This is consistent with the statement of Dinesh *et al* (2010) which states that the application of organic matter can improve soil structure, increase water holding capacity, and increase soil biological life.

The same thing was expressed by Sevindrajuta (2012), giving organic fertilizers such as manure can increase the C-organic content in the soil which can increase or even decrease the soil pH. Other organic fertilizers such as chicken manure are an important source of nutrients because they have a higher nitrogen and phosphate content than other manure (Melati and Andriyani, 2005). Furthermore, the rumen of the cow is an important part covering the pre-digestion space for ruminating for a symbiosis of living microorganisms which have the function of helping to accelerate the breakdown of foodstuffs in livestock. The contents of cattle rumen are waste from slaughterhouses (RPH) that have not been widely used. The contents of the beef rumen can be used as a basis for making liquid organic fertilizer. Beef rumen contains cellulose and lignin compounds (Utomo and Rogen, 2015). The use of organic waste from the market to make compost will help overcome the problem of market waste that pollutes the environment. Compost made from market waste will reduce dependence on inorganic fertilizers whose prices are increasing.

In leek or leek cultivation, use organic fertilizers or restore soil fertility. The dry land in Nagari Singgalang is problematic at the moment. Declining soil fertility has led to a decline in the income of farmers in this Nagari. the rest of the harvest to Bawang Prei is one of the plants belonging to the genus Allium which does not have a true stem. Prei onions have large pseudo-stems, white and have a sharp aroma. The leaves are long and flat and not hollow. The leaves have tough stems with a green colour. The size of these leeks is bigger than red onions. This plant does not have tubers like onions or garlic. Growth is quite slow with a harvest age of about 6 months. The use of fertilizers on dry land generally uses inadequate doses, so that nutrient depletion is suspected. Fertilization with adequate NPK doses is important for the cultivation of Leeks or Prei Onions (Hartatik, 2015). This is found in community service locations in Nagari Singgalang.

Leek can be cultivated as a single plant or an intercropping plant. This plant can grow well in tropical climates. Plant propagation by separating clumps of saplings. Leek can grow in areas with an altitude of 250-1500 m above sea level. Good soil conditions for planting leek are soil with a neutral pH level of around 6.5-7.5. If the soil pH level is below 6.5 (acidic pH) it is necessary to calcify the soil before planting. Leek andosol soils and clay soils are very popular as the growth substrate. The optimal ambient temperature is 18-25ºC and the optimal rainfall is 2000 mm/year.

Almost the same thing is also found in Nagari Pauh Duo Nan Batigo in South Solok Regency, in this village, farmers plant field crops such as arabica coffee, areca nut, banana and also vegetable crops such as tomatoes, red chillies, cayenne pepper and so on. This village is having trouble doing short-lived horticultural cultivation business due to the high price of chemical fertilizers. This causes the productivity of the harvest to decrease and income to decrease. Farmers have not been able to make organic fertilizers, either solid or liquid. For this reason, the UNP Community Service Team conducted training on making liquid NPK fertilizer from market waste. After the training, it is hoped that farmers will be able to make it themselves. After that, organic liquid fertilizers can be used to solve the problem of high fertilizer prices and increase farmers' income.

Farmers have planted Cayenne pepper. Farmers are faced with the problem of fluctuating and uncertain market prices for red chillies and cayenne peppers. This is a problem in cayenne pepper cultivation. In the village of Pauh Duo Nan Batigo, this is the case, which makes it difficult for farmers to try to grow what commodities or major vegetables are profitable in the market. The uncertain market price of chillies has made people uneasy. Erratic weather coupled with the supply of imported chillies (Thailand, with prices below the local chilli price) causes the selling price of food commodities in Caringin Central Market (as the main supplier market for traditional central markets in West Java) and also in West Sumatra. Red chilli or Cayenne pepper is one of the complementary vegetables and cooking spices needed by almost all levels of Indonesian society at all times. Chilli is also an important ingredient in food processing, especially typical foods of several regions in Indonesia that like spicy taste. Many farmers grow various kinds of chillies which have a high selling value to meet community needs. It can be said, chilli is an ingredient primary complementary for the people of Indonesia and in West Sumatra. The demand for red chilli or cayenne pepper is determined by weather factors as supporting factors for adequate cultivation, including suitable soil and climate conditions, correct planting methods, careful maintenance and lack of imports of these materials. The uncertain market price of chillies has made people uneasy. Erratic weather coupled with the supply of imported chillies (Thailand, with prices below the price of local chillies) causes the selling price of food commodities in traditional markets in West Java and West Sumatra. (Budiman, 2012).

METHODS

The Community Service Team in Nagari Singgalang has two partners, namely Group 1 are vegetable farmers and Group 2 are rice farmers. The objectives of this community

service are: 1) training farmers to process organic market waste into organic fertilizer that is ready to sell; and 2) assisting the government in overcoming the problem of market waste by creating a market-based model of organic waste processing. The Community Service Team in Nagari Pauh Duo Nan Batigo has a farming partner who grows vegetables. The objectives of this community service are: 1) training farmers and housewives to process organic market waste into organic fertilizer that is ready to sell. 2) assisting the village government in overcoming the problem of market waste by making examples of market-based organic waste processing. The service steps that have been taken are as follows: 1) socialization and coordination with all related parties; 2) making NPK liquid compost, procuring tools & materials; 3) sorting organic and non-organic waste; 4) training in making liquid compost; and 5) educating vegetable traders to dispose of trash in its place.

RESULT

3.1 Program Socialization and Coordination with Related Parties

Socialization and coordination with related parties are useful for explaining the aims and objectives of community service implementation. In Nagari Singgalang Tanah Datar, the Chairperson and the PKM Team Dra. Des, MMS coordinated with Plt. Walinagari Singgalang. The results of the coordination were agreed upon when the PKM was implemented and the location was in Jorong Ganting, Nagari Singgalang, Tanah Datar Regency. In Nagari Pauh Duo Nan Batigo Tanah Datar, Chairman and PKM Team Dr. Abdul Razak M.Si coordinate with Walinagari. Pauh Duo Nan Batigo Socialization and coordination with related parties is useful for explaining the aims and objectives of community service implementation. The results of the coordination were agreed upon when the PKM was held and its location was in Jorong Pinang Awan, Nagari Pauh Duo Nan Batigo, South Solok Regency.

3.2 Making NPK Organic Liquid Fertilizer

After the liquid fertilizer material was available and the PKM Team had prepared the tools and materials, training was carried out on the manufacture of NPK organic liquid fertilizer. The manufacture of this liquid fertilizer is separated in a plastic barrel with a volume of 200 litres each for liquid fertilizer N, P and K. This is done in Nagari Singgalang. For the manufacture of liquid N fertilizer, the ingredients come from vegetable waste. For liquid K fertilizer from chopped dry coconut husk and for P fertilizer, it comes from the banana stem that is already fruitful and chopped with a size of 5-10 cm. Each 1/3 part after that until the volume of half the plastic barrel was added with well water and given a starter of 200 mm EM4. After that, it is tightly closed with fermented black plastic for 2 weeks. After that, it is filtered and the liquid is taken as liquid fertilizer, N, P, and K are taken to be used for leek plants. After that, it is used to water the leek plants at a dose of 30 m/litre of water, N, P and K.

Table 1. Level of Understanding of PKM Participants Post-Training of Organic Liquid NPK Fertilizer

No	Group Name	Level of Understanding			
		Very Good	Good	Enough Good	Not good
1	Farmer Group 1 Jorong Singgalang 20 people		V		
2	Farmer Group 2 Jorong Pinang Awan 15 people	V			

Note: 1 = Not good, 2 = Good enough, 3 = Good, 4 = Very Good

For Nagari Pauh Duo Nan Batigo done in a combination of market waste materials, dry coconut husk and banana stem umbu that have been fruitful and chopped in sizes 5-10 cm. Each 1/3 part after that until the volume of half the plastic barrel was added with well water and given a starter of 200 mm EM4. After that, it is tightly closed with fermented black plastic for 2 weeks. After that, the NPK liquid fertilizer material is filtered and the liquid is taken as liquid fertilizer. After that, it is used to grow cayenne pepper at a dose of 60 ml/litre of water.

3.3 Application of N, P and K Liquid Fertilizer on Prei Onion Plants

After planting the Leeks or Prei Onions for 2 months, the effect of N, P, K fertilization is obtained using the BWD Leaf Color Chart (BWD) 4 Color scale. Leek leeks are dark green. The same thing was done by Razak (2016) planting trials using Sargassum fertilizer, the results were dark green leek leaves which indicated the adequacy of NPK and fertile soil.

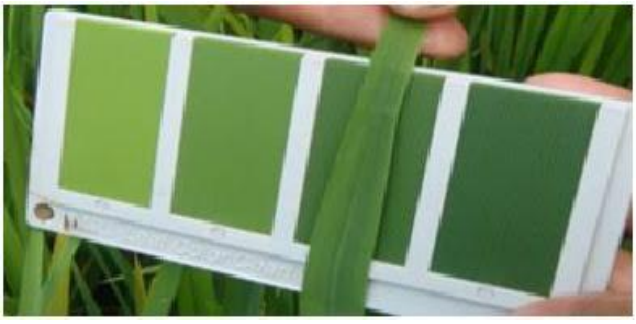

Fig 2. Leaf Color Chart (BWD) 4 Color scale

3.4 Application of NPK Liquid Fertilizer to Plants Cayenne Pepper

After planting cayenne pepper for one week, the seedlings of cayenne pepper have rapid growth of stems and leaves with a 3-4 scale leaf colour indicating the effect of NPK fertilization. Planting this cayenne pepper without using basic fertilizers such as manure. This shows that NPK liquid fertilizer affects the growth of cayenne pepper which is given a dose of 60 cc/litre.

CONCLUSION

Based on the description above, it can be concluded: 1) Training participants can make fertilizer organic liquid NPK made from market waste and understand the BWD as an indicator of growth and fertilizer adequacy on the planting area; 2) Organic liquid NPK fertilizer affects the growth of leek and cayenne pepper plants; and 3) According to the above results this PKM has achieved the goal and was successfully implemented and implemented by trainees.

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