




Making of Compost Fertilizer through Waste Raw Materials for Water Spinach Plants in Polybag

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Abstract

The article aimed giving an assistance of making compost fertilizer through waste raw materials for water spinach Plants in Polybag. The researchers used Community Based Research (CBR). This service was in the form of material counseling and direct demonstrations in the field for three months starting from a preliminary survey, determining the schedule until conducting outreach counseling in composting from waste sources. The Extension was carried out in two stages, namely by providing materials related composting and followed by carried out a direct demonstration in the field on how to make compost it with children at Yayasan Kesejahteraan Anak (YKA) Jambi City. The article conducted at Yayasan Kesejahteraan Anak (YKA), with 50 students as participants. The results showed that this assistance giving significant results of children because they have skilled in making compost from waste and planting water spinach in polybags where the results gave nutrition of Yayasan Kesejahteraan Anak (YKA).

Keywords: Making Compost Fertilizer, Compost Fertilizer, Assistance Students

ARTICLE INFO

Article history:

Received
June 01, 2022
Revised
October 01,
2022
Accepted
October 07,
2022

Published by
ISSN

CV. Creative Tugu Pena
2774-7077

Website

<https://attractivejournal.com/index.php/bce/>

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INTRODUCTION

Water spinach is an annual vegetable crop, short-lived, and widely favored by various levels of Indonesian society because of its delicious taste and high nutritional value, such as iron, vitamins A, B, C, protein, and fiber. In addition, according to (Xiang et al., 2020; Liang & Chien, 2013) water spinach also contains sedative substances that can reduce tension and induce calm, contain phytochemical compounds which are bioactive components and natural antioxidants for the body and can reduce the risk of cancer, liver, stroke, high blood pressure and diabetes (Chepkirui et al., 2021; Ning et al., 2017). gastrointestinal tract infections (Maulana 2018). In addition, consume kale by all ages because of its very good benefits for the brain. For children, kale will help brain development. On the other hand, parents also need kale to keep the brain working stable and avoid senile dementia. Can prevent cancer, prevent heart disease, diabetes and dehydration and can also make it easier to sleep.

According to the Central Statistics Agency (BPS) (2019), kale is one of the three most consumed vegetables, but the national productivity of kale is in the period 2014–2018 decreased from 6.06 tons/ha to 5.99 tons/ha. The productivity

is still relatively low when compared to its potential productivity which reaches 20-35 tons/ha. The low productivity of kale is caused by environmental factors (climate and weather), pests and plant diseases, genetic potential, low soil fertility conditions, as well as reduced land area, from 52,541 ha in 2014 to 48,353 ha in 2018.

Yayasan Kesejahteraan Anak (YKA) Institution is an institution that cares for more than 50 students. This child is an orphan, an orphan or an orphan who is entrusted by his family or local authorities. These foster children come from various districts in Jambi province. Foster children who are educated here ranging from 6 years to 20 years old come from various ethnic groups and different economic backgrounds. Children in YKA Jambi City In this Palmerah location, they are formally educated starting at the elementary, junior high, high school and equivalent levels and are also educated informally in the city of Jambi at the YKA Orphanage to meet the nutritional needs and feed the orphanage children. So the orphanage does the cooking 3 times a day. in the public kitchen of the Panti so that a lot of used kitchen waste or kitchen waste is left to accumulate before being disposed of at the end of the Jambi City garbage disposal. Based on the large amount of kitchen waste. Hence, this material can be utilized as long as it is managed first by making compost. Compost is the result of partial / incomplete decomposition of a mixture of organic matter that can be artificially accelerated by a population of various microbes in warm, humid and modified aerobic environmental conditions.

Meanwhile, according to Zulkarnain (2013), compost is a fertilizer that partially or wholly consists of organic materials derived from plants or animals or from kitchen waste or household waste or former plants that have gone through a decomposition process, which can be in solid or liquid form to increase fertility. soil to incorporate organic matter, improve physical, chemical and biological properties. Where to make compost from kitchen waste material, it is first selected from inorganic materials after which it is inserted into the soil and given EM4 microorganisms as an activator to speed up the process of making compost. Microorganisms as activators for decomposing organic matter, namely bacteria, fungi. In making this compost using EM 4 activator with the aim of accelerating the composting process that the selection of polybags as a planting medium for cultivation is influenced by several factors including rust resistance, durability, light weight, not getting dirty quickly, and easy to obtain. In addition, polybags are very good for drainage and aeration so that plants grow very quickly. But there is a disadvantage, Polybags have limited durability (maximum 2-3 years) or 2-3 times.

At the Yayasan Kesejahteraan Anak (YKA) Jambi city. Children carry out formal and informal learning activities. For an informal activity, the extension team wanted to provide assistance in making compost from kitchen waste for water spinach planted in polybags. The purpose of this service is to increase the skills and insight of Yayasan Kesejahteraan Anak (YKA) children so that they can grow crops by using kitchen waste raw materials as organic fertilizer. In addition, it is hoped that the skills will be useful to be able to independently make compost for plants if YKA's children are no longer in this orphanage.

To achieve the success of the service and counseling program. The output that is expected from this community service activity can make a positive

contribution to the children of YKA Jambi City with a solution, namely improving environmental insight that is clean, beautiful and cool, because with improved treatment of kitchen waste it can be used as compost that can be used as compost. can be used directly for fertilizing existing plants or if possible, can be marketed so that it is expected to increase the income of the YKA Institution in Palmerah Village, Jambi City.

In the service, socialization has been carried out on composting materials derived from kitchen waste raw materials and other organic materials around the YKA Institution. Foster children at the YKA Institute will be invited to discuss how to make compost. In addition, it was also held to accommodate the aspirations of foster children at the YKA Institution. In delivering material to foster students at the YKA Institution, namely through the delivery of theories, pictures and demonstrations in the field in the correct way of making compost.

By utilizing kitchen waste at YKA, it is hoped that it will reduce air pollution. If the waste is burned, it will release CO gas into the air and methane gas. In addition, composting will reduce the place for waste decomposition and also reduce the need for land for landfilling the kitchen waste. Then the compost that has been finished can be used to fertilize the plants around the yard of the garbage house, which is the result of the waste generated from a domestic or industrial process or agricultural waste. In the Environmental Law Number 18 of 2008, concerning waste management, it is stated that waste is the remains of human daily activities or natural processes in solid or semi-solid form in the form of biodegradable or non-biodegradable organic substances. considered useful and discarded in the environment.

Based on the type of waste origin or source, namely: the waste can be grouped into organic waste and inorganic waste. Organic waste is waste produced from biological materials and can be degraded by microorganisms, easily biodegradable through natural processes Most household waste which is mostly organic material, including vegetable market waste, food scraps, fruit peels and leaves and twigs, fish bones, traditional markets, and fruits.

As a result, the presence of waste that is not managed properly will lead to a decrease in the quality of health and environmental hygiene which has an impact on public health. As a result, among others, the emergence of diarrheal diseases, typhoid, waste water that can contaminate residents' drinking water, dengue fever, the emergence of diseases, fungi, ringworm, tinea versicolor and itching, disruption of all economic activities due to the smell of garbage, air pollution, and creating unsightly and unhealthy view. From the explanation above, our counseling team from the agricultural faculty of UNJA, set the title of assistance in making compost with raw materials for kitchen waste for kale plants in polybags at the Child Welfare Foundation (YKA) Orphanage, Jambi City.

METHOD

The method used Community Based Participatory Research (CBR). CBR is a the form of research conducted or done with a commitment from useful society as strength support, resources linkage to the process research to obtain a research products that have value benefits for the surrounding community empowered and also useful for researchers who are directly involved (Belone et al., 2016; Wilson

et al., 2018). In CBR researchers are seen as a tool to empower community members as partners to produce knowledge (along with academics, civil society organizations, and other stakeholders) to collect information and seek change for important community issues (Mayan & Daum, 2015). This approach emphasizes the active role of the community in planning, implementing, and evaluating research result. The community service team for the Agro-ecotechnology program, Faculty of Agriculture, University of Jambi, continued its service activities at the Yayasan Kesejahteraan Anak (YKA) Orphanage Jambi City.

After making compost from kitchen waste, they were given counseling on how to use compost for kale. After composting, it can be used for kale plants in polybags. Where the use of compost for kale plants is expected to give maximum results in addition to being used for vegetables, it can be used for other vegetable crops. Then it is hoped that in addition to kale for consumption for orphans, the excess can also be sold on the market so that it increases the income of the YKA Institution

In the context of justification of the problem, the approach used is to aid and counseling as well as hold a demonstration in the manufacture of compost from kitchen waste and provide instructions on the dosage of compost fertilizer and provide guidance on the advantages and disadvantages of using polybags for planting kale.

The Steps of activity

This is the preparation stage for determining the extension schedule and where the counseling will be held as well as the preparation of materials and tools including kitchen waste, EM 4 kale seeds, granulated sugar, TSP fertilizer, polybags, black plastic, water, buckets, hoes, knives, machetes and hoes, stone and wood.

Counseling assistance by providing extension materials and explaining the material as well as a demonstration on how to make kitchen waste compost, then a demonstration on how to apply compost for kale in polybags

Evaluation Activity

The review activities in composting and planting kale in polybags are carried out every 6 days on Sundays because the YKA orphanage is on school holidays, starting from how to make fertilizer, filling soil into polybags, giving compost and planting kale maintenance until kale can be harvested

RESULTS AND DISCUSSION

Mentoring and counseling activities for YKA orphanage children in Jambi city. The service is carried out from August to October 2022. The purpose of the activity is to provide education and assistance on skills in making compost from kitchen waste to be used as compost as organic fertilizer for kale plants planted in polybags. The method used in this service is the participation observation method.

The process of making compost for kitchen waste from the YKA buffer source in Jambi City. The steps for making it are as follows. Steps in Making involve 1. Prepare kitchen waste to be processed for composting, 2. Separate organic waste from plastic waste .3. Soil hoe as deep as 30 cm with a size of 2 m long and 1 m wide.4. Prepare long and wide black plastic as a base for composting .5. Put the soil first about 5 cm deep and sprinkle organic kitchen scraps evenly on the soil

surface. Flush with surface water of the pile of soil and organic matter while being given EM 4 evenly over the entire surface of the compost material .7. Put the soil again about 2 cm and sprinkle again the kitchen waste material evenly on the surface of the soil then flush again with water and give it with EM 4 which is diluted. Do this until the waste material runs out, you can also add leaves or small twigs from grass clippings on the soil surface until they run out.9. After that, the plastic tightly closed lid so that it doesn't fly or open is given a ballast lid from wood or stone 10. Let the compost be opened for 20 days and see the results. 11. It should be noted in making compost is a place to accommodate compost fertilizer that is not contaminated by rainwater, animals and is not exposed to direct sunlight. 12. So that the composting process is stable, leave it for a few weeks. 13.

After making the compost, leave it for 4 weeks and then look at it again, stir it or turn it back and then close it again for about 2 weeks, and see again the compost is finished, it is marked with lack of smell and brownish black color of compost with the characteristics of the finished compost according to the characteristics of compost fertilizer, among others 1. Blackish brown in color, 2. Compost texture and slightly fine fibrous ,3. Does not cause odor ,4. The water content is no longer visible ,5. Soil with crumb and lumpy structure.

After composting, it can be added to the soil at the Polybag with a dose of 2 100 grams for each polybag mixed with soil media. After being put into a Polybag measuring 20 x 20 cm, the soil is flushed for 3 days, left first, after that, the kale seeds are planted. From the monitoring that can be done after mentoring and counseling for YKA children in Jambi City, it can be seen that the orphanage children have had deep insight about how to make kitchen waste compost and know how to determine the dose of compost fertilizer and how to fill planting media that is put into polybags. And understand how water spinach cultivation in Polybag starting from planting seeds, maintenance, giving fertilizer and eradicating pests and diseases on kale plants..

If you look at the water spinach propyl growing in the field, it looks like it is thriving and has a lot of tillers, so the yield of kale has increased from before. Previously, it was only about 10 tons per ha to 15 tons per ha of fresh kale. The increased production of fresh kale is because this plant can get enough nutrients from the compost from kitchen waste so that kale plants can grow optimally. Compost increases soil fertility, providing macro nutrients such as NPK and micro nutrients such as Fe, Cu, Mn, Mo, Zn, Cl, B, and compost fertilizer can make the soil crumbly (Aboukila et al., 2018; Clarke et al., 2019). Increase water absorption Improve the quality of crop yields. Provides hormones and pytamine. Provide environmentally friendly soil. The presence of organic compounds containing humid acid and pulpit acid. The characteristics of compost.

If you look at the high yield of water spinach, according to (Hou et al., 2021), the wet weight of a plant is very dependent on the results of photosynthetic accumulation in the plant. After the kale plant thrives, the leaves are green with many tillers, because the plant gets enough nutrients from the waste compost. Compost is an organic fertilizer derived from plant, animal and animal residues and organic waste that has undergone a decomposition or fermentation process (Kadir et al., 2016). Hence, it can be used as a source of nutrients for plants but the quality of compost is largely determined by the activity of decomposers and the

source of compost material (Sharma & Reynnells, 2018). Compost can increase the organic matter content of the soil so that the soil becomes good and fertile. The general characteristics of compost, among others, are that it contains nutrients, provides nutrients, is slow in limited quantities and can improve soil fertility.

Composting technology is developed from the process of decomposition of organic material that occurs in the wild. The formation of humus in the forest is one example. natural composting. The process of making compost is very slow, it can take months or even years if it is natural, but now composting can be done quickly and briefly by means of composting techniques. where making compost is to regulate and control the natural process so that compost can be formed faster by adding composting activators.

The benefits of compost for plants include increasing soil fertility, improving soil structure and soil characteristics, increasing microbial activity, providing hormones and vitamins, suppressing growth or disease attacks, increasing water absorption capacity, improving crop quality, nutritional value, taste and quantity. increase the availability of nutrients in the soil.

The results of the research by (Kadir et al., 2016) showed that the application of compost derived from lantoro, gamal and kriyuh at a dose of 5 tons was able to increase soil organic C, increase water content and reduce soil polume weight and soil density. In addition, according to (Kadir et al., 2016) Drenovsky et al., (2004) Organic materials can play a role in the form of compost in the form of compost that can improve soil, soil aeration, soil is easy to process and loose has enough pores for water and air content.

Other results obtained by YKA orphanage children besides being able to make compost from kitchen waste. You can also learn how to cultivate kale, understand how to determine the dosage of compost for plants, understand how to mix compost with soil, be able to choose good kale seeds for planting, and also understand the advantages and disadvantages of using polybags for planting media. In carrying out the counseling, it was seen that the YKA children were very enthusiastic in following the counseling given. this can be seen from the questions from YKA children in the material presented and it can be seen that many YKA children were present because the counseling team provided material that was easy to understand and asked questions and answered until they understood and felt that YKA children had sufficient insight in growing kale. So this YKA boy intends to hope that there will be a continuation for the future for the extension team with other materials because they want to always be able to always cultivate good crops so that the results they get are maximum.

In addition, YKA children can already understand how to make compost from daour waste and how to plant using polybags for land water spinach plants. In addition to the results of kangkiung, it can be used for vegetables for YKA children, it can also be sold to the market so that it can increase the income of YKA Panti Jambi City

Outcome of service

The implementation of the service was held at the YKA Panti, Jambi city, for 3 months in 2022. The implementation time is based on the agreement between YKA and the members of the counseling team. With the title of mentoring and

counseling on the making of kitchen waste compost for kale plants in [polybag]. From the results of the discussion before counseling the children of YKA orphanage in Jambi city, wanted to improve the skills of YKA children to grow crops, because of the narrow yard area, a solution was sought so that they could grow plants in polybags. the rest of the kitchen waste from YKA per week that has accumulated. So it is recommended by the service team that this waste can be used as organic fertilizer by making compost first and then it can be used for plant fertilizer. In addition, the team will also carry out demonstrations of making compost from kitchen waste, how to put compost into polybags, dosage and dosage per polybag, and how to use polybags as well as how to cultivate kale until harvest.

The implementation of the drawing is carried out in two stages. for the first stage is how to sort kitchen waste materials to make compost, how to make compost, provide information about compost fertilizer, how to determine the dose of compost, explain the advantages and disadvantages of growing plants using polybags, how to fill and mix soil media with fertilizers, how to add soil media to polybags, how to grow kale seedlings, explain how to cultivate kale, and how to care for and maintain kale plants in polybags, and finally how to harvest kale in polybags.

In the second period, the method used in the field is to make compost from waste, how to plant and cultivate kale plants in polybags, starting from selecting seeds, planting, eliminating the media for the soil in polybags, and how to maintain kale plants in a polybag. The hope for the future from the extension team is that YKA's children will be able to produce compost fertilizer. can utilize kitchen waste from YKA can be used as compost and can cultivate kale in polybags so that YKA can be clean and safe from disturbances from kitchen waste pollution and can create an environment-friendly and clean and healthy atmosphere for children in YKA's orphanage.

After the counseling was carried out, we evaluated and discussed the material that had been conveyed whether YKA children understood it with discussion and question and answer. compost and how to cultivate kale. We got this from the answers given from the questions the team asked about the benefits of compost, making compost from kitchen waste, how to plant kale in polybags and how to take care of kale until harvesting. Future expectations from the extension team for the achievements of knowledge obtained by YKA children. Daiman can make his own compost from kitchen waste and can cultivate kale in compost and can grow crops in a limited space using polybag planting media.

The contribution that can be taken by the extension team is in the process of mentoring and counseling at the Child Welfare Orphanage in Jambi City. It was a success and YKA's children were satisfied with the increase in knowledge of how to use waste that could be used as compost for fertilizing kale plants planted in polybags. and from the orphanage, it is hoped that the extension team can continue with other plant cultivation sciences in the future.

CONCLUSIONS

After mentoring and counseling on making compost for kale plants in polybags can add skills for the future to YKA children in Jambi City. Besides the results of kale, some can also be consumed in the market. Thank you to the Jambi

University Faculty of Agriculture for providing support and morals and the Orphanage at the Yayasan Kesejahteraan Anak (YKA) in Jambi city.

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