



Utilisation of Cow Faeces as a Base Material to Making Bokashi Fertiliser to Increase Farmers Income in Balai Hamlet, Taram Village, Harau District

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Received: July 8, 2024

Revised: August 31, 2024

Accepted: September 23, 2024

Published: September 30, 2024

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DOI: [10.29303/ujcs.v5i3.669](https://doi.org/10.29303/ujcs.v5i3.669)

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Abstract: The application of technology in agriculture aims to increase food production through the substitution of traditional farming systems with modern farming systems by utilising more advanced technology. This has an impact on the use of chemical fertilisers and pesticides, which can cause environmental damage and ultimately reduce agricultural productivity. Processing cow dung into organic fertiliser for crops is an applied technology in the framework of implementing zero waste farming technology. One of the benefits that can be obtained is increased income by reducing the cost of artificial fertiliser needs. Cow faeces as cattle farming waste has not been optimally utilised. Cow faeces are usually piled up by farmers behind or near the cowshed, causing a strong smell (air pollution). The results of the activity of making cow feces bokashi organic fertiliser are very beneficial for farmers as a substitute for inorganic fertiliser; The creation of clean cowshed conditions, and environmentally friendly rice fields.

Keywords: Cattle faeces; Bokashi fertilizer; Farmer; Income

Introduction

The development of technology in agriculture is necessary because it is part of the revolution in agriculture. The application of technology in agriculture aims to increase food production through the substitution of traditional farming systems with modern farming systems by utilising more advanced technology. This has an impact on the use of chemical fertilisers and pesticides, which can cause environmental damage and ultimately reduce agricultural productivity.

Processing cow dung into organic fertiliser for crops is an applied technology in the framework of implementing zero waste farming technology. The benefits that can be obtained are: 1. Increased income by reducing the cost of fertiliser and pesticide needs. 2. Saving energy, reducing energy costs for cooking and reducing non-renewable energy consumption, namely fossil fuels. 3. Able to carry out sustainable agriculture,

the use of organic fertilisers and pesticides is able to maintain soil capacity and ecosystem balance to ensure sustainable agricultural activities.

Integrated farming system (IFS) as a concept of farming system that combines two or more farms (Channabasavanna et al., 2009; Jayanthi et al., 2009; Ugwumba et al., 2010; Massinai, 2012; Walia & Kaur, 2013; Jaishankar et al., 2014) where there are input-output linkages between commodities and biological recycling processes (Prajitno, 2009; Changkid, 2013; Massinai, 2012; Thorat et al., 2015), which use low external inputs (Devendra, 2011; Nurcholis & Supangkat, 2011; Hilimire, 2011) and utilise resources efficiently (Bosede, 2010; Balemi, 2012 and Soputan, 2012), and apply various techniques so as to increase production, productivity and income of farmers and sustainably (Gupta et al., 2012; Manjunatha et al., 2014; Thorat et al., 2015).

Crop-livestock integrated farming systems are one of the many technologies currently being developed in

How to Cite:

Mukhlis, M., Fitrianti, S., Wisra, R. F., Hendriani, R., & Sari, N. (2024). Utilisation of Cow Faeces as a Base Material to Making Bokashi Fertiliser to Increase Farmers Income in Balai Hamlet, Taram Village, Harau District. *Unram Journal of Community Service*, 5(3), 144-148. <https://doi.org/10.29303/ujcs.v5i3.669>

order to sustain the production system (Mukhlis et al., 2023). One form of integrated crop and livestock farming is integrated rice and cattle farming (Mukhlis et al., 2022).

Nagari Batu Balang as one of the Nagari in Harau District has reliable potential in improving the community's economy related to zero-waste agriculture or integrated agriculture. This condition is supported by the 2nd largest cattle population in Harau District, which is 1,020 heads, 120 buffaloes, and 506 goats. Nagari Batu Balang is also supported by a large area of rice fields in Harau District (Badan pusat Statistik Kabupaten Lima Puluh Kota, 2022).

To optimise integrated farming, it can be done through the use of cow feces, straw, bran, husk. In this Community Service (PKM) we chose the Subarang Ateh farmer group, where this farmer group really needs the introduction of science and technology in utilising cattle farm waste to be processed into organic fertiliser (bokashi fertiliser).

Subarang Ateh Farmer Group was established on 21 November 2021 with the Decree of the Wali Nagari Batu Balang No. 32 of 2021. Subarang Ateh Farmer Group is located in Jorong Balai, Nagari Batu Balang, Harau District, Lima Puluh Kota Regency. This farmer group consists of 27 people, chaired by Hasni. Each member in this group has a livelihood from farming (rice fields, fields, ponds and raising livestock). The members of this farmer group each own 0.5-1.0 hectares of paddy land with a total area of 9.0 hectares of paddy land and have 0.5-2 hectares of dry land each with a total of 19.5 hectares. Each group member owns 1-2 cattle, with a total of 15 cattle, 35 chickens and 15 ducks.

Method

Materials

The materials used in making 500 kg of cow faeces bokashi organic fertiliser are: 500 kg of cow feces, 50 kg of husk, 25 kg of bran, 500 ml of EM-4 and 500 grams of sugar, and 3-5 litres of water.

Methods

The method used is direct demonstration practice carried out by farmer group members in making 500 Kg Cow Feces Bokashi Fertiliser as for the practical steps are as follows;

1. Make a pile of sape fester evenly as high as 15 - 20 cm
2. Adding rice husk gradually and stirring evenly in a pile of cow feces
3. adding dran gradually and stirring evenly to the cow dung pile 3.
4. making microba lution by making a mixed solution of em-4, sugar and water that is stirred evenly

5. adding the microba lution gradually by sprinkling, then stirring evenly in the cow faeces mixture (until 30-40% wetness)
6. then the mixture is mounded to a height of 15 cm and covered with plastic
7. It needs to be stirred every 3 days to maintain a temperature of 40-50oc.
8. after 14 days the organic fertiliser can be applied

Result and Discussion

Lectures on the concept of integrated farming and the practical theory of making bokashi fertiliser

The results of the first activity showed that all members of the Prosperous Farmers Group were happy, excited, very interested, enthusiastic and grateful for the implementation of this community service programme. This programme began with a lecture and discussion. This activity has provided an overview and explained to farmer group members about: a). The concept of integrated farming which is an environmentally friendly zero-waste farming and farming system that can create increased income for farmers and surrounding communities; b). Practical technology for making cow feces bokashi organic fertiliser through the use of cow feces waste that has not been utilised into bokashi fertiliser which has high nutrients.



Figure 1. Lectures and discussions on the concept of integrated farming and the practical theory of making bokashi fertiliser

Demonstration of making bokashi fertiliser

The results of the demonstration activity of making cow faeces bokashi fertiliser consist of: a). Make a pile of cow feces evenly as high as 15 - 20 cm; b). Adding rice husk gradually and stirring evenly in a pile of cow feces; c). Adding brans gradually and stirring evenly on the cow feces pile; d). Making microba solution by making a mixed solution of em-4, sugar and water which is stirred evenly; e). Adding the microba solution gradually by spraying, then stirring evenly in the cow faeces mixture (until 30-40% wetness); f). Then the mixture is stirred to a height of 15 cm and covered with plastic; g). Need to

be stirred every 3 days to maintain a temperature of 40-50°C; h). After 14 days the organic fertiliser can be applied. If more, the mixture is stirred until the temperature drops and covered again. For more details can be seen in the following picture.

a. *Make a pile of cow feces*

Make a pile of cow feces was done by: cleaning the place for the pile, then piling the cow faeces by picking up the cow faeces that have been collected near the cage, then carrying and piling on the available place with a pile height of 15-20 cm, and evenly levelled.



Figure 1. Making Cow Faeces Piles

b. *Adding rice husk*

Adding rice husk was done by: sprinkling the rice husk by hand little by little, then stirring until it is evenly mixed with cow faeces.



Figure 2. Adding rice husk

c. *Adding rice brans*

Adding brans gradually and stirring evenly on the cow feces pile was done by: sprinkling rice bran

by hand little by little, then stirring until it is evenly mixed with cow faeces.



Figure 3. Adding rice brans

d. *Making microba solution*

Making microba solution was done by: preparing a bucket as a container, putting 5 litres of water into the

bucket, adding 500 grams of sugar and stirring evenly, adding 500 millilitres of EM-4 solution by pouring it

slowly into the water, then stirring until evenly distributed (not too concentrated and not too diluted).



Figure 4. Adding rice husk

e. *Adding the microba solution*

Adding the microba solution was done by: sprinkling the microbial solution by hand or watering directly with a paddle into the mortar, then stirring continuously until evenly distributed (until 30-40% wetness).



Figure 5. Adding the microba solution

e. *cover the mix of bokashi fertiliser ingredients*

Cover the mixture of bokashi fertiliser ingredients using black plastic until it is tight, so that it is not exposed to water and the fermentation process can occur optimally.



Figure 6. Cover the mix of bokashi fertiliser ingredients

Conclusion

Cow faeces as cattle farming waste has not been optimally utilised. Cow faeces are usually piled up by farmers behind or near the cowshed, causing a strong smell (air pollution). The results of the activity of making cow feces bokashi organic fertiliser are very beneficial for farmers as a substitute for inorganic fertiliser; the creation of clean cowshed conditions, and environmentally friendly rice fields.

Acknowledgments

We would like to thanks to Politeknik Pertanian Negeri Payakumbuh for contributing research funding through the PNB Fund of Politeknik Pertanian Negeri Payakumbuh with contract number. 3254/PL25/PG/2024. Then, all parties involved in the completion of this research.

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