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BRAND QUALITY IMPROVEMENT OF COMPOST PRODUCTS ORGANIC HOUSEHOLD WASTE TPS 3R SEKAR TANJUNG, WINDUSARI, MAGELANG

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ABSTRACT

Organic household waste is a problem for landfills that can cause unpleasant odors if not managed properly, the existence of TPS 3R Sekar Tanjung Windusari Magelang provides a solution to the problem through compost production. The benefits obtained include the organic waste that does not cause odor and is useful for plant media materials in addition to nutrients for plant nutritional needs. The production of TPS 3R Sekar Tanjung compost still produces bulk compost which is traded to farmers and consumers who love ornamental plants. Community service activities seek to improve the quality of compost product brands through label design, attractive packaging, and testing for C-Organic nutrient content, C/N ratio, pH, total N, P2O, and K2O at the Yogyakarta Agricultural Technology Research Center Laboratory in order to increase the economic value of compost products in the agricultural market.

Keywords: Compost, Organic, Household Waste, Sekar Tanjung

A. Introduction

The problem of waste in people's daily lives is still a prolonged polemic if without proper and wise handling it will lead to disaster and disaster. Garbage is part of the rest of human daily activities and/or from natural processes in solid form (Suyoto, 2008). According to the WHO definition, waste is part of something that is not used, not used, not liked, or something that is thrown away that comes from human activities and does not occur by itself. The results of human activities from the smallest group can come from the household environment, household waste generated by one or several families living in a building, house, or dormitory located in a village or city. The rate of volume of waste production continues to increase, not only in line with the rate of population growth but also in line with the increase in people's consumption patterns (Sucipto, 2012).

Household waste in the form of organic and organic has become a big problem faced by the community, in the era of the increasingly rampant onslaught of packaging products and organic waste (markets, agricultural products and the tofu and tempeh industry) which dominate in the Magelang Regency area. The area of Magelang Regency is 1,085.73 km2 with an increasing population of 1,279,630 people (2018); 1,290,590 people (2019) and 1,299,860 people (2020) with an increase in population for 3 years of 20,230 people (BPS Kabupaten Magelang, 2021) based on primary field data obtained in 2022 regarding the condition of the volume of waste entering the Pasuruan TPA of 32,802,520 m3 during 2021, especially the Windusari District with an area of 61.65 km2 has a population of 51,636 people in 2020 with a population density of 838 people/km2 sub-district level waste disposal is carried out in the Pasuruhan TPA area. Due to the increasing population, the amount of waste in Magelang Regency is increasing, with the condition of the Pasuruan TPA being overloaded with a heap height of 35 meters and the location almost no longer having plains to accommodate new waste. The policy issued by the Environmental Service of Magelang Regency as of January 1, 2022, is that the Pasuruan TPA does not accept organic waste disposal and the completion of reducing the volume of waste can be carried out with 3R TPS in each sub-district and village area.

Tanjungsari Village is located in the administrative area of Windusari District, Magelang Regency, has a population of 3,716 people with a population density of 1,147 per km2 (BPS Windusari District, 2021). The high population results in the amount of household waste reaching 1.98 tons/day, meaning that in one year the amount of waste reaches 722.7 tons/year of household waste, while the working area of TPS 3R Sekar Tanjung includes 7 hamlets and 239 families, hamlets These include Sudimoro Jurang, Sudimoro Dukoh, Grogol, Pendean, Ngabean, and Cengkirangan. TPS 3R Sekar Tanjung does not only accommodate household waste, but also waste from agricultural activities and market waste. Garbage that is left untreated will disturb the environment and even the health of the population.

Waste can be processed using the 3R principle which consists of reduce, namely reducing the use of single-use packaging or disposable items and reducing the use of raw materials in the manufacture of a product in order to reduce the waste generated; reuse, namely reusing goods that can still be used; and recycle, namely recycling an item or packaging into new items with new functions that can be used continuously. Recycle in 3R can also be applied to reduce the amount of organic waste by recycling organic waste into compost that can be reused

Waste management is important to reduce piles of garbage and environmental pollution. According to the Minister of Public Works Regulation number: 21/PRT/M/2006, in order to achieve a healthy and prosperous society in the future, it will be necessary to have a healthy residential environment. From the aspect of waste, the word healthy will mean a condition that can be achieved if the waste can be managed properly and correctly so that it is clean from the residential environment in it (Dwiyanto, 2011). The Regent's Regulation (PERBUP) of Magelang Regency Number 39 of 2018 concerning Regional Policies and Strategies for the Management of Household Waste and Types of Household Waste, hereinafter referred to as Jakstrada, is a policy direction and strategy in reducing and handling household waste and household waste at the regional level. integrated and sustainable. (JDIH BPK RI, 2018). Household organic waste management can be used for composting as has been done by the manager of TPS 3R Sekar Tanjung, even though the packaging and content conditions have not been carried out optimally, therefore assistance to the community focuses on increasing the competitiveness of compost products starting from product packaging to testing. nutrient content in mature compost.

B. Method of Implementation

Sekar Tanjung 3R TPS manager as a partner who is assisted in mentoring activities for packaging compost made from household waste, markets and agricultural products located in Tanjungsari Village, Windusari District, Magelang Regency. Daily activities carry out the activities of the

process of transporting waste from household sources/markets, the process of sorting (organic and inorganic) then proceeding with processing organic waste into fertilizer (solid and liquid). The technology and infrastructure used were applied using 2 workers for sorting and composting, 2 for drivers and garbage transportation, 1 administration and 2 managers of TPS 3R Sekar Tanjung. Mitra is able to produce 3 tons of compost from organic waste obtained from sources as an additional product of 3R services.

The bulk compost packaging used by TPS 3R Sekar Tanjung is still in the form of 25 kilograms of plastic bags and 2 kilograms of clear plastic with no sticker labels or laboratory test results for plant nutrient content in compost. Making compost products unattractive and cheaply priced among farmers and other consumers. From the conditions found in the field, it appears that the problems of packaging and nutrient content are still relatively ignored by partners. The strength of product packaging as an offering strategy will determine marketing success (Kotler and Keller, 2015). The business opportunity of compost as a planting medium is a business opportunity that is very much needed for lovers and hobbies of ornamental plants in urban areas, the condition of competitors selling the same product is very much in the Windusari District. Therefore, the manager of the Sekar Tanjung 3R TPS is trying to be competitive in order to be able to compete with the compost business actors. Increasing product branding through attractiveness of packaging is one of the tools that can be used for this purpose, so mentoring activities are directed to the following matters:

1. Conduct a series of assistance to help design compost product packaging that has attractiveness and selling value to consumers.
2. Testing the nutrient content of compost to the soil, plant, fertilizer and water laboratory at the Yogyakarta Agricultural Research and Development Agency, and
3. Implement the results of the packaging design that has been made on the compost product produced by TPS 3R Sekar Tanjung.

The activity was carried out by mentoring partners for 15 weeks of activity consisting of 1 lecturer of the

Agrotechnology study program, 1 main director of business entity organizations, and 2 accompanying students who accompanied the manager of TPS 3R Sekar Tanjung. The mentoring methods applied include:

1. Interview and observation method

Interviews were carried out for 3 weeks before the mentoring activity was carried out as a form of pre-conditioning activity to find out the main problems experienced by TPS 3R Sekar Tanjung in carrying out 3R waste management operations and processed compost which was used as a planting media business product (see Figure 1.)

Figure 1. Operational Management of Sekar Tanjung 3R TPS: a) Organic Waste Reversal; b) Weighing of Mature Compost

1. Methods of discussion and consultation

Discussion and consultation activities were carried out to obtain a form of common view and agreement on the form of activities between facilitators and partners which were carried out in the first week. The series of activities can be changed / modified according to the needs of the Sekar Tanjung 3R TPS (see Figure 2.)

Figure 2. Compost Packaging Discussion and Consultation: a) Packaging Model Discussion between Design and Management Teams; b) Design Consultation with the Chairperson of the Sekar Tanjung 3R TPS Management

2. Simulation method and practice

The series of activities carried out during the mentoring process always involved the manager of the Sekar Tanjung 3R TPS where the facilitator acted as a facilitator. Most of the implementation of mentoring activities for compost packaging products was carried out at the Sekar Tanjung TPS 3R Office. The packaging design process is carried out by accompanying students using Coreldraw software tailored to the needs of partners. The draft design that has been made is communicated with partners regularly to get the desired packaging agreement. The facilitator provides directions and

information on packaging and packaging functions as considerations for making an effective design. The packaging design process does not only include the size, volume, material, and shape of the packaging but also informative compost product labels that are competitive among consumers. Next, look for sources of pre-determined packaging orders so that they can be obtained regarding the location and the amount of packaging price per unit product that is calculated with partners. The calculation of the cost of packaging as a compost product label that appears from the packaging price can have an impact on the selling price of the product, if it is considered feasible and affordable then procurement and ordering is carried out.

3. Test the nutrient content of the compost

The nutrient content of compost has quite complete macro and micro nutrients that are needed by plants, especially macro nutrients including N-Organic, N-NH4, N-NO3, total N, P2O5 and K2O with supporting parameters for compost nutrients including C-Organic, C/ N ratio, and pH. The mature compost produced by TPS 3R Sekar Tanjung was tested for nutrient content at the testing laboratory of the Yogyakarta Agricultural Technology Study Center.

C. Result and Discussion

1. Production of Organic Household Waste Compost

Compost is part of one of the growing media that can provide plant nutrient intake from the degradation of organic matter residues that can improve soil properties and structure, increase water holding capacity, soil chemistry, and soil biology assisted by microorganisms as composting biactivators that can takes place both aerobically and anaerobically (Rukmana, 2007; Kesumaningwati, 2015). Composting is a solid waste treatment technique that contains biodegradable organic matter (microorganisms can decompose it). In addition to compost, it can be used as a planting medium, and can also be used as an organic fertilizer that has the ability to improve soil structure, optimize the soil's ability to absorb water and retain water and other

nutrients. The composting process carried out at TPS 3R Sekar Tanjung uses a local bacteritivator which is made independently by the manager with a bacterial production time of 20 days, while the process of composting organic waste until it is ripe is ready for application for 35 days. Decomposition through composting, in addition to reducing the amount of organic waste in the Tanjungsari Village area, can also provide benefits both as a planting medium and organic fertilizer for agricultural and ornamental plants, while from an economic point of view it provides additional income for the management of the Sekar Tanjung 3R TPS in carrying out environmental hygiene operations in the village. Tanjungsari, Windusari District.

Reducing the volume of household sources of organic waste carried out by TPS 3R Sekar Tanjung can make a positive contribution to the phenomenon of people littering on agricultural land, yards, ditches and rivers which causes drainage channels to fill with piles of garbage causing flooding/overflowing water. on the surface of roads and houses and smells a foul odor that is not good for respiratory health. Tanjungsari Village has a population of 3,716 people with 1.98 tons/day of waste consisting of organic and inorganic waste. The operational series of the Sekar Tanjung 3R TPS includes:

a. Garbage Collection and Transport from Waste Generating Sources

Garbage collection from sources (households and markets) totaling 239 families consisting of 7 hamlets includes: Sudimoro Jurang, Sudimoro Dukoh, Grogol, Shortan, Ngabean, and Cengkirangan which is carried out on Wednesdays and Saturdays every week using a Tosa motorbike. and 2 garbage collectors.

b. Segregation of organic and inorganic waste

Household waste from residents and markets that have been collected, then dropped in the 3R TPS hangar, then sorted organic and inorganic waste. Organic waste is followed by the process of processing waste into compost which is carried out by 4 sorters. The sorting process still pays attention to waste that has the characteristics of being easily decomposed, easily decomposed, and

easily destroyed by microorganisms / bioactivators, while inorganic waste, namely non-decomposing waste such as cans, plastic, glass, metal, and others is collected for sale. return back to collectors of used/junk goods.

c. Organic Waste Management

Organic waste collected is enumerated with the aim of reducing the size of organic waste from large to smaller up to 80% of the original form of organic waste, 1 person managing organic waste who routinely monitors and supervises regularly.

d. Composting Process

The composting process uses aerobic composting techniques by pressing, namely the waste is sorted, taken organic, then (the large ones) are chopped, given 150 milliliters of local microorganisms into 2 liters of clean water then mix 335 milliliters of drops and stir until blended (decomposer solution), after mixed perfectly, sprinkled on organic waste that has been chopped with a capacity of 100 kg of organic waste, added bran and dolomite in stages / gradually then stirred into the garbage collection tank located at TPS 3R Sekar Tanjung. Maintenance and temperature measurements are carried out every day using an alcohol thermometer for ± 1-2 minutes plugged into organic waste, temperature monitoring on the first 3rd day of temperature measurement (72o C) the pile is turned over and doused with decomposer solution, on the 9th day less temperature (67o C) the pile is turned over and watered with decomposer solution, on the 13th day the compost is ripened with temperature (60oC) the pile is turned over and watered with decomposer solution, the 16th day is ripening temperature (49oC) the pile is turned over, the 19th day is ripening compost size temperature (30oC) pile is turned over. The maturation process takes about 22 – 28 days and the drying of mature compost. Days 28 – 30, the cooling process is carried out by spreading the fertilizer until the fertilizer is completely dry. After drying, it is continued with sifting to produce fine compost, ready for application as a planting medium.

a. Pengemasan kompos matang

Kompos matang yang telah diayak, kemudian dilakukan pengemasan di

plastik bening berlabel stiker produk TPS 3R Sekar Tanjung.

2. Design Making for Fertilizer Packaging and Packaging

Product is one comcomponent/everythingat is offered to the market to be used, consumed an,d supporting the fulfillment of one's neeneeds/desires wide variety of products are offered to the market in attractive and informative packaging. Packaging is an element of product strategy circulating in the market so that it can be sold in demand by consumers, so packaging has a strategic position in marketing a compost product. In simple terms, packaging can also be interpreted as a way to deliver goods to consumers in the best and profitable conditions. In the current era of globalization, packaging has a very important role because it will always be associated with packaged commodities and at the same time increase the selling value and image of the product in the eyes of consumers. The Directorate General of Agricultural Product Management and Marketing of the Ministry of Agriculture of the Republic of Indonesia (2012) informed that the packaging functions are as follows:

1. Protect and preserve products, such as protecting from hot ultraviolet rays, humidity, impact and contamination with dirt and microbes that can damage and reduce product quality.
2. A a product identity, in this case the packaging can be used as a means of communication and information to consumers through the brand listed on the packaging.
3. Improve efficiency, such as simplifying the process of counting, shipping and storing products.

In general, packaging should be informative, clearly identified, convey the benefits and uses, have clear labels in accordance with label and advertising regulations, be effective, attractive and provide convenience. Packaging designs that are not well received will make it difficult for consumers to recognize, choose and make decisions on a particular product choice (Kotlter and Armstrong, 2014). Packaging is also a medium for marking goods, the color of the packaging reflects the contents, is

environmentally friendly and can be recycled. In order to appear attractive, the packaging needs to be designed so that it fits the packaged product, according to the level of the intended marketing, is up to date, attractive and acceptable, easy to display, communicative and different from competing products. Packaging design includes shape design and graphic design. On the packaging there is also a need for labeling as identification, assisting product sales and compliance with statutory regulations. Branding is also important as an identity, differentiator from competing products and quality assurance (Widianti, 2019). The packaging elements that are made try to encourage product positioning and marketing strategies, so the packaging does not only function to protect the product from defects, it provides detailed information related to the nutrient content of compost which is an image of compost quality, it is necessary to carry out a good packaging design process. Kotler and Keller (2015) state that packaging is a "five-second communication" with consumers. The basics of size, durability, shape, material, color, type/character of writing and product brand writing can be considered in the preparation of designs including:

A. Design Making

The design of the planting media packaging was first discussed with the design team and TPS 3R Sekar Tanjung management to get an overview of the concept, design templates and textual messages as well as images that will be conveyed on the packaging label, the results of discussions and consultations can be obtained. see Figure 3.

Figure 3. Organic Compost Product Label: a). Front Fertilizer Label, b). Back of Fertilizer Label, c). Box Fertilizer Label (Grow Kit / Planting Package Consists of Seed, Media, Fertilizer and Polybag)

b. Composting Product Packaging Simulation

Simple packaging that is carried out during assistance, how to offer and deliver goods to consumers in the best and profitable conditions. the packaging made is informative, clearly identifies, conveys the benefits and

uses, has a clear label in accordance with labeling and advertising regulations in an effective, attractive, and can convey a message of product strengths / advantages. Packaging is also a medium for marking goods, the color of the packaging reflects the contents, is environmentally friendly and can be recycled, see Figure 4. Packaging before labeling and after

Figure 4. Compost Fertilizer Packaging (a) Front (b) Back(c)Planting Package (Media,Seeds, Fertilizer Polybag (d) Front of Box

Fertilizer was tested at the soil laboratory owned by BPTP Yogjakarta, the test was aimed at testing pH, content of N, P, K, Organic and C/N Ratio (See Table 1).

Fertilizer testing

Tabel 1. Compost Nutrient Laboratory Test Results

No	Parameter	Unit	Compost	Method	Solid Quality Standard
1	C-Organik	%	19,87	Walkley & Black, Spektrofotometri	Min. 15
2	C/N rasio	-	19,86	Kalkulasi	≤ 25
3	pH H_2O	-	8,1	Electrometry, pH meter, (1:5) IK 5.4.j	4 – 9
4	Hara Makro				
	N-Organik	%	0,80	-	-
	$N\text{-}NH_4$	%	0,09	-	
	$N\text{-}NO_3$	%	0,11	-	
	N total	%	1,00	Kjeldahi, Titrasi IK 5.4.l	Min. 2
	P_2O_5 total	%	1,08	Wet Oxidation, HNO_3+$HClO_4$, Spektrometri IK 5.4.m	
	K_2O total	%	2,77	Wet Oxidation, HNO_3+$HClO_4$,AAS IK. 5.4.n	

Source: Yogyakarta AIAT Laboratory Analysis, 2021

It can be seen from the table of fertilizer test results at the soil laboratory owned by BPTP Yogyakarta showing that the C-organic content according to the solids quality standard is 19.87% with a minimum quality standard of 15. The content of organic matter C/N ratio is high, namely 19.86 %. The alkaline pH content is 8.1 with a solids quality standard of pH ranging from 4 to 9. The total N content is relatively low at 1.00% with a minimum solids quality standard of 2%. The total P2O5 content is still low, namely 1.08% with a minimum solids quality standard of 2% and the total K2O content is classified as moderate, namely 2.77% with a minimum solids standard of 2% based on the Decree of the Minister of Agriculture of the Republic of

Indonesia Number 261/KPTS/SR.310/ M/4/2019 regarding the minimum technical requirements for organic fertilizers, biological fertilizers, and soil enhancers.

The organic matter contained in compost is a buffer that functions to improve the physical, chemical, and biological properties of the soil which is used as an energy source (Dewi and Tressnowati, 2012; Pereira et al., 2014). The nutrient content of N serves to stimulate plant vegetative growth such as root, stem and leaf growth, besides that N also plays a role in the formation of green dye in leaves which is very important for the continuity of photosynthesis (Hajama, 2014). slow plant growth, thin and stunted plants, small leaves with a green to brass color. The condition of nutrient nitrogen (N) does not meet the requirements of Minister of Agriculture Number 261/KPTS/SR.310/M/4/2019, the low yield of N is due to the lifting of nitrogen in the form of ammonia during the composting process and can occur during packaging before analyzing the nutrient content. (Capah, 2006).The content of phosphorus (P) in plants serves to stimulate root growth in the initial root conditions, the seeds become buds and young plants, can help the assimilation and respiration processes in plants (Baroroh et al., 2015), accelerate the flowering process, and ripen fruit and seeds. , if P deficiency can affect the entire color of the leaves will turn older and appear reddish shiny, the edges of the leaves, branches and stems will turn purplish red and will gradually turn yellow and wither. The condition of the P nutrient does not meet the requirements of Minister of Agriculture No. 261/KPTS/SR.310/M/4/2019, the lack of phosphate ions H2PO4- and HPO42- during the composting process (Elfiati, 2005). The nutrient content of potassium (K) has met the requirements of Minister of Agriculture number 261/KPTS/SR.310/M/4/2019 with K functioning to strengthen plants in the formation of protein and cellulose (Ekawandani and Kusuma, 2018) so that leaves, flowers and fruit do not easy to fall off, and become a source of resistance to drought and disease, symptoms that can arise if the deficiency is shriveled and curly

leaves, brown spots appear and the leaves will dry out.

D. Conclusion

The implementation of Community Service (PKM) activities to improve the quality of compost at TPS 3R Sekar Tanjung can be concluded as follows:

1. Assistance in the design of compost packaging produced by TPS 3R Sekar Tanjung has a new appearance that is attractive and easy for consumers to understand.
2. The results of the analysis of the C-Organic nutrient content, C/N ratio, pH H2O, total N, P2O and K2O carried out in the soil, plant, fertilizer and water laboratory of AIAT Yogyakarta can provide information disclosure on the nutrient content of compost that can be beneficial for plants agriculture and increase trust for both farmers and consumers.
3. Farmers and other consumers are interested in buying compost products directly at the location of the compost production house by observing activities and learning about household waste management with the manager of the Sekar Tanjung 3R TPS.

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