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Stimulating Plant Growth with Microorganisms and Hormones in Worm Compost

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Abstract

Worm compost is a fungus that carries microorganisms and hormones that stimulate plant growth. Because of the vast number of microorganisms present and their high activity, the transfer of nutrients from worm droppings into forms that are accessible to plants may be accelerated. For decorative plants, vegetables, and fruits, the purpose of this research is to investigate the rise in plant growth on both a vegetative and generative level. Excellent for use as a planting medium combination in nurseries due to its high porosity. Containing hormones that have the potential to enhance the soil's physical, chemical, and biological qualities.

Introduction

A form of organic fertilizer known as Worm compost. Fertilizer derived from worm droppings that has been combined with soil and other organic ingredients is known as Worm compost fertilizer (Jack & Thies, 2006). In terms of organic matter, Worm compost is a smart choice since it may enhance the physical, chemical, and biological aspects of the soil, which is particularly beneficial in less fertile soils (Sofo et al., 2020). When applied to the soil, Worm compost fertilizer may improve the absorption of nutrients from the soil. It is possible to make organic vermicompost from a combination of animal waste and crop leftovers with the assistance of worms.

Vermicomposting, also known as vermicomposting, is the product of the metabolism of the worm's body, which is also known as earthworm excrement in certain circles (Domínguez, 2018). Worm compost, also known as vermicompost, is very high in nutrients, which are essential for soil fertility. Worm compost is a comprehensive nutrient source that comprises both macro and microchemical ingredients that are beneficial to plant development. This is due to the fact that the vermicompost has gone through two different breakdown stages throughout the procedure. First and foremost, it happens as a result of the critical role played by bacteria, namely prior to being ingested by worms. Second, it happens as a result of the worm's participation in the process, especially when the worm's stomach is filled with the worm's prey and the worm's prey is decomposed by metabolic processes. Worm compost fertilizer comprises nutrients such as nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, and other components that plants need (Hue & Silva, 2000). Giberallin, cytokinins, and auxin hormones are some of the biological components found in vermicompost fertilizer, and they do not have a detrimental impact on the environment (Arancon & Edwards, 2005). Giberallin is the body's regulating hormone, and it is also non-toxic to the environment.

There are various aspects that need to be understood when it comes to the cultivation of earthworms, including: Locations for Maintenance When selecting a company site, it is important to ensure that the location is convenient for the intended building placement; that the

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location is affordable; and that the area is safe. In addition, there is a water supply, which is very useful for maintenance. The location is easily accessible by the modes of transportation that are utilized. The availability of the essential raw materials, both for construction and for manufacturing processes; Accepted by the people in the surrounding area; Protection against social disruptions.

Buildings and maintenance are two important aspects of every business. Containers, to be precise Buildings for the growth of earthworms may be constructed in accordance with the preferences and requirements of those who design or execute them, ranging from basic to durable and permanent structures. Containers for routine maintenance Maintenance containers are used to hold the earthworms' living medium while they are being cleaned. There are many things to keep in mind: (1) the container does not emit poisonous chemicals; (2) it is not easily damaged by weather; (3) it is available at all times at the place of business; (4) The pricing is reasonable; (5) It is not in competition with other requirements; Either Lumbricus rubellus, Malaccus species, Pheretima Asiatica, Perionyx excavatus, Eisenia fetida, or Eisenia andrei earthworm seeds are used to propagate the worms' larvae

Methods

This practicum was carried out at Hasanuddin University's Experimental Farm (Ex-Farm) Agriculture in Tamalanrea District, Makassar City, as part of the university's agricultural research program. Saws, beams, machetes, meters, hammers, nails (3cm - 5cm), green insects, 2m used billboards, 2.5m bamboo, and scissors are among the items utilized in this practicum. Worms and 50 kg of sawdust were utilized in this project.

Results and Discussion

The media and feed for earthworms are as follows: media for media purposes; the organic material to be utilized must first be fermented before it can be used as media and feed. How: Organic material is taken from a source that is huge in size and diced into pieces 5-10 cm in length. Stir the ingredients together until they are uniformly distributed. Approximately 1 m3 should be stacked or placed in water-absorbing bags. It is rotated every 3 days for the first 4 days to ensure that the fermentation process is completed properly and that the piles do not form again. After that, it is stirred once more every 4 days. It is necessary to deconstruct the fermentation after 15 days.

After that, it is well mixed and allowed to air dry for 5-7 days before being transferred (prepared) into the maintenance container that will be utilized. It is 5-10 cm in height at the beginning of maintenance if the medium has been fed since planting, and it is 10-20 cm in height if the feeding begins on the third day after plant establishment. All animal waste (including leftover feed and excrement); all household trash; agricultural waste; sawmill; rice mill waste are examples of appropriate organic ingredients for the creation of media. In the production of media, it is important to ensure that the chemical composition of the material being used matches the criteria for a C/N ratio of 25-30% in the feed.

The organic matter that will be utilized as earthworm feed should include the nutrients that are required for the production goals in question. The feed components used for producing earthworms are greater in protein than those used for other purposes (Edwards, 1985; Edwards & Arancon, 2004). In order to induce spawning in earthworms that are in production (adults), the diet offered includes higher levels of carbs and fiber than is normally provided.

The following is the procedure for preparing organic matter for use as feed, as well as the method of administration: A large amount of material cut into 2-5 cm pieces or mashed;

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fermentation for 3 days; stirring until homogenous; Squeezing the container to verify the water content is tried to ensure that it is not too high. If the fluid is simply dripping slowly, the signal is sufficient. Prepare to present earthworms that have been maintained as a gift; Given a 25 percent dry matter content and a 24-hour rearing period, calculate the weight of earthworms that were raised. In this approach, seeds are dispersed equally on a surface of medium; the next day, it is determined whether the feed has been digested or whether there has been clumping. Feeding is completed on a daily basis (24 hours). A gentle stir is performed before each feeding to ensure that the residual feed is equally distributed throughout the medium.

The composition of vermicompost is mostly determined by the food supply used by the worms in the process of composting (Appelhof & Olszewski, 2017). Vermicompost contains a variety of components with a wide range of content, which reflects the diversity of the elements in their natural state. However, in general, the nutrient content of vermicompost includes the following elements: nitrogen (N) 0.63 percent, phosphorus (P) 0.35 percent, potassium (K) 0.20 percent, calcium (Ca) 0.23 percent, magnesium (Mg) 0.26 percent, sodium (Na) 0 0.07 percent, copper (Cu) 17.58 percent, zinc (Zn) 0.007 percent, manganium (Mn) 0.003 percent

Tabel 1. Data pengamatan pupuk Worm compost

Observation Week	**Observation Parameters**		
	Worm Volume	**Color**	**Texture**
I	Remain	The color is still the same as the original.	Rough
II	Add	Brown color	Rough
WE	Add	Blackish brown color	Smooth

Source: *Primary data after processing*

According to our findings, the number of worms will rise week after week, and the color of the vermicompost fertilizer will change from week to week. According to our observations during the sixth week, our vermicompost fertilizer was on the verge of failing due to a lack of control measures implemented, such as failing to maintain the humidity of the vermicompost. However, our vermicompost fertilizer was successful due to the assistance of rainwater, which kept the vermicompost moist, which occurred when it rained. a stream that runs through the baleho above our vermicomposting cage.

Conclusion

Worm compost fertilizer is an organic fertilizer that is produced by the breakdown of organic materials with the assistance of microbes and worms. Worm compost includes a variety of nutrients as well as a high concentration of growth regulators, which help to promote plant development. It contains growth regulators such as gibberellins, cytokinins, and auxin in addition to nutrients N, P, K, Mg and Ca. It also contains Azotobacter sp, which is an N-fixing bacteria that does not require a symbiotic relationship with the plant and will aid in enriching the N elements required by the plant. Worm compost also includes a variety of micronutrients required by plants, including as iron, manganese, copper, zinc, borax, and molybdenum. It is necessary to supervise the vermicompost fertilizer production every week in order to prevent failure in the production of vermicompost fertilizer.

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