Scientific Innovation Magazine
ISSN : 2584-1157

Harnessing the Power of Vermiwash
An Eco-Friendly Elixir for Sustainable Agriculture

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Abstract

During green revolution the use of synthetic fertilizers, pesticides and other inputs adversely affected environment and ecosystem. Therefore the soil productivity and fertility has been declined thus resulting in declining the yeild. And the second green revolution started as organic farming which has introduced the concepts of vermicompost, vermiwash, composting, organic manure, green manure, beejaamrutha, jeevaamrutha etc. to conserve and protect our resources and ecosystems. For this the vermiwash has emerging as an important tool which is a brown color liquid biofertilizer which is collected after passing via column of warm culture as it contains the earthworm mucus, Coelomic fluid and excretory products which is a store house of nutrients.

Introduction:

Vermiwash is a potent organic fertilizer derived from the process of vermicomposting an eco-friendly technique that harnesses the power of earthwarms to break down the organic matter. This resulting liquid extract,known as vermiwash, is a nutrient rich solution that boasts a myriad of benefits for plant growth and soil health. The vermicomposting process involves feeding organic waste materials to earthworms, such as kitchen scraps, vegetable peels, and decomposable plant matter. As the worms consume this organic material. They excrete nutrient rich castings, also known as vermicompost the liquid leaches out from this composting process is collected and termed as vermiwash.What sets vermiwash apart is its composition, which includes

essential plant nutrients like nitrogen, phosphorous, potassium, and micronurients. Additionally, vermiwash is rich in enzymes and benificial microorganisms, which contribute to the enhacement of soil structure and fertility.

The application of vermiwash offers numerous advantages to plants. Firstly, it acts as a powerful growth stimulant, promoting root development and overall plant vigor. The nutrient content aids in the balanced nutition of plants, fostering robust growth and improved resistence to diseases. Moreover, the presence of benificial microorganisms in vermiwash enhances soil microbial activity, contibuting to soil health and sustainability.Its versatility extends to various agricutural practices, including organic farming and gardening. Vermiwash can be easily incorperated into irrigation systems, sprayed on foliage, or applied directly to the soil. Its eco-friendly nature aligns with sustainable agricultural practices, reducing the rekiance on the synthetic fertilizers and promoting a more balanced and resilient ecosystem. Vermiwash stands as a remarkable byproduct of vermicomposting, prividing a natural and potent solution for enhancing plant growth and soil fertility. Its rich nutrient profile, coupled with its environmentally friendly production, positions vermiwash as a valuable asset in the realm of sustainable agriculture and horticulture. The quality of vermiwash produced by earthworm depends on the vermicompost means source of feeding material used.

Principle of vermiwash preparation: During the process of vermiwash preparation burrows are formed by the earthworms in the cow dung and soil. where the bacteria live and the burrows are called as drilospheres.when the water passes through these burrows it takes the nutrients from these burrows.similarly when the water pases through the tunnels in mixture of cow dung and soil it carries the nutrients to the root zone where the plant will absorb the nutrients.and the water is added with the help of pot having a whole. And the liquid is collected from the bottom of the barrel or bucket through the whole present at the bottom of the barrel.

Properties of vermiwash: It is a store house of macro and micronutrients such as potassium,calcium,iron,zinc,manganese,copper,nitrogen and many vitamins and enzymes and plant growth hormones such as gibberlins and cytokinnis and has various bacteria such as

nitrosomonas and nitrobacter. The ph. range is between 7-8 and electrical conductivity is approximately 0.25ds/m.

Vermiwash and its composition-

Ph	7.39-7.5
Colour	Golden yellow
Total solids	2448
Volatile solids	738
Silica	8
Phosphorous	10.15
Organic carbon	0.008%
Nitrogen	49 or 0.01%
Potassium	10.20mg/l or25 ppm
Zinc	0.90 mg/lor0.02 ppm
Copper	0.01mg/l or 0.01 ppm
Manganese	0.14mg/l
Sodium	196mg/l
Calcium	404mg/l or 3 ppm
Fungi cfu/ml	8
Auxin 0.98	
Cytokinin	0.68

Preparation of vermiwash-

Take a plastic container of 15-20 lts capacity.and the base of the Tank is filled with different successive layers .first layer-medium sized bricks and stones of 10-15 cm.second layer-a layer of course sand and fine sand are spread .third layer-introduction of locally available earthworms {Eisenia foetida}mixing with fertile soil is applied after that a layer of partially decomposed cowdung {20-25 cm}organic residues of 40-45 cm are poured.all the layers in the container is moistened by sprinkling water over it .and it is sprinkled with approximately 2 lts per day.after

16-20 days preparation of vermiwash unit begin .and every day 1-2 let's of vermiwash is collected

Dosage for use-

Root dips /stems dip-the seedlings of the plant are dipped vermiwash solution for 15-20 min before transplantation. The solution need to be diluted 5 times with water and then after they can be transplanted.

Foliar spray-it is diluted with water for 5 times and then sprayed on the crops. soil drench-used to prevent soil borne diseases and it is diluted about 10 times with water and the soil is drenched with the solution.

Uses and its importance-it inhibits the mycelium of disease causing fungi, providing disease resistance.used as effective environmentally friendly biopesticide and helps in enhancing the soil physio chemical qualities like texture and aeration.Improves soil water retention and increases water and nutrient absorption. It has several vitamins humic acids micro and macronutrients. Plant growth hormones are present. Environment conservation disease suppression and long-term sustainability.

Effect of vermiwash on plant growth and yield-application of vermiwash can have specific effects on plant growth and yield:

1. **Increased Nutrient Availability:** Vermiwash is rich in nutrients, including nitrogen, phosphorus, and potassium. These essential nutrients are readily available to plants in a form that is easily absorbed. Improved nutrient availability can result in enhanced plant growth, development, and overall health.
2. **Promotion of Flowering and Fruiting:** The presence of plant growth-promoting substances in vermiwash, such as hormones and amino acids, can stimulate the initiation of flowers and fruits. This may lead to an increase in the number of flowers produced and, subsequently, higher yields.
3. **Root Development:** Vermiwash contains compounds that can promote root development. Strong and well-developed root systems enable plants to access water and nutrients

more efficiently, contributing to increased growth and yield.

4. **Improved Water Retention:** The enhanced soil structure associated with vermiwash application can improve water retention in the soil. This is particularly beneficial during dry periods, as plants have better access to water, reducing stress and promoting optimal growth.

5. **Disease Resistance:** The beneficial microorganisms present in vermiwash can contribute to a healthier soil environment, potentially reducing the risk of diseases that could negatively impact plant growth. This, in turn, can contribute to better overall yield.

6. **Enhanced Photosynthesis:** The improved nutrient status and overall health of plants treated with vermiwash may lead to increased photosynthetic activity. Enhanced photosynthesis can result in greater biomass production, ultimately contributing to higher yields.

It's essential to consider factors such as application rates, timing, and the specific requirements of the plants when using vermiwash for maximum effectiveness. Regular monitoring and adjusting the application based on observed plant responses will help optimize the benefits of vermiwash on plant growth and yield.

Effect of vermiwash on soil-

Vermiwash, a liquid fertilizer derived from the process of vermicomposting, can have several positive effects on soil properties. Here are some of the potential impacts:

1. **Nutrient Enrichment:** Vermiwash is rich in essential nutrients such as nitrogen, phosphorus, potassium, and various micronutrients. When applied to soil, it helps replenish nutrient levels, promoting the overall fertility of the soil. This can lead to improved plant growth and development.

2. **Microbial Activity:** Vermiwash contains beneficial microorganisms from the vermicomposting process. These microbes contribute to the development of a healthy and diverse soil microbial community. Improved microbial activity enhances nutrient cycling, organic matter decomposition, and overall soil structure.

3. **PH Regulation:** The application of vermiwash can help regulate soil pH. Earthworm activity in vermicomposting tends to neutralize acidic or alkaline conditions, creating a more

balanced pH range that is favorable for plant growth and microbial activity.

4. **Improved Soil Structure:** Vermiwash promotes the formation of stable soil aggregates. The sticky exudates produced by earthworms during the vermicomposting process help bind soil particles together, enhancing soil structure. Improved soil structure allows for better water infiltration, aeration, and root penetration.

5. **Water Retention and Drainage:** The organic matter in vermiwash improves the soil's water retention capacity. It helps soil hold moisture, ensuring a steady supply of water to plants. At the same time, the improved soil structure allows excess water to drain effectively, preventing waterlogging.

6. **Reduced Soil Erosion:** Enhanced soil structure and the presence of organic matter contribute to reduced soil erosion. The stability of soil aggregates helps prevent the loss of topsoil through water runoff or wind erosion.

7. **Promotion of Biodiversity:** Vermiwash supports a diverse ecosystem in the soil, including beneficial microbes and other organisms. This biodiversity can contribute to a balanced and resilient soil environment, reducing the likelihood of soilborne diseases and promoting overall soil health.

It's important to note that the specific effects of vermiwash on soil properties may depend on factors such as the initial soil condition, the type of plants, and the frequency of application. Additionally, while vermiwash provides valuable nutrients and microbial activity, it is typically used in conjunction with other sustainable soil management practices to optimize soil health and fertility.

Conclusion- It is liquid bio fertilizer, in order to have a sustainable agriculture we need to follow organic methods in agriculture. vermicompost not only helps in addition of plant nutrients but also enhances the plant growth,it was rich in coelomic value and contains wide variety of macro and micronutrients ,vitamins ,plant growth promoters etc.so it can be used as a potent input in organic farming and sustainable crop production.

Referance-

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