

Vermiwash: Production and Practices

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OPEN ACCESS

Keywords

Vermiwash, Eco-friendly practices, Biodiversity

How to cite this article:

Singh, D., Vishwakarma, G., Singh, H. and Jha, R. K. 2026. Vermiwash: Production and Practices. *Vigyan Varta* 7 (07): 123-127.

ABSTRACT

Vermiwash a nutrient-rich liquid produced from vermicomposting. It is a non-toxic and eco-friendly compound. In agriculture, vermiwash serves as both a natural fertilizer and a mild biocide, promoting plant growth and helping in disease management. Its regular application enhances soil fertility, supports biodiversity, and reduces the need for synthetic chemical inputs.

INTRODUCTION

Agriculture is the backbone of the Indian economy. Agriculture, with its allied sectors, is the largest source of livelihoods in India. 70 percent of its rural households still depend primarily on agriculture for their livelihood. In our country green revolution started in the year 1966-67, due rapid modernization and globalization indiscriminate use of Synthetic fertilizers and

pesticides have been used extensively in the last few decades, causing several environmental issues that could pose a threat to human health. Due to the excessive use of Synthetic chemicals physio-chemical and biological properties of soil deteriorated day by day and the quality of food is also deteriorating, posing food poisoning and our environment is getting polluted. To cope up

with this problem we reducing the use of Synthetic chemical fertilizer, by using non synthetic inputs *i.e.*, organic products like manure, compost, green manure vermicompost, vermiwash, etc (Verma *et. al.*, 2018).

Vermiwash is a honey-coloured liquid organic manure which is produce during earthworm manure production. Earthworms consume organic material while burrowing through the soil, creating tunnels that host beneficial microorganisms. When water flows through these tunnels, it absorbs nutrients in a soluble form, making them easily available to plants. The same principle is applied in the production of vermiwash. Earthworms bodies are continuously excreted mucus from body, and these are enriched with a wide range of nutrients which acts as a reservoir of liquid bio stimulant for plant growth. It also contains a wide range of plant hormones like cytokinin's and oxytocin, vitamins, amino acids, enzymes, and beneficial microorganisms such as bacteria, fungi, and actinomycetes, which help nitrogen fixation, solubilize phosphates. These nutrients are present in a soluble form, making them readily available to plant. Its production is a remarkable example of how earthworms contribute to sustainable agriculture (Nayak *et. al.*, 2019).

Vermiwash unit

The vermiwash unit is typically constructed using a drum, tank, or bucket with a capacity of around 200 liters, made of clay, iron, or plastic. The top of the container remains open to facilitate the production of vermiwash. A vertical T-shaped tube is inserted through a hole at the bottom of the tank, with about half an inch of the tube submerged inside. One end of the tube is connected to a tap for controlled discharge, while the other end is sealed with a dummy nut. The entire setup is placed on a sturdy stand in a shaded area. Here is a step-by-step description of how to set up a vermiwash unit.

Materials Needed:

1. **Container:** A 200-liter capacity drum, tank, or bucket made of clay, iron, or plastic.
2. **T-shaped tube:** A half-inch diameter tube.
3. **Tape:** To control the flow of vermiwash.
4. **Dummy nut:** To seal one end of the tube.
5. **Post/Stand:** To elevate the unit.
6. **Earthworms:** Suitable composting worms such as *Eisenia fetida* (red wigglers).
7. **Organic material:** Such as dried leaves, cow dung, and kitchen waste.
8. **Water:** For maintaining moisture levels.

Steps to Set Up:

1. Prepare the Drum:

- Use a drum or tank with an open top to allow air circulation.
- Make a hole at the bottom of the tank for draining the vermiwash.

2. Install the Tube:

- Insert a vertical T-shaped tube through the hole at the bottom. Ensure about half an inch of the tube remains submerged inside the tank.
- Attach a tape to one side of the tube to regulate the flow of vermiwash.
- Tighten a dummy nut on the other side to prevent leakage.

3. Layer the Material:

- Create a bedding layer inside the tank with dried leaves and cow dung.
- Add composting worms to the bedding.

4. Maintain the Unit:

- Keep the unit in a shaded area to prevent excessive heat.
- Add organic waste regularly for the worms to process.
- Sprinkle water occasionally to maintain adequate moisture, but avoid waterlogging.

5. Collect Vermiwash:

- Open the tape periodically to collect the vermiwash.
- Store the collected liquid in a cool place, and dilute it with water before application to plants (typically in a 1:10 ratio).

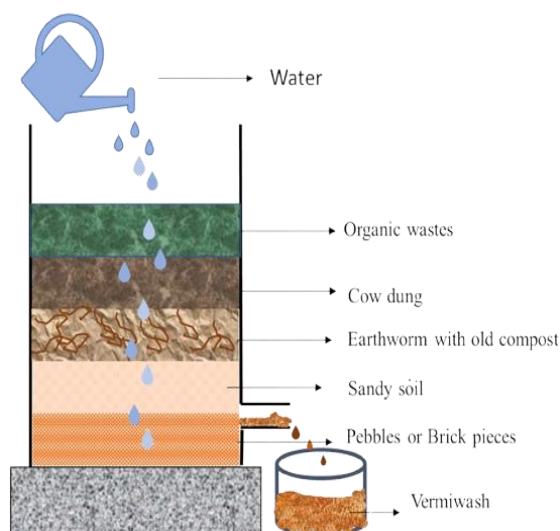


Fig 1: - Vermiwash Unit

Nutrient analysis of vermiwash

Parameter	Value
pH	7.39-7.5
Electrical Conductivity (EC)	0.008 ± 0.001
Organic Carbon	0.25 ± 0.03%
Nitrogen	0.01-0.001%
Phosphorus	1.70%
Potassium	26 ppm

Sodium	8 ppm
Calcium	3 ppm
Copper	0.01 ppm
Iron	0.06 ppm
Magnesium	160 ppm
Manganese	0.60 ppm
Zinc	0.02 ppm
Microbial Composition	Value (cfu/ml)
Total Heterotrophs	1.79×10^3
Nitrosomonas	1.01×10^3
Nitrobacter	1.12×10^3
Total Fungi	1.46×10^3

Source: - <http://www.erfindia.org/vermiwash.asp>

Precautions for Preparing Vermiwash:

- Avoid Fresh Cow Dung:** Do not use fresh cow dung, as it can harm or kill the earthworms. Use decomposed organic material instead.
- Shaded Location:** Place the vermiwash unit in a shaded area to protect earthworms from direct sunlight and excessive heat.
- Maintain Moisture:** Keep the composting material moist but not waterlogged, as too much water can suffocate the earthworms.
- Use Clean Water:** Always use clean, non-chlorinated water to maintain the health of the earthworms and the quality of vermiwash.
- Select Suitable Earthworms:** Use appropriate species of earthworms, such as *Eisenia fetida* (red wigglers), which are ideal for composting.
- Protect Against Predators:** Safeguard the unit from predators like frogs, snakes,

birds, ants, and lizards that may harm the earthworms.

7. Proper Height and Collection Setup:

Position the unit at an appropriate height on a stand to ensure easy collection of vermiwash without disturbing the system.

8. Prevent Contamination: Avoid adding non-biodegradable or toxic substances into the vermicompost bed, as they can affect the quality of vermiwash.

Uses of Vermiwash:

1. Foliar Fertilizer:

- Vermiwash can be sprayed directly on plant leaves after diluting it with water (1 liter of vermiwash to 7-10 liters of water). This improves nutrient absorption, enhances plant growth, and boosts immunity.

2. Disease Control:

- Mixing 1 liter of vermiwash with 1 liter of cow urine and 10 liters of water, letting it sit overnight, and spraying 50-60 liters per hectare helps prevent various crop diseases.

3. Promotes Flowering and Fruiting:

- Foliar application of vermiwash during the flowering stage in summer vegetables accelerates flowering and fruiting, increasing yield.

4. Improves Soil Microbiology:

- When applied to soil, vermiwash enriches it with beneficial microorganisms, improving soil fertility and structure.

5. Natural Pesticide:

- Vermiwash, especially when combined with cow urine, acts as an organic pesticide, reducing pest infestations naturally.

6. Organic Gardening:

- It is an eco-friendly fertilizer used in organic gardening for enhancing plant growth and maintaining sustainable agriculture.

Precautions While Spraying Vermiwash:

- 1. Time of Application:** Always spray vermiwash in the evening to reduce evaporation and allow better absorption by plants.
- 2. Dilution:** Prepare the vermiwash solution in the correct ratio with water to avoid over-concentration, which could harm the plants.
- 3. Mixing with Cow Urine:** If using vermiwash with cow urine as an insecticide or pesticide, ensure the proportions are accurate to maintain its effectiveness without damaging crops.
- 4. Wind Direction:** Always spray in the direction of the wind to ensure even application and prevent wastage.
- 5. Avoid Direct Sunlight:** Do not spray during intense sunlight as it can cause the solution to dry quickly, reducing its effectiveness.
- 6. Clean Equipment:** Use clean and properly functioning spray equipment to prevent contamination of the vermiwash.

CONCLUSION

Vermiwash serves as both a liquid organic fertilizer and a gentle biocide, making it a valuable tool in organic farming. It contributes to soil health and helps manage diseases, offering a sustainable, low-cost solution for crop production.

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