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# PRODUCTION OF VERMIWASH USING RED WIGGLERS

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## Abstract

Production of vermiwash in agriculture helps in increasing the yield of the crop by providing micronutrients and macro nutrients along with some plant growth regulators, such as indole-acetic acid, gibberellins and cytokinins and also humic acids, which simulate the effects of hormones. This Vermiwash is a Brown colored liquid fertilizer, which is collected by passing water within the earthworm culture column. Vermiwash is used as a foliar spray for crops. The aim of the study is to produce large scale vermiwash using red wigglers. The vermi worms used are collected are identified as Red wigglers or scientifically known as Eisenia fetida. The entire vermiwash system is packed in a plastic tub. The wash was harvested from the bottom. In first 10 days the solution of vermiwash contained lower concentration of secretion and nutrients in it. The solution after 10 days gave good elutents. The final elutent are in color of cow's urine and viscous.The ph of the vermiwash ranges from 8-9. This shows the alkaline nature of the solution. The elutent showed effective growth in plants like tomato and brinjal and some leafy vegetables and also showed good growth in plants like chille, cauliflower plants, cabbages, carrots, beetroots, bitter gourds.

## Introduction

Vermiwash is a liquid that is collected after the passage of water through earthworm which brings the wash outs of the worms which contains excretory products and mucus secretion of earthworms along with micronutrients from the soil organic molecules. This solution is given to plants as fertilizer which helps in nourishing the plants, by providing nutrients for their growth and development. Vermiwash is also used as pesticides and insecticides. Vermiwash also helps

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in enhancing seed germination. Generally vermiwash, is a clear and transparent,pale,yellow coloured fluid.

Eisenia fetida also known as redworm, brandling worm, panfish worm, trout worm, tiger worm, red wiggler worm, etc., is a species of earthworm adapted to decaying organic material. These worms thrive in rotting vegetation, compost, and manure. They have groups of bristles (called setae) on each segment that move in and out to grip nearby surfaces as the worms stretch and contract their muscles to push themselves forward or backward. This redworm exudes a pungent liquid, thus the specific name foetida meaning "foul-smelling". This is presumably an antipredator adaptation.

The basic principle of Vermi wash preparation is simple. Burrows formed by the earthworms in soil. Water passing through these passages washes the nutrients from these burrows to the roots to be absorbed by the plants. This principle is applied in the preparation of vermiwash. Vermiwash can be produced by allowing water to percolate through the tunnels made by the earthworms on the vegetable wastes-cow dung substrate kept in a plastic barrel. Water is allowed to fall drop by drop from a pot hung above the barrel into the vermicomposting system.

**About vermiwash**

- Contains excretory products and excess secretions of earthworms, micronutrients from soil organic molecule.
- Vermiwash has high quantities of nitrogen, phosphorus, potassium, calcium, magnesium & zinc and is alkaline.
- Fresh vermiwash contains many beneficial microbes helping plant growth and preventing infections.
- Sugars, phenols and amino acids are also present.
- Hormones promoting plant growth like indole acetic acid, gibberellic acid, and humic acid are present as well.
- Vermiwash must be diluted before application or the plant/crop may die.

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**Way to use**

- Dilute with water (10%) before spraying effectively on any plant.
- Vermiwash should be diluted 5 to 10 times with water and then applied.
- Can also be mixed with cow's urine and diluted for use as foliar spray.

**Contains**

- High amount of enzymes, amino acids.
- Heterotrophic bacteria, fungi, actinomycetes including nitrogen fixers, phosphate solubilizers.
- Vitamins and hormones like Cytokinins, auxins, gibberellins etc.
- Along with macro and micronutrients used as foliar spray.
- Soluble Nitrogen, Phosphorus and Potassium.

**Materials required**

- Cattle dung

It is used as the food source for the vermi worms to feed on. Different cattle dung can be used but cow dung is mostly used.

- 200 liters drum

The complete vermiwash system is engaged in this drum.

- Big granite
- Small granite
- Fine sand
- Gunny bag

Gunny bags are used to spread a layer over the system on the top to prevent sunstroke and help in retaining water for a long time.

- Vegetable waste

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Vegetable wastes or other plant wastes are used as food source of earthworms which helps in nourishment of the worms.

- Husk (paddy)
- Earthworms (adult)

The vermi worms used in the project are collected from workplace which are identified as Red wigglers or scientifically known as Eisenia fetida.

**Method**

- Take 200 litres drum and make a hole at the bottom of the drum to collect the elutents.
- Add big granite stones equally of 2 layers and then add small granite stones of three layers, make sure that you completely cover the big granules.
- Add a fine layer of sand of $1/4^{th}$ part of the drum (the sand should be fine to get fine elutents. Place one layer of gunny bag on the sand and make sure that the sand is completely covered by the bag.
- Add dry neem leaves on the gunny bag, because neem leaves show antibiotic sensitivity towards microbes which helps in decreasing the microbes count which prevents the vermiwash from spoilage.
- Then add finely chopped vegetable waste to the unit, which initiates the grow of earthworms.
- Make sure that the vegetable waste does not contain chilly, ginger, citrus like substances.
- Add ½ part of the cattle dung to the unit, to encourage the growth of earthworms by feeding on it.
- Make sure that the cattle dung is dried to avoid other insects or parasites.
- Add 0.75 kg to 1kg of earthworms on the dried dung. Place a layer of dried paddy straw to protect the unit from direct sunlight and predators, it also helps in maintaining the moisture equally in the unit.

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- Place an earthen pot filled with the water placing a hole at the bottom and make sure that the wick is placed to maintain the drop wise flow of the water.
- This pot is tied to the top on the vermiwash unit such that the drops fell into the unit drop wise.
- Add 100 liters of water to the unit such that the total unit got settled down equally.

**Results and discussion**

Adequate amount of vermiwash is eluted by using red wigglers which is used on plants like tomato plants, brinjal plants, and some green leafy vegetables which showed good growth of plants. In the first 10 days the solution of vermiwash from Eisenia fetida contained lower concentration of secretion and nutrients in it. The solution after 10 days gave good elutents. The final elutent are in color of cow's urine and viscous. The pH of the vermiwash ranges from 8-9. This shows the alkaline nature of the solution. This vermiwash solution should be used within one month. The more duration causes exothermic reactions and causes color change that is blue, these solutions are toxic when pH ranges from 2-3. This unit is sufficient for 3-4 months of duration, later the dried cow dung is added to the unit and the run starts. The more number of adult earthworms gives the more efficient secretions.




Unit is prepared by place a bucket at the bottom and pot filled with water along with wick on the top. The vermiwash is eluted out and pH test is performed which showed 8-9 on the second

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Effective growth of vegetables i.e. tomatoes and brinjals and green leafy vegetables.