Vermiwash and its uses in Agriculture: An Article

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Abstract: Due to the use of various agrochemicals such as plant growth hormones, pesticides and fertilizers the quality of land is degrading. Therefore, the quality of soil is not suitable for the production. Due to declining soil quality there is less fertility, less yield and increasing health hazards and environmental pollution. So, we need to follow the organic methods to prevent the degradation of land and maintain good soil quality. One of the organic methods is Vermiwash, this will prevent the usage of some of the agrochemicals because Vermiwash can act as a plant growth enhancer and as a foliar spray. *Eisenia foetida* is the species of the earthworms used in the vermiwash preparation. In this article we have discussed about the Vermiwash , its preparation and its uses.

Keywords: Degradation, *Eisenia foetida,* organic methods, soil fertility, vermiwash.

Introduction: Nowadays the use of chemicals in the agriculture is increasing day by day. Due to over use of the chemicals the soil quality is decreasing which leads to the less soil fertility. Therefore, it is demand of the nature to prevent the usage of these chemicals in the agriculture. The organic methods are the best alternatives to this problem. Vermiwash is one of the organic methods to prevent the usage of chemicals. Vermiwash is a liquid which is obtained by the passage of clean water through the column of earthworms and soil units. It is a liquid which contains the excretory products and mucus of the earthworms along with it , it contains various micronutrients of the soil molecules. Therefore, it is very nutritive, contains growth hormones, vitamins, enzymes, micronutrients and macronutrients. It is used as foliar spray. The major nutritive and enzymes help in the promotion of the growth of the plant. Earthworms are the major part of the vermiwash experimental unit. *Eisenia foetida* is the species of earthworms which is used for the vermiwash preparation. Earthworms have the ability to consume all types of wastes such as animal waste, kitchen waste, filed waste, hospital waste, temple waste etc. The excretory product of the waste of the earthworms contains many enzymes and nutrients in it.

Principle of vermiwash preparation: The basic principle of vermiwash preparation is simple. The burrows are formed in the soil by the earthworms. Bacteria live in these burrows. These burrows are also called as drilospheres. When water is passed from these burrows, it carries the nutrients from these burrows. Water takes away these nutrients along with it to the the roots of the plants from where it get absorbed by the plant. So, this is the principle used for the vermiwash preparation. Similarly the water percolates from the tunnels which are made by the earthworms on the cow dung and soil. Water is added to the vermiwash unit from the top with the help of pot having a whole. So, the water is added drop by drop to the vermiwash barrels.

Vermiwash is a clear and transparent liquid which is collected from the bottom of the barrel or bucket through the whole present at the bottom of the barrel.

Vermiwash unit: A barrel which has capacity to carry 25 liters is used for the vermiwash preparation. A tap is added at the bottom of the barrel or a whole is made at the bottom to collect the vermiwash. The followings steps are followed for the vermiwash preparation:

- A layer of the broken bricks of 10 cm thickness is added at the bottom.
- A layer of pebbles or stones of 10 cm thickness is added.
- A layer of sand of 10 cm thickness is added.
- A layer of cow dung of almost 15 cm thickness is added.
- 60-70 earthworms are added to the cow dung.
- 7-10 cm thick layer of the straw is added on the top.
- 1 liter water is added to the barrel daily for 20 days.
- After 20 days, a pot is hung on the top of the barrel with the whole at the bottom.
- Water is added to the barrel drop by drop through the pots.
- A clear and transparent fluid is obtained from the bottom of the barrel, which is called vermiwash.

Properties of the Vermiwash:

- It is a colemic extraction which contains many macronutrients, micronutrients and vitamins.
- It contains many enzymes and plant growth hormones such as gibberlins and cytokinin etc.
- It contains potassium, calcium, iron, zinc, manganese, copper, nitrogen etc.
- The pH range is 7-8.
- Electrical conductivity is approximately 0.25dS/m.
- It contains various bacteria such as Nitrosomonas and Nitrobacter.

Uses of Vermiwash:

- It is a biofertilizer or an ecofriendly natural fertilizer which is completely organic and is obtained from degrading the organic wastes. It is free from the chemicals.
- It provides resistance from various diseases because when it is diluted to 20-30%, it inhibits the growth of the mycelium of the disease causing fungus.

- When it is diluted with 10% cow urine and neem extract, it provides resistance against various pests. Therefore, it is a biopesticide with no harmful effects on the environment.
- It improves the physico-chemical properties of the soil such as soil texture and soil aeration.
- Because of the organic matter present in the vermiwash is high, it leads to improvement in the water holding capacity of the soil.
- As it promotes the root growth of the plant so more the root growth, more is the uptake of water and more nutrient absorption.
- It contains many macronutrients, micronutrients , vitamins and humic acids.
- It contains many enzymes and plant growth hormones such as gibberlins and cytokinin etc.

Conclusion: To have sustainable agriculture we need to follow organic methods in agriculture. Vermiwash, this will prevent the usage of some of the agrochemicals because Vermiwash can act as a plant growth enhancer and as a foliar spray. *Eisenia foetida* is the species of the earthworms used in the vermiwash preparation. It is a colemic extraction which contains many macronutrients, micronutrients and vitamins. It contains many enzymes and plant growth hormones such as gibberlins and cytokinin etc. It contains potassium, calcium, iron, zinc, manganese, copper, nitrogen etc.

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