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Farming the Natural Way with Vermiwash: Smart, Sustainable

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Introduction:

In the modern era, where climate change and food safety have become major global concerns, there is a growing demand for sustainable agricultural practices. Consumers today are more aware and conscious about what they eat, they prefer food that is not only nutritious but also free from harmful chemicals. This has led to a significant shift among farmers towards organic and natural farming systems. One of the most promising and eco-friendly tools supporting this transformation is vermiwash. chemical fertilizers leave toxic residues and contribute to groundwater pollution, but vermiwash is biodegradable and non-toxic, making it safe for the environment, farmers, and consumers. It also plays a role in carbon sequestration indirectly, by promoting healthy microbial life that facilitates organic matter decomposition and nutrient cycling helps in the process in sustainable soil management.

Vermi wash is a natural plant booster which boost the immunity of the plant and enhance the plant growth. Vermiwash serves as a highly effective bio-fertilizer and also boosts microbial activity in the rhizosphere, particularly beneficial bacteria and fungi, which play a crucial role in nutrient cycling and soil structure enhancement.

As a fertilizer vermiwash offers multiple agronomic benefits across a wide range of crops. It improves nutrient up take which enhances root growth and helps plants to absorb nutrients efficiently. Boosts soil microbial activity and encourage beneficial microbes which improves the soil structure

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and fertility. It also enhances Plant Immunity and boosts plants' natural defence by cutting down the need for chemical inputs, and leads to healthier plants with better yield, taste, and shelf life of fruits and vegetables.

As a pesticide it acts like a natural pest repellent the enzymes and compounds in vermiwash naturally repel common pests such as aphids, whiteflies, and caterpillars. It helps in controlling fungal diseases like powdery mildew, rust, and damping off due to its antifungal properties. Unlike chemical pesticides, vermiwash is safe for bees, butterflies, and humans.

This contains wide range of essential nutrients and biological components which is vital for plant health and it is also rich in micronutrients such as iron, zinc, copper, and manganese, which are often missing in conventional fertilizers but are essential for photosynthesis, enzyme activity, and stress resistance. Beyond nutrients, vermiwash is loaded with plant growth hormones like auxins (Helps in root growth and cell elongation), gibberellins (Stimulates stem elongation, germination, and flowering), and cytokinins (Promotes cell division and delays leaf aging) which naturally helps the plant grow strong roots and healthy stems.

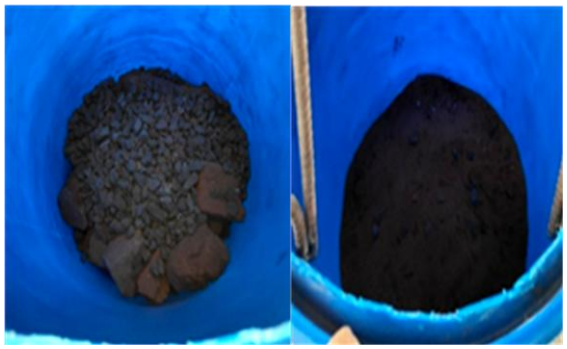
Step-by-Step Guide to Installing a Vermiwash Unit

To install a vermiwash unit choose a shaded and cool location with minimal direct sunlight to maintain optimal temperature and moisture for earthworm activity. For installation a 500 litres plastic drum is placed at 1 feet height above the ground and an outlet is placed at the bottom (which helps in easy collection of liquid through outlet). An earthen pot with a small hole on the bottom is placed on the drum with the help of an iron stand. For filling different materials are used and each material is layered one on another. At the bottom broken red clay bricks are layered 1feet(30kg). Next to that half feet(20kg) 20mm stone chips is layered. About 1 feet(15kgs) of sand is layered on top of stone chips and the final layer is cow dung10kg) on top Place a healthy batch of earthworms Eudrilus eugeniae, commonly known as the African night crawler, is a reddish-brown earthworm characterized by a convex dorsal surface and a pale white, flattened ventral side. It typically grows up to 10–12 cm in length and thrives in the surface layers of moist, organic-rich soil. This species prefers a temperature range of 24–30°C for optimal growth and activity is placed at top. These worms will process the organic matter and release nutrient-rich vermiwash as a by product of their digestive activity. To maintain optimal moisture levels, place a small pot with a hole at the bottom and place above the drum. Line the hole with

cotton or mesh to allow slow dripping. This system ensures that water slowly percolates through the layers, creating a stable and moist environment for the worms.

Step 1 collection Of raw materials

Step 2 Site selection



Step 3 filling the materials in layers.

This multi layers helps in controlled environment for leachate collection. Lightly Sprinkle water to maintain a uniform moisture condition because the water we supply from the pot covers only central part. Vermi wash is collected after 27 days. The outlet must be turned off until vermiwash is collected. The primary indication that vermiwash is ready for collection is when earthworms begin to rise to the surface, and the top layer appears overly moist. This suggests that the lower layers are saturated and nutrient-rich leachate has formed. In the operation of the vermiwash unit, 10 liters of water were applied daily through a drip system. Over the first 27 days, a total of 270 liters of water was supplied, from which 25 liters of vermiwash was collected. In the following 14 days, another 20 liters of vermiwash is collected. This brought the total water input to 410 liters and the total vermiwash output to 45 liters. The cycle is repeated for 14 days

Vermiwash Unit

Agricultural value of vermiwash

Research studies across various crops like green gram, black gram, fenugreek, okra, and chickpea have shown that vermiwash enhances seed germination, root and shoot development, flowering, and yield. The pH value between 7.39 - 7.5, which means it is nearly neutral to slightly alkaline. This pH range is generally suitable for supporting beneficial microbial activity and plant growth. The electrical conductivity (EC) is 0.008 ± 0.001 dS/m, indicating very low levels of dissolved salts, which is a good sign for avoiding salinity stress in plants. The organic carbon content was 0.25 ± 0.03%, reflecting a moderate amount of organic matter that can help improve soil structure and support microbial life. Nitrogen was present in very low amounts, ranging from 0.01% to 0.001%, which may not be sufficient for plant needs and might require supplementation. However, phosphorus was found in a high concentration of 1.70%, which is beneficial for root development and flowering. Potassium, an essential nutrient for fruiting and overall plant health, was present at 26 ppm. Sodium was found at 8 ppm, which is within safe limits, while calcium, important for cell wall strength, was detected at 3 ppm. Micronutrient : copper at 0.01 ppm, iron at 0.06 ppm, magnesium at 160 ppm (a relatively high amount which supports chlorophyll production), manganese at 0.60 ppm, and zinc at 0.02 ppm. These nutrients, though required in small amounts, are essential for enzyme activity and healthy plant metabolism.

Total heterotrophic bacteria is 1.79 × 10^3 colony-forming units per milliliter (cfu/ml), indicating the presence of general-purpose bacteria that break down organic matter. Nitrosomonas and Nitrobacter, which are important for nitrogen cycling, were present at 1.01 × 10^3 cfu/ml and 1.12 × 10^3 cfu/ml respectively. These bacteria help

convert ammonia into nitrites and then into nitrates, which plants can absorb. fungi of 1.46 × 10^3 cfu/ml, showing the presence of fungal communities that may help in decomposing organic materials and improving nutrient availability. Before applying, vermiwash should be diluted with water in a 1:3 ratio (1 liter of vermiwash mixed with 3 liters of water). This diluted solution acts as a natural growth promoter and mild pesticide. When 1 litre of vermiwash is mixed with 1 litre of cow urine and diluted with 8 litres of water, the solution acts as a natural pesticide. We can use this vermiwash in 3 different ways like Foliar spraying, drenching and for seed treatment. Foliar spraying method helps to deliver nutrients and beneficial microorganisms directly to the plant, promoting growth and potentially enhancing flowering and fruiting. In drenching diluted vermiwash is applied to the soil near the plant roots, where it helps suppress soil-borne pathogens through its antimicrobial properties and enhances soil fertility by adding essential nutrients. By selling the excess, one litre of concentrated vermiwash can earn around ₹50 to ₹70 in the local market. vermiwash isn't just beneficial for farmers it's equally valuable for home gardeners. When more vermiwash is produced than needed, the excess can be sold to fellow gardeners, local nurseries, organic stores, or even through online platforms. vermiwash serves as a sustainable bio-input and offers economic value through small-scale commercialization.

Method of using verimwash at different stages of crop growth

Vermiwash can be applied at various stages throughout the crop growth cycle. 1. In pre-sowing/seed treatment stage. If seeds are Soak in diluted vermiwash (1:3 ratio) for 12–24 hours before sowing. It enhances seed germination, root initiation, and disease resistance. Vermiwash helps t reduce early blight and seed rot, especially in tomato and chill crops. 2. Seedling (Nursery Stage) by Apply diluted vermiwash (1:5) through foliar spray or drip once every 7 days helps in healthy seedling growth and reduced damping-off disease (ex: tomato).3. Vegetative Growth Stage, in this stage spray 1:3 diluted vermiwash once every 10–15 days on leaves improves vegetative biomass, leaf chlorophyll content, and disease resistance. The combination of vermiwash + panchagavya for leafy greens to boost yield and pest resistance. 4. Flowering Stage Spraying 1:3 diluted vermiwash every 10–15 days till harvest Enhances fruit quality, size, colour, and taste while reducing pest impact and supports a healthy yield.