A Guide to Preparing Vermicompost in Kodaikanal

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in
collaboration with

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Introduction:

Vermicomposting is a method of preparing enriched compost with the use of earthworm excreta, also known as earthworm casts. Harvesting earthworm casts is one of the easiest, nature-based, methods of turning agricultural or household food waste into nutrient-rich farming inputs. Vermicompost is a fine, granular organic manure that enhances soil by improving its physical, chemical, and biological properties. It boosts soil structure, making it more porous for better water retention and root growth. Nutrient-rich, vermicompost provides essential elements like nitrogen, phosphorus, and potassium, and few micronutrients like zinc, boron, manganese which become readily available to plants. Additionally, it introduces beneficial microbes, fostering a biologically active soil environment that supports healthy plant growth. It is particularly useful in raising seedlings and for crop production.

Benefits of Vermicompost

- Improves Plant Growth: Vermicompost adds essential nutrients like nitrogen, potassium, and phosphorus to the soil.
- Reduces Household Waste: Diverts household kitchen waste from landfills and reduces the burden on waste management systems.
- Soil Improvement: Vermicast contains high concentrations of bacteria, fungi, and introduces a diverse community of microorganisms which break down organic material and cycling nutrients in the soil.
- Cost-effective Fertilizer: Reduces the need to purchase chemical fertilizers, and potential surplus can be sold to gardeners, farmers, and nurseries.

Inputs Required for Vermicomposting

- **Container:** Choose a bin with a depth of at least 3 feet, in which you can make small holes at the bottom to allow drainage. The container can be made of any material - wood, plastic, metal - whatever is readily available and convenient in your setting.
- **Bedding Material:** The bedding provides a comfortable habitat for worms and helps maintain moisture. They should be slow-decomposing materials such as paper, cardboard, coconut coir, dry leaves, and sawdust.
- **Worms:** The preferred species for vermicomposting is Eisenia foetida (Red Wigglers), as they thrive in organic waste and are well-suited for high-altitude environments like Kodaikanal. These worms can be sourced from local agriculture research stations or colleges, government agriculture extension offices, or commercial breeders. You can also collect worms from the soil where you live or cultivate - this would require you to identify active compost heaps or manure piles and collect the earthworms manually.
- **Worm food:** You will need to feed the worms with a healthy mix of decomposable organic waste such as livestock dung, kitchen waste, chopped farm residues and leaf litter. A good mixture of food to include are:
    - Fruit and vegetable scraps (no citrus, garlic, or onion peels)
    - Coffee grounds and tea leaves (in moderation)
    - Dry leaves, cut grass, and yard clippings
    - Dried, chopped farm residues such as wheat straw, rice or corn husks
    - Cow dung is an excellent base material, rich in nutrients and microbial activity

What to Avoid:

- Cooked food, oily or greasy residues, and dairy products
- Meat or fish (high odor and pest risk)
- Citrus peels and onion/garlic scraps (too acidic for worms)
- Eggshells (unless finely powdered and used sparingly)

A mixture of leguminous (e.g., beans, peas) and non-leguminous (e.g., wheat straw, rice husks) residues enriches vermicompost. Leguminous materials provide nitrogen, while non-leguminous materials supply carbon. A 1:1 ratio ensures an ideal carbon-to-nitrogen (C:N) balance for optimal microbial activity.

Step-by-Step Guide

1. Prepare the Container

- Place your bin in a shaded, cool spot, protected from heavy rain and direct sunlight. The base of the bin should have holes for drainage.
- Place a natural fabric such as cotton cloth at the bottom of your bin to allow water to filter out.
- Add a base layer of bedding material about 3-4 inches deep.
- Moisten the bedding material to a damp, sponge-like consistency.

2. Add the Worms

- Gently place the worms on top of the bedding. They'll start burrowing in naturally.
- Allow a few hours for the worms to adjust to their new environment.

3. Add Organic Waste

- Start with a small layer of waste on top of the bedding.
- Cover the waste with more bedding to keep odours down and prevent fruit flies.

4. Cover and Maintain

- Cover the bin loosely with a cloth or net to allow air circulation while keeping pests out.
- It is more to place your bin in an enclosed place (under a shed) to keep it warmer during cold months

Tips for Successful Vermicomposting

Climate and Altitude Considerations for Kodaikanal: In Kodaikanal, where nighttime temperatures can drop below 10°C, it's essential to take steps to protect the worms from extreme cold to ensure their activity and survival. Here are some practical tips:

- Increase the bedding thickness to 4–6 inches to help retain warmth.
- Place the bin in a sunlit area during part of the day to absorb heat but move it to a protected area at night.
- Cover the surface of the bedding with a layer of dry leaves or a breathable fabric to trap warmth.
- Mix small amounts of partially decomposed organic matter into the bedding; the decomposition process generates heat.
- Raise the bin slightly off the ground using bricks or wooden blocks to prevent cold from seeping in.
- During heavy rains, ensure the bin is covered and raised off the ground to prevent waterlogging. Adjust drainage and bedding to maintain proper moisture levels.

Feeding the Earthworms: Feed the worms a little at a time to avoid overwhelming them. Add fresh waste every few days, but in small amounts. Too much food at once can lead to bad odours and slow down the composting process. Avoid oily foods, meat, dairy, and acidic materials (like citrus peels) as they decompose slowly and can produce strong odors that attract pests like rodents, flies, and other scavengers. Also, oily foods can coat the worm's bodies, disrupting their respiration and their survival. 15-20 days old cow dung should be used to avoid excess heat. The organic wastes should be free from plastics, chemicals, pesticides, metals etc.

Moisture and Temperature Control: The bin should stay moist but not waterlogged. If the bin feels too wet, add more dry bedding. Avoid placing it directly on cold cement floors; use a raised platform instead. Aeration should be maintained for proper growth and multiplication of earthworms by regularly turning the compost bed every 1-2 weeks to introduce oxygen, which prevents compaction and ensures proper microbial and earthworm activity. Optimum moisture level (30-40 %) should be maintained. 18-25oC temperature should be maintained for proper decomposition.

Harvesting Vermicompost

After 4-5 months (in Kodaikanal) you will see signs of compost readiness. The material in the bin will appear dark, crumbly, and soil-like, with most of the original organic matter broken down. Move the finished compost to one side of the bin. Add fresh bedding and food to the empty side. Over a few minutes, the worms will migrate to the fresh material, allowing you to easily collect the compost. The compost can be sieved to separate the worms if any, in the compost. If the compost is too moist, allow it to air dry for a day. It can be stored in a breathable container such as a jute sack or cardboard box to maintain moisture and prevent it from compacting.

Crop type	Crops	Vermicompost dosage per acre(t/a) and per plant(g/p)	Application frequency	Application method
Vegetables	Cabbage, cauliflower, brocolli	1-2t/a 500g/p	At planting, then after 30 days	Mix into planting holes or as dressing
Root crops	Carrot, radish, beet	1t/a 150-200g/p	At planting & after 4 weeks	Over topsoil before planting
Leafy greens	Spinach, lettuce, celery	0.5-1t/a 100-200g/p	Every 4 weeks	Spread around base of plants and incrporate using shovel
Fruit trees	Blueberry, avocado, jackfruit, plum, peach	1-2t/a 1-2kg/p(young) 3-5kg/p(mature)	Once in 6 months	Around tree/ bush base, keeping away from trunk & mix lightly
Citrus trees	Orange, lemon	2-3t/a 2-3kg/p(mature)	Before flowering & during fruit formation	Spread aroundtree base & mix lightly
Herbs & medicinal plants	Mint, basil, aloe vera	0.5t/a 50-100g/p	Every 6 weeks	Spread around plants as top dressing
Spices	Cardamom, pepper	1t/a 0.5-1kg/p	Start of rainy season & maturity stage	Around plant base
Flowering plants	Marigold, dahlia	1-1.5t/a 200-500g/p	Once at planting, once midway through season	Mix into soil at planting or as top dressing
Plantations	Tea, coffee	1t/a 1kg/p(mature)	During planting & after pruning	Around base of each plant

*1 ton = 1000 kg of vermicompost

You can also make a liquid fertilizer (compost tea), by mixing vermicompost with water, letting it steep for 24–48 hours, and then using it to water plants.

For additional details

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1. Prepare the bucket

2. Add the base layer and bedding material

3. Add the worms

4. Add the organic waste

5. Maintain moisture and place under a shaded area

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