



# **Production of Vermicompost using *Eisenia fetida* in a Cemented Pit at KVK, Yachuli, Arunachal Pradesh.**

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## **Abstract**

Vermicomposting is an eco-friendly biotechnology that converts organic waste into nutrient-rich manure through the action of earthworms. The present study was conducted at Krishi Vigyan Kendra, Yachuli, Keyi Panyor District during a 14-day training program to demonstrate vermicompost production using *Eisenia fetida*. A cemented pit of dimensions 10 ft × 4 ft × 2 ft was used. A total of 50 kg cow dung and 30 kg straw were utilized as substrate, along with 1500–2000 earthworms. The composting process involved layering of straw and cow dung slurry, followed by maintenance of moisture at 40–50% under shaded conditions. After 3–5 months, the vermicompost obtained was dark brown, granular, porous, and odorless, indicating maturity. The final yield ranged from 40–48 kg with a pH of 6.5–7.6. The study confirms that vermicomposting using *Eisenia fetida* is an efficient method for recycling organic waste into high-quality manure suitable for sustainable agriculture.

**Keywords:** Vermicomposting, *Eisenia fetida*, organic waste, cow dung, sustainable agriculture, nutrient recycling, KVK

## **Introduction**

The increasing demand for sustainable agricultural practices has led to renewed interest in organic waste management techniques such as vermicomposting. Vermicomposting is a biological process that utilizes earthworms,

particularly *Eisenia fetida*, to convert organic residues into stabilized humuslike material (Edwards et al., 2011). This process not only reduces waste but also produces nutrient rich compost that improves soil fertility, structure, and microbial activity.

Cow dung is one of the most widely used substrates in vermicomposting due to its high nutrient content and favorable microbial population. When combined with lignocellulosic materials such as straw, it enhances aeration and carbon balance, promoting efficient decomposition (Gajalakshmi & Abbasi, 2004).

Krishi Vigyan Kendras (KVKs) play a crucial role in disseminating such eco-friendly technologies to farmers. The present study was undertaken at

Krishi Vigyan Kendra, Yachuli to demonstrate the practical production of vermicompost using locally available materials under controlled conditions.

## Materials and Methods

### Experimental Site

The experiment was conducted at Krishi Vigyan Kendra Yachuli during a 14-day training program.



**Fig 1.1:** Group photo with the scientist Dr. Pema Khandu Goiba, SMS (Soil Science)

### Pit Design

A cemented pit measuring 10 ft × 4 ft × 2 ft was used for vermicomposting.

### Raw Materials

Cow dung: 50 kg

Straw: 30 kg

Earthworms: 1500-2000 (approx. 2kg) (*Eisenia fetida*)



**Fig 1.2:** Red Wigglers (*Eisenia fetida*)

### Preparation of Substrate

Cow dung was mixed with water to form a uniform slurry.



Fig 1.3: Cow dung slurry preparation

### Layering Technique

The vermicomposting unit was prepared as follows:

A bottom layer of dry straw was placed to act as bedding.

Cow dung slurry was added above the straw layer.

Alternate layers of straw and slurry were repeated until the desired height was achieved.



Fig 1.4: Layering process in Vermicompost pit using cow dung and straw

### Maintenance

Moisture content was maintained at 40–50% by regular sprinkling of water.

The pit was covered with jute bags to conserve moisture and prevent pest entry.

The unit was kept in a cool, shaded area with an ideal temperature range of 13°C–25°C.



Fig 1.4: Covering the vermicompost pit with jute bags to conserve moisture

### Harvesting

After 3–5 months, when the compost became dark, crumbly, and odorless, it was considered mature. The compost was separated by shifting material to one side and allowing worms to migrate to fresh feed.

### Results

The vermicomposting process successfully converted organic materials into stable compost within 34 months.

### Physical Characteristics

The final vermicompost was dark brown in color

Fine, granular, and porous in texture

Odorless

High in water-holding capacity and aeration

### Yield

Total vermicompost produced: 40–50 kg

### Chemical Properties

pH: 6.5–7.5 (near neutral)

### Conclusion

The study demonstrates that vermicomposting using *Eisenia fetida* in a cemented pit is an efficient and practical method for converting organic waste into nutrient-rich manure. The process produced 40–50 kg of high-quality vermicompost with favorable physical and chemical properties. This technique can be effectively promoted among farmers to enhance soil health and reduce dependency on chemical fertilizers.

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