

# IOT BASED AUTOMATIC VERMI COMPOST MAKER

## Abstract

Making homemade organic fertilizer from organic waste is a cost-effective approach.

Maker of vermicompost: These are biological reactors or composters that produce 100% organic fertilizer through the action of earthworms.

## Author

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## I. IOT AUTOMATION – WHAT IS IT?

The development of industrial automation systems is greatly facilitated by the Internet of Things (IoT). With the purpose of removing errors and inefficiencies, largely from people, IoT combined with computer automation controls helps simplify industrial systems and increase data automation.

## II. WHAT IS VERMICOMPOSTING?

The method of making compost from biodegradable waste by using red worms is called vermicomposting.

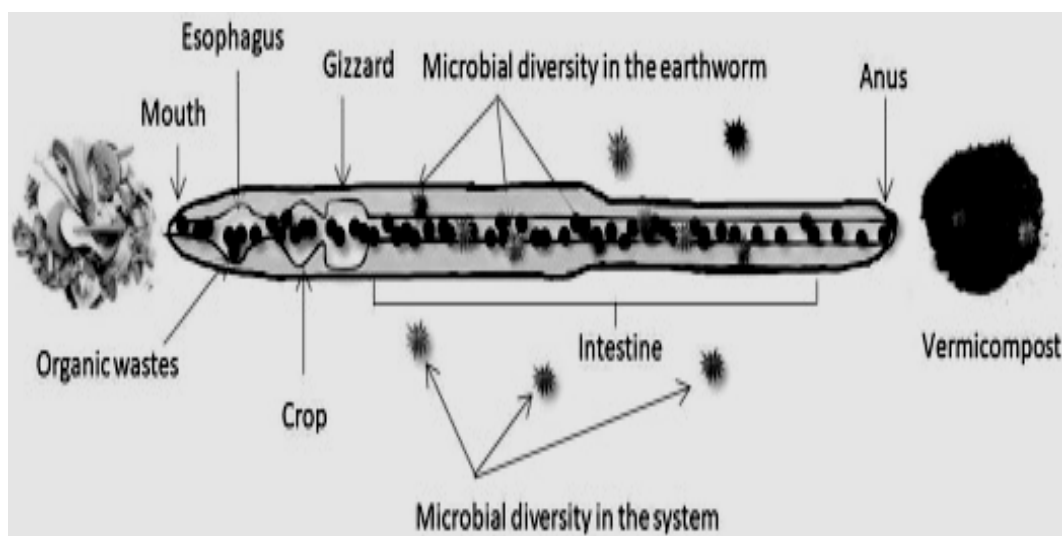
### 1. What is Vermicompost Manure? Write its Significance.

The term "vermicompost" refers to manure that has been produced with the aid of earthworms. Earthworms consume organic matter and dirt, casting it out as casts. Vermicompost is created using this cast.

#### Following Are Some Reasons Why Vermicompost Is Important

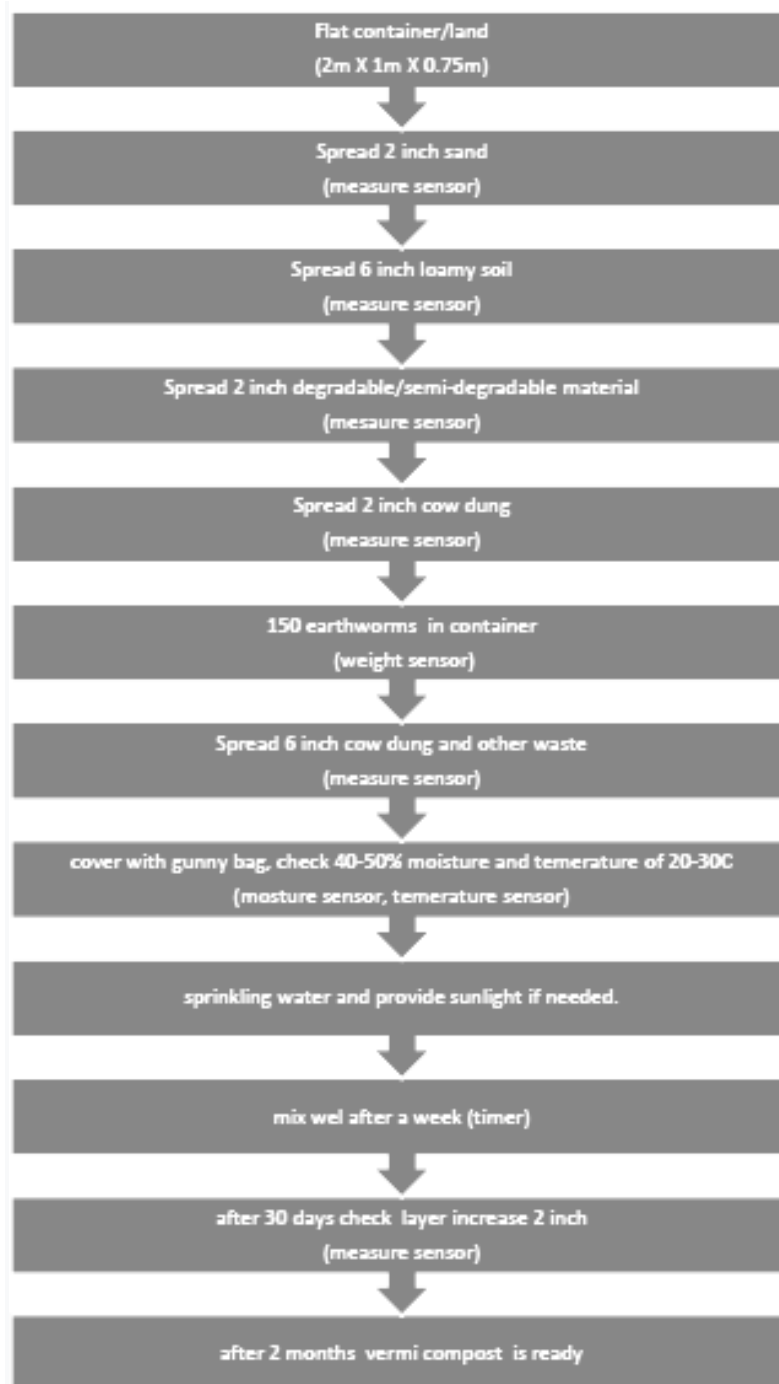
- It is inexpensive and accessible.
- It is simple to store.
- They coexist peacefully with nature
- They don't produce any pollution of any kind.
- Farmers are adaptable and simple.
- The input is renewable.

## III. WHAT IS THE BASIC PRINCIPLE OF VERMICOMPOSTING?



Vermicomposting is a type of composting in which specific types of earthworms are used. Essentially, an earthworm and microbial mesophilic method is being used. The earthworms consume organic garbage and expel it in the form of granules called cocoons.

## 1. Process: Graphical process



- To prepare vermicompost, choose an airy moist vessel or a flat land. To make vermicompost, select a place where there is no direct sunlight and there is a shady area with wind.
- Spread 2 inch thick sand or gravel in this vessel and spread a 6 inch thick layer of black or loamy soil over it. Keep in mind that there should not be pieces of glass, stone and metal in the soil.

- Now spread a 2 inch thick layer of easily degradable material or semi-degradable material such as coconut husk, vegetable peels, sugarcane leaves, sorghum stalks and banana waste on this soil.
- Spread a layer of 2 inch thick decomposed cow dung over it. Keep in mind that cow dung is not fresh.
- Now put earthworms on it and cover it with a 6 inch thick layer of cow dung and other waste.
- 150 earthworms may be introduced into a compost pit of about 2m x 1m x 0.75m, with a vermibed of about 15 to 20 cm thickness.1500kg/lt material.
- A earthworm has approximately ranging length and weight from 14–29 cm (mean  $21.5 \pm 6.8$  cm) to 1.6–3.0 g
- After putting the waste, cover it with a thick gunny bag or gunny bag, so that the air is not blocked and the moisture remains for a long time.
- Keep in mind that this entire mixture should be sufficiently moist and the temperature should be 25 to 30 degree centigrade.
- Keep sprinkling water on it daily to maintain moisture, and lighten it every week by turning the upper cow dung manure and garbage.
- If small earthworms are visible after 30 days, then spread a 2 inch thick layer of garbage on it again and sprinkle water.
- Vermi compost or earthworm manure will be ready in about 2 months. It will be dark black in appearance like a tea leaf and lighter than clay.

## 2. Equipment

- 2mX1mX0.75m plastic container as Composting Chamber
- Water/ aeration pipe to maintain humidity
- Kitchen waste(1 week 10%),
- green leaves (10%)
- cow dug dry (1 year) (20%)
- clayey soil with pebbles and stones (10%)
- dry plant (dead plants)(10%),
- earthworm (150)
- jute bags
- water spere pump
- Green Net cloth to make dark and mosture(40%) area

## 3. Sensor and Components

- DHT11 Sensor humidity sensor
- DHT11 Sensor Temperature sensor
- Linear Potentiometer
- Weighing Load Cell Sensor 1Kg
- Loadcell sensor 24-bit ADC - HX711
- Breadboard
- I2C 16x2 LCD Display – 2 (vary according to need)
- weight sensor
- measure sensor

- NodeMCU with Arduino IDE
- Arduino Uno
- ESP8266 WiFi Module
- Jumper Wires
- solar panel

**4. Process Completion Time :** 1 to 2 months (30 to 35 days)

#### **IV. FEATURES**

Garden trash is turned into organic compost using a hand-operated shredder, which doesn't require electricity. The shredder can process up to 50 kg of compost each month.

#### **V. AIM**

- Processing the information as rapidly and effectively as feasible is the aim.
- Making homemade organic fertilizer from organic waste is a cost-effective approach. Maker of vermicompost:
- These are biological reactors or composters that produce 100% organic fertilizer through the action of earthworms.

#### **VI. IOT-BASED AUTOMATIC BIOLOGICAL VERMICOMPOSTER ADVANTAGES**

- Increase the soil's ability to hold onto water, lessen soil erosion, increase soil productivity, and create a defence against pest and disease attack.
- Better tasting and higher-quality crops free of harmful residues. improved germination, growth, and crop production of plant roots.
- The best and most affordable method for turning organic waste from the garden or any other source into high-nutrient manure.

