

How worm works: Discovering the World of Vermicomposting



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Vermicompost is a nutrient-rich product produced by the natural biotechnological process using some suitable earthworm species called vermicomposting. Nowadays, the popularity of vermicomposting has surged as individuals, communities, and even businesses seek sustainable solutions to waste management challenges by converting large amounts of organic waste material into valuable compost.

What is the biology of Earthworms?

To understand how vermicomposting works, first of all, it is essential to understand the biology of earthworms. Earthworms belong to the Oligochaeta class and are characterised by their segmented bodies, which lack appendages. The most commonly used earthworm species in vermicomposting are *Eisenia fetida*, *Eudrilus eugeniae*, and *Perionyx excavatus*. Earthworms play a vital role in improving the soil ecosystem by facilitating soil aeration and nutrient cycling. They feed decaying organic waste material and microorganisms, breaking it down into simpler compounds through digestion. This process involves mechanical grinding in the worm's gizzard and the enzymatic breakdown in its digestive tract. One of the key secrets about the digestive ability of earthworms lies in their symbiotic relationship with microorganisms. A diverse community of bacteria and other microorganisms play the leading role in decomposing organic matter in the earthworm gut. The enzymatic action of

these microbes breaks down complex molecules such as cellulose, lignin, etc.

What is the method of vermicomposting?

Actually, the vermicomposting process facilitates the feeding behaviour of earthworm species to convert the organic waste into a better end product. The first step of this process begins with preparing a comfortable habitat for the worms, such as a compost bin or composting system. This habitat provides a controlled environment with suitable bedding materials like shredded newspaper, cardboard, straw, dry leaves, etc., maintaining adequate moisture, temperature and aeration. Different types of organic waste materials like agricultural wastes, kitchen scraps, and yard wastes are added to this composting system, and suitable earthworms are added. As the added worm feeds on this organic matter, they digest it and break it down into simpler substances. This process transforms these waste materials into valuable nutrient-rich worm castings or vermicompost. Throughout the composting process, earthworms promote aeration by burrowing behaviour and helping the microbial activity. This aerobic condition helps to hasten the decomposition process and reduce the odours associated with anaerobic decomposition.

What are the Environmental Benefits?

Vermicomposting offers several environmental benefits, creating it an



attractive alternative to traditional waste management practices. This technique produces a precious soil amendment that improves soil fertility and maintains the soil's good health. Vermicompost contains essential plant nutrients such as nitrogen, phosphorus, and potassium, as well as beneficial microorganisms and enzymes. After application into the soil, vermicompost improves soil health, water retention, and nutrient cycling, leading to healthier plants and increased crop yields. Moreover, vermicomposting reduces the use of chemical fertilisers and chemical pesticides, thereby minimising pollution and promoting sustainable agriculture practices (Fig 1).

What is the practical aspect of this process?

Vermicomposting has various practical applications in waste management, from small-scale home composting to large-scale agricultural operations. This process provides an efficient technique for recycling kitchen scraps and other household organic waste materials at the domestic level. Using a simple compost bin or vermicomposting unit, everyone can reduce their carbon footprint and produce good quality compost for their own garden. In urban areas, vermicomposting at the community level offers collective action and environmental education opportunities. Community gardens, schools and urban farms can benefit from vermicomposting by improving soil fertility power, minimising the waste disposal cost, and encouraging community involvement. On a larger scale, vermicomposting can be integrated into agricultural systems to enhance soil quality and productivity. Farms and agribusinesses

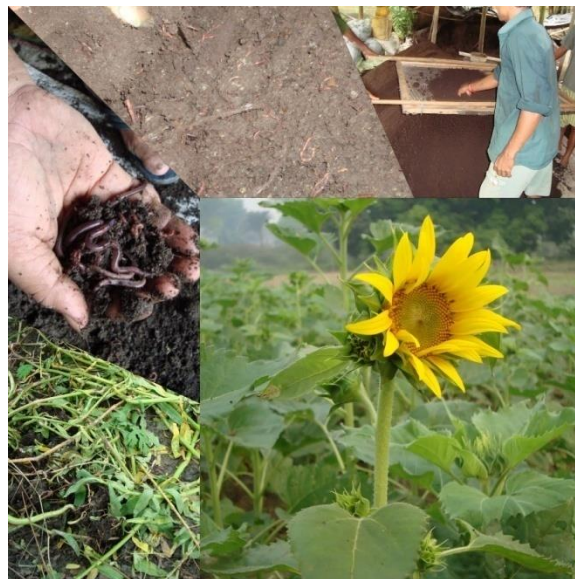


Fig 1: Recycling of organic wastes into valuable compost

can use vermicompost as a natural fertiliser and soil conditioner, reducing reliance on synthetic inputs and improving crop resilience to environmental stresses.

Finally, we can see that the vermicomposting process exemplifies the cooperation between nature and technology in addressing environmental challenges. On the other hand, vermicomposting exhibits the harmonious interaction between human ingenuity and natural processes, serving as a suitable solution to the growing difficulties concerned with waste management and soil degradation. With the help of earthworm power, we can convert massive amounts of organic waste into valuable compost, enriching the soil ecosystem and nourishing the planet. As we struggle towards a more sustainable future, vermicomposting is a shining example of how small actions can yield profound ecological benefits, one worm at a time.

