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African crawler worms

Vermikomposting means the use of earthworms (plate 9) for composting organic residues. Earthworms can consume virtually all kinds of organic matter and can eat their own body weight daily, for example, 1 kg of worms can consume 1 kg of residue per day. Excrement (castings) of worms are rich in nitrates, available forms of P, K, Ca and Mg. Passage of soil with earthworms promotes the growth of bacteria and actinomycetes. Actinomycetes thrive in the presence of worms and their content in worm castings is more than six times that in the original soil. Types of wormsHumid compost heap 2.4 m by 1.2 m and 0.6 m high can support a population of more than 50,000 worms. The introduction of worms into the compost heap has been found to mix materials, benefit the heap and accelerate decomposition. Turning the piles is not necessary if earthworms are present, so as not to mix and sleek. The ideal environment for worms is a shallow pit, and the right kind of worm is necessary. Lumbricus rubellus (red worm) and Eisenia foetida are thermotolerant and are therefore particularly useful. Field worms (Allolobophora caliginosa) and night crawlers (Lumbricus terrestris) attack organic matter from below, but these do not beg during active composting, they are killed more easily than others at high temperatures. European night crawlers (Dendrabaena veneta or Eisenia hortensis) are manufactured commercially and have been successfully used in most climates. These night crawlers grow to about 10-20 cm. The African Night Crawler (Eudrilus eugeniae) is a large species of tropical worm. Tolerates higher temperatures than Eisenia foetida, provided there is enough moisture. However, it has a narrow temperature tolerance range and cannot survive at temperatures below 7 °C. Vermicomposting is used in many countries. Experience from selected countries is described as case studies. PLATE 9The worm culture is closed [FAO/17449/ODOUL] Vermicomposting case studies in the PhilippinesWorms used in this study (FAO, 1980) were Lumbricus rubellus and/or drum excavator. The worms were raised and multiplied from a commercially acquired breeding stock in shallow wooden boxes stored in a shed. The boxes were approximately 45 cm × 60 cm × 20 cm and had drainage holes; stored on shelves in rows and levels. The bedding consisted of various organic residues such as sawdust, grain straw, rice husks, bagasa and cardboard, and was well moistened with water. The wet mixture was stored for about a month, was covered with a damp bag to minimize evaporation, and was thoroughly mixed several times. After fermentation, chicken manure and green matter, such as ipil ipil or water hyacinth, were added. The material was placed in boxes. It was free enough for the worms to bury and was able to The proportions of different materials varied according to the nature of the material, but the goal was to achieve a final protein content of about 15 percent. The pH value was as neutral as possible and the boxes were kept at temperatures between 20 and 27 °C (at higher temperatures the worms are hung; at lower temperatures they hibernate). Although worms were able to eat the material of bedding, worms were regularly fed at this stage: every kilogram of worms was given 1 kg of feed every 24 hours. For every 0.1 m2 area of the area, 100 g of breeding worms were added to the boxes. Feeds included chicken manure, ipil ipil and vegetable waste. On one farm, water hyacinth was grown specifically and used fresh (chopped) as the only source of feed. Some form of protection against predators (birds, ants, leeches, rats, frogs and centipedes) was required. Composting procedure A number of pits (number depending on the available space) were dug approximately 3 m × 4 m × 1 m deep, with oblique sides. Bamboo rods were laid in a parallel row on the floor of the pit and covered with a grid of wooden strips. This provided the necessary drainage, because the worms could not survive in a subdued environment. The pits were lined with old feedstuff bags to prevent worms from leaking into the surrounding soil, and yet allow the drainage of excess water. The pits were then filled with rural organic residues such as straw and other crop residues, animal manure, green straw and leaves. Filled pits were loosely covered with soil and kept moist for a week or so. One or two places on the pile were then well watered and the worms from the breeding boxes were on top. The worms immediately buried in damp soil. In order to get worms from boxes, two-thirds of the box was emptied into a new box lined with a banana leaf or an old newspaper. The original box was then provided with fresh bed material and these worms remained multiplied again. The worms emptied from the box were selected manually to be added to the heap. Compost pits were left for two months; Ideally, these pits should be shaded by hot sun and kept moist. Within two months, about 10 kg of castings per kilogram of worms were produced. The pits were then exuded in the range of about two-thirds to three quarters, and the bulk of the worms were removed manually or by soothing. This left enough worms in the pit for further composting, and the pit was refilled with fresh organic residue. Compost was dried in the sun and sown to create quality material. The typical analysis was: organic matter, 9.3 percent; N, 8.3 percent; P, 4.5 percent; K, 1.0 percent (water soluble); Ca, 0.4 percent; and Mg, 0.1 percent. Surplus worms harvested from the pit were then either used in other pits, sold to other farmers for the same used or sold as an animal feed supplement, used or sold as fish feed or used in certain food preparations in humans. Vermicomposting in CubaIn Cuba, various methods are used for the spread of worms and vermicomposting (Cracas, 2000). Screed troughs The most common method uses cement troughs (60 cm × 180 cm) to increase worms and create worm compost. Due to the climate, they are connected manually every day. In these beds, manure is the only raw material for worms. This manure is aged about one week before being added to the trough. First, a layer of 7.5-10 cm of manure is placed in an empty trough, and then worms are added. Since worms consume manure, more manure is layered on top, about every ten days, until the worm compost reaches about 5 cm from the top of the trough (about two months). Then the worms are separated from the compost and transferred to another trough. Wind lines Another method of vermicomosting is wind lines. Cow manure accumulates about 90 cm across and 90 cm tall. It is then deployed by worms. As the worms work their way through, fresh manure is added to the end of the line, and the worms move forward. The rows are covered with leaves or palm leaves to keep them shaded and cool. Some of these lines have a drip system (the hose runs next to the row with holes in it), but most of them are connected manually. Some of these rows are tens of meters long. Compost is collected from the opposite end as soon as the worms move forward. It is then bagged and sold. Fresh manure, planted with worms, begins the row and process again. Some of the wind rows have bricks running on their sides, but most of them are simply piles of manure with no sides or protection. Manure is static composted for 30 days, then converted into rows for worms to be added. After 90 days, the piles reach a height of about 90 cm. Windy rows are also used to compost rice skins and sugar cake (cake is what's left after processing sugar cane), but even this is mixed with animal manure. Food residues are sometimes added to worm beds. Vermiculture in IndiaThis approach (Jambhhekar, 2002) uses the following materials: breeding worms, wooden bed and organic waste. The bed should be the desired length and about 75 cm high × 120 cm wide. Worms should be applied to each part of the waste. The next steps in the process are: Soothing and crushing - decomposition can be accelerated by crushing raw materials into small pieces. Mixing - carbonic substances such as sawdust, paper and straw can be mixed with N-rich materials such as sewage sludge, biogas porridge and fish residues to achieve an almost optimal C:N ratio. Half digestion - raw materials should be kept in piles, and the temperature should reach 50-55 °C. Pilots should remain at this temperature seven to ten days. Maintaining humidity, temperature and pH - the optimal level of humidity to maintain aerobic conditions is 40-45 percent. The correct humidity and control can be maintained by mixing fibrous with materials rich in N. Pilot temperature should be 28-30 °C. Higher or lower temperatures reduce the activity of microflora and earthworms. The height of the bed can help control the temperature increase. PH raw materials should not exceed 6.5-7.Compost is ready after about one month. It is black, mingly, light and rich in hummus. To facilitate the separation of worms from compost, watering should stop two to three days before emptying the beds. This forces about 80 percent of the worms to the bottom of the bed. The remaining worms can be removed manually. Vermicompost is then ready for application. Some entrepreneurs have made adjustments, such as to make the floor impermeable and provide covered shade, to ensure temperature control and protection against the accumulation of excessive water during the rainy season. While this increases costs, increased vermicomostation efficiency and faster earthworm growth rate more than offsets these additional costs. Excess water, which can be infused together with earthworm extracts, is also collected from the concrete floor and recirculated. This ensures a high N content in the finished product and also better quality thanks to canned worm extracts. The steps in this process are: Cattle manure is collected from cow shelters. Manure is kept for about 7-10 days to cool. Beds/rows of manure and crop/leaf residues, etc. In beds/rows, vegetable waste, such as leaves, straw, etc., is layered alternatively with manure to reach a height of about 75 cm. Beds are kept as such for 4-5 days to cool down. Water is sprinkled to cool the compostable mass. Earthworms are located on the top of the row /beds of manure. About 1 kg of worms in a meter-long row of manure is inoculated. It is left undisturbed for 2-3 days after covering with banana leaves. Covering with jute bags or bags is not recommended, as it heats the bed with manure. The bed is open after 2-3 days. The upper part of about 10 cm of manure is released with the help of a suitable hand tool. The bed is covered again. Worms feed on the upper bed about 10 cm. This part will turn vermicasted in about 7-10 days. This part (vermicasted manure) is removed and collected near the bed. The next upper part of 10 cm is loose and again covered with leaves. Humidity is maintained in bed by regular sprinkling of water. The released part of the manure is vermicast in the next 7-10 days and is removed again. Thus, in about 40 days, about 60 cm of bed is converted into and 3-4 opportunities are collected. The remaining bed with a height of about 10 cm contains earthworms mixed manure. Fresh mixture of manure/organic residues, etc. Manure taken from the bed is freed from worms by soothing. In this way, uncompiled or foreign substances are also removed. The steeded manure is packaged and used or sold as needed. Increasing vermicompost productionVermicompost production using epigeic compost worms such as Eisenia foetida, Lumbricus rubellus and Eudrilus eugenie can be effectively increased by supplementing organic waste used for vermicomposting with cow urine. Undiluted urine can be used to moisten organic waste during the preliminary composting period (before the addition of worms.). After the start of the activity of the worm, urine can be diluted with the same amount of water. No problems were observed with the daily use of diluted cow urine for moistening the vermicompetal bed. This simple technique can bring vermicompost with a higher content of N. In addition, it was found that worms are very active, and vermicompost can be harvested at least 10 days earlier. The integration of traditional composting and vermikompostingProblems associated with traditional thermophilic composting relates to: the long duration of the process, frequent turning of the material, a reduction in the size of the material to increase the area, loss of nutrients during the prolonged process and heterogeneous resulting product. However, the main advantage of thermophilic composting is that the temperatures achieved during the process are high enough to adequately kill the pathogen. During vermicomposting, earthworms assume both the role of turning and keeping the material in an aerobic state, thus reducing the need for mechanical operations. In addition, the product (vermicompost) is homogeneous. However, the main drawback of the vermicompost process is that the temperature is not high enough to kill the pathogen. While in traditional thermophilic composting temperatures must be above 70 °C, vermicompetitive processes must be maintained at less than 35 °C. The study examined the possibility of integrating traditional thermophilic composting and vermicomposting (Ndegwa and Thompson, 2001). The work involved combining the appropriate attributes from each of the two processes to improve the overall process and improve product properties. The two approaches examined in the study concerned: pre-composting followed by vermicomostation; and (ii) before vermicomposting, followed by composting. The duration of each of the combined operations, i.e. the duration of each of the combined operations, shall be estimated at eur 100 A comparison was made only with vermicomposting (duration: 56 days). The results showed that the combination of the two reduce stabilisation time and improve product quality. In addition, the resulting product was more stable and consistent, had less potential environmental impact and met pathogen reduction requirements. Requirements.