

IMPORTANCE OF VERMICULTURE

The importance of vermiculture is as follows:

- 1. Source of biocompost:-** Vermicompost is the principal product of vermicomposting. It is one of the most valued and ecofriendly biocompost. It is free from synthetic chemical inputs, heavy metals and toxic compounds.
- 2. Soil fertility and soil health:-** Application of vermicompost increases the soil fertility by improving the macro and micronutrient status of the soil. It improves the physical, chemical and biological properties of the soil. It improves soil aeration, texture and tilth thereby reducing soil compaction. It maintains the soil health and water retention capacity of soil because of its high organic matter content. It enhances beneficial soil microflora and destroys soil pathogens.
- 3. Plant growth and productivity:-** Many researchers have found that vermicompost stimulates further plant growth even when the plants are already receiving optimal nutrition. Whether they are used as soil additives or as components of horticultural soil less media, vermicomposts have consistently improved seed germination, enhanced seedling growth and development, and increased plant productivity much more than would be possible from the mere conversion of mineral nutrients into more plant-available forms. It promotes better root growth and nutrient absorption.
- 4. Plant health:-** There has been considerable anecdotal evidence in recent years regarding the ability of vermicompost to protect plants against various diseases. The theory behind this claim is that the high levels of beneficial microorganisms in vermicompost protect plants by out-competing pathogens for available resources, while also blocking their access to plant roots by occupying all the available sites. There are evidences that vermicompost repel hard-bodied pests and also suppress plant-parasitic nematodes.
- 5. Waste management:-** Vermicomposting can be employed for converting all the biodegradable wastes such as farm wastes, kitchen wastes, market wastes, bio-wastes of agro-based industrial wastes, livestock wastes etc. into useful product through the action of earthworms. Through their digestive process, earthworms convert decaying vegetable matter, composted green waste, animal waste and paper into valuable nutritive products for agriculture. Approximately 60% or more of household waste is of an organic type that could be recycled using vermiculture. Food discards account for 5% to 10% of the overall municipal solid waste stream and offers a huge opportunity for recovery of value from materials otherwise destined for disposal as waste. Solid wastes are produced in enormous quantities from industries like breweries, distilleries, sugar industries, food industries, agro-based industries, dairy industries etc. Management of these wastes and their disposal is a major problem. Wastes if not managed scientifically pose a sequel of environmental and health hazards. Considering these wastes as the misplaced resource they can be scientifically managed by biodynamic composting and vermicomposting transforming them into a marketable value added product.
- 6. Waste water management:-** Water pollution in surface or groundwater that adversely affect the humans, animals, aquatic biota and the living environment as a whole has become a challenging problem all over the world. Keeping the efficiency of drainage system which is the main problem in managing sanitary landfills; failure of leachates collection system is mainly caused by biofouling (formation of insoluble, consolidated deposits and incrustations). Vermicompost can act as a buffering material limiting the acid phase and enhancing waste biostabilization. Another possible advantage of using compost as biofilter could be the removal

of heavy metals from leachates due to adsorption or complexation phenomena. Vermifilter that involves land treatment and vermitechnology has shown its promise in purifying municipal wastewater. The land treatment mechanism includes complex physical, chemical and biological interaction operating together. During the treatment, sewage sludge so settled are removed and processed through anaerobic digestion or composting. In vermifilter, the surface portion of the vermibed containing worm cast and suitable species of earthworms can enhance the process of bacterial decomposition of organic matter present in the waste water, thereby enhancing the rate of waste conversion to manure. Some high water consuming ornamental plants can be grown on the vermibed to minimize the nutrient content of wastewater.

- 7. Bioremediation:-** In recent years the possibility of recycling organic wastes as soil conditioners has been subject to a great and generalized interest. Huge quantities of sewage sludge; solid urban waste, agricultural residues and agro-industrial byproducts are produced as a result of human activities. Before their agronomic use, organic waste must be subjected to appropriate treatments to both stabilize organic matter and avoid harmful effects. Apart from their effect on soil fertility, the bioremediated organic wastes have been shown effective in two important aspects of agriculture improvement and environmental safety. The role of earthworms in processing organic waste and producing stable organic matter is a suitable alternative way to solve at least on farm dimension; the problem of organic waste recycles. Like composting, vermicomposting is aimed to recycle the energetic resources of any kind of organic wastes. In nature, earthworm cast consist of excreted masses of soil, mixed with residues of comminuted and digested plant residues. Casts obtained by vermiculture are usually called vermicompost. The vermicompost is a product rich in organic bioremediated matter, which differs from the compost obtained, from the same matrix for its level of humification and the greater presence of microbial metabolites. These metabolites, i.e., growth regulators, polysaccharides are strongly responsible for the fertilizing value of casts. Vermicomposting process mineralize complex substances, releasing the nutrients available for plants firstly into compost and then into soil. These substances, that play an important role in the plant growth and development, contribute to the promotion of rooting, root growth, plant development and improvement in crop production that are among the claimed effects associated with the supply of bioremediated wastes. It is worthy to note that such substances, mainly hormone-like compounds and metal chelating agents have been widely used for a long time to improve the quality of agricultural crops. The chemical and biological assay carried out on the same material submitted to the two above reported processes shows that hormone like substances are present in the vermicompost in greater amounts than in the compost and that such compounds are present in the earthworm cast in amounts comparable with those found in the rhizosphere of many plants. It supplies the soil with plant nutrients and organic matter that will be completely humified over medium or long term. That contributes to enhance the rest effect, responsible for the future fertility of soil.
- 8. Poultry feed:-** The mature and worn out earthworms from vermicomposting or vermiculture process can be used as feed for poultry, fish, pig and other domestic animals.
- 9. Environmental benefits:-** In addition to being a respectable, profitable business, worms are asset for our environment. By consuming organic waste and eating up to their own weight daily, these little creatures offer an alternative to taking all our waste to landfills. This small act will certainly help and promote recycling. Worms eat anything that was once living. They consume household food waste, cardboard, paper, newspaper, old phone books, composted green

waste, vegetables, fruits, paper, coffee grounds, and the paper filter, egg shells and any leftovers go in the garbage, and they have no disease. While cutting down the volume of waste going to our landfills and helping Mother Nature, there is also the business side of becoming a worm farmer. Prevention of soil pollutants and cleanup of contaminated soil have become a worldwide environmental priority. Composting has been used to remove pollutant compounds from organic wastes, while generating organic matter for soil directly usable for in-situ bioremediation. Composting food discards aerobically can result in many environmental toxicity benefits by reducing the chemical reactions that occur as food discards break down in landfills and other waste treatment systems. Composting results in reductions in methane and leachate generation. Methane is a flammable gas that must be managed when generated. Leachate generated in landfills must be treated and disposed of properly. Odors and leachate in solid waste compactors and dumpsters, where health concerns can arise. Vermitechnology provides a viable option for pre-treatment of different types of environmentally hazardous waste materials before and after their disposal.

Climate change is one of the most serious and pressing environmental problems of our time. Farms are a significant contributor to climate change, largely through the release of carbon from soils and the generation of methane gas from livestock and their manure. Both composting and vermicomposting address these issues. One of the principal benefits of both composting and vermicomposting occurs through carbon sequestration. This is the process of locking carbon up in organic matter and organisms within the soil. Because composts of all types are stable, more carbon is retained in the soil than would be if raw manure or inorganic fertilizer were applied. Soils worldwide have been gradually depleted of carbon through the use of non-organic farming systems. The consistent application of compost or vermicompost gradually raises the level of carbon in the soil. Although carbon is constantly leaving the soil as more is being sequestered, the use of composts can increase the equilibrium level, effectively removing large amounts of carbon permanently from the atmosphere.