

IMPORTANCE OF VERMICOMPOST AND ITS BENEFITS IN AGRICULTURE

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ABSTRACT :- Vermicompost is an eco-friendly fertilizer. It is very essential for the growth of the plants. Vermicomposting is a process which can be defined as biooxidation and stabilization of organic material involving the joint action of earthworm and mesophilic micro-organisms. In an ideal situation, worms eat agricultural waste and reduce the volume by approx. 45% to 65%. Vermicompost produced by the activity of earthworms is rich in nutrients, growth hormones, vitamins and enzymes such as proteases, lipase, amylases, chitinase, cellulose and immobilized microflora. The role of enzymes is very important because in presence of these enzymes, organic matter disintegrates, even after it has been ejected from the worms. The use of vermicompost is crucial and beneficial because it reduces use of water for irrigation, pest and termite attack, weed growth, promotes faster rate of seed germination, and helps in the growth and development of plants.

The present study focuses on some of the beneficial effects of the vermicompost usage in agricultural production. The study also proves that earthworms and vermicompost can boost horticultural production without the use of agrochemicals. This study attempts to increase awareness among people.

KEYWORDS:-Vermicompost, Biooxidation, Mesophilic micro-organism, Horticultural production, Agrochemicals.

INTRODUCTION:-

In the recent years, it is observed that the disposal of organic wastes from domestic, agricultural and industrial areas is a chief source of vermin-compost in the urban areas. These effluents have caused increasing environmental and economic problems. But there are several technologies also developed to combat this serious problem. According to Edwards, 2004, the growth of earthworms in organic waste has been known as vermiculture, while processing of organic wastes by

earthworms is called vermicomposting. Vermicomposting has been arising as an innovative biotechnology for the conversion of agro-industrial wastes into value added products, which are very useful and important, and can be utilized for improving the soil structure and fertility in organic farming (Garg and Gupta, 2009). The soil conditioner and plant feeding material is produced by many species of earthworm such as *Eudrilla-euginae* and *Eisenia foetida* and they are the best for changing the physical and chemical structures of bovine feces and organic plant material, which is collectively known as vermicompost.

There are many vermicompost methods, which are reliable, economical and sustainable for the evaluation of various organic wastes, and that enable the production of products called "Vermicest". The vermicest has great value and has a biological suppression effect on plant growth, plant nutrition and rot factors. Earthworms increase plant growth (38% and grain yield 34%) especially in grain products. (Baker, 1994). Now-a-days, vermicompost methods are used in wide range in agricultural areas. Actually, these methods are used as techniques that ensure food safety for humans and animals, and support a sustainable agricultural production model that is very much perfect and reliable in terms of environmental health and has high economic value Demir *et al.*, 2010.

Vermicompost provides great quality of soil which increases the productivity nature of soil. It also ensures that there are no mistakes and capacity of water holding in the soil is appropriate. Kale *et al.* 2013. He concluded that vermicompost increased the vegetable's growth of the plant in comparison of chemical fertilizers. In a study involving sugar beet, the effects of nitrogen fertilizer, barn manure and vermicompost were treated and investigated, and it was found in the conclusion that vermicompost used at the level of 10t/ha formed biomass with more growth of root and leaf of sugar beet (Mimuy *et al.*, 2001, Bucker field and Webster, 1998). In another

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study the effect of vermicompost and sand mixtures on plant growth in radish found that plant growth (weight) increased, when ratio of vermicompost increased. Therefore, there are beneficial effects in using vermicompost based substrates, which are very useful in agriculture (Olle, 2016). The use of vermicompost accelerates growth, increases crop yields, and creates a favorable environment for the growth of beneficial microorganisms. The action of these beneficial microorganisms permanently improves soil structure and increases plant secretion. Sometimes, pure vermicompost is not good for agricultural production, because it contains too much nutrients, which may cause harmful effects on agricultural production (Olle 2016a, Olle, 2017).

Vermicompost composting is an efficient method of breaking down organic matter which splits into an end product that is beneficial to soil and plants. Adding garden wastes, kitchen wastes products directly to the soil without composting them will lead to some undesirable effects. When materials such as leaves and grass clippings, kitchen wastes are composted, a microbial action starts, which converts them into a more usable organic material. Now a days, vermicomposting is considered as an easy way to recycle solid or liquid wastes. When cared properly, worms progress very quickly and soon convert waste material into nutrient rich casting. In the breaking down process of food waste, worms feed on micro-organism, which grow on the surface of the waste and excrete smaller sized particles, commonly called worm casting.

VERMICOMPOSTING AND THEIR BENEFICIAL EFFECTS ON AGRICULTURE:-

Vermicomposting is very useful for agricultural purposes in the following ways:-

- Reduces fertilizer requirements and soil composition.
- Improves soil structure, drought tolerance, water infiltration and nutrient holding capacity.
- Helpful in root growth and yields production.
- Increases beneficial microbial growth of the soil.
- It also increases earthworm population in the soil.
- Always protects plants from the diseases.
- Increase the soil's organic meter, and prevents soil erosion.

- Increases water holding capacity of the soil.
- Removes soil salinity and sodicity.
- Maintains optimal pH value of soil (Sinha, 2014)

NUTRIENT CONTENT IN VERMICOMPOST:-

Vermicompost produces higher percentage of protein content and carbohydrates per plant as compared to chemical fertilizer (Adhikary, 2012). Studies suggest that treatment of humic acids, plant growth promoting bacteria and vermicomposts could be used for a sustainable agricultural production instead of the use of chemical fertilizers. (Joshi *et al.*, 2015). Vermicomposting is very beneficial and it also protects plants against various pests and diseases through the biological resistance in plants (Sinha *et al.*, 2012). According to Dunn, 2011, the crops treated with vermicompost are also very resistant to blight, parasitic nematodes and bacterial wilt and the treatment is compared with synthetic fertilizers.

CONCLUSION:-

Vermicompost is produced by the activity of earthworms because it contains in high composition of micro and macronutrients, vitamins and growth hormones. In Vermicompost also contains many enzymes such as proteases, lipase, amylases cellulose and chitin, and are immobilized micro-flora. It can increase the production of crops and prevent them from harmful pests.

Vermicompost is organic manure which is helpful for the better growth of plants without polluting the environment. Vermicompost increases growth and improves the quality of the fruits and seeds in a short duration. (Mistry, J. 2015). Vermicompost, due to its granular structure, regulates the soil structure, increase water holding capacity and provides aeration of the soil. The soil therefore has rich nutrients effects on wheat production (Kizilkaya *et al.*, 2012). Maji *et al.*, 2012 concluded that vermicompost application is very useful and Humic acid rich. Vermicompost promotes plant growth by improving microbial community structure of soil as well as Root Nodulation and Mycorrhizal colonization in the root.

It is also concluded that in the presence of micro and micronutrients, the physical and biological properties of the soil increases. Potassium and nitrogen are very essential nutrients for growth of the plants and it also

enhances microbial activity and greater ability to retain water (Lim *et al.*, 2015).

The study of vermicompost concludes that its importance and benefits in agriculture are very effective and it helps in the production of crops and vegetables. It also creates resistance against plant diseases and protects plants.

Vermicompost is very beneficial in agricultural production. Economically and according to results, the use of vermicompost by farmers also reduces production costs and increases profitability.

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