

PRODUCTION OF IMPROVED QUALITY ORGANIC MANURE FROM DOMESTIC ORGANIC WASTE THROUGH INTEGRATION OF COMPOSTING AND VERMICOMPOSTING

ABSTRACT

This project is primarily aimed at studying the feasibility of producing quality organic fertilizer from domestic organic wastes.

Two common organic wastes processing technologies have been combined in the present study. Traditional thermophilic composting which is commonly used for treatment of organic waste or for production of natural /organic fertilizer has been combined with a related technique called vermicomposting where earthworms are used to breakdown organic waste. These two techniques have their inherent advantages and disadvantages. The integrated approach followed in this study extracts pertinent attributes from each of these two technologies and combines them to enhance the overall process and improve the quality of final product. Above combination could be proceeded in following two ways as reported by several scientists.

- a) Pre- composting followed by vermicomposting (CV system approach)
- b) Pre- vermicomposting followed by composting (VC system approach).

The present study was based on the above mentioned CV system approach. First phase was composting process and domestic organic wastes was used as the substrate. During composting phase raw organic wastes were partially decomposed under thermophilic conditions by microbiological activity. Naturally occurring microorganisms were provided with optimum environmental conditions for rapid composting. During this period process was well managed and monitored to keep the waste pile at conditions optimum for microbial activities.

Second phase of this process was vermicomposting phase. Earthworms naturally occurred in domestic waste dumping places were collected and used for vermicomposting process. Earthworms utilized partially decomposed waste produced in the first phase and final product was excreted as vermicompost. During that period earthworms were provided with optimum environmental conditions. This process was monitored and managed to increase process efficiency.

This study was not only focused on integration approach. Process control measures were also implemented to enhance process efficiency and product quality. Findings of this study also revealed that the integrated approach was not adequate to improve product quality and process efficiency. Process control approach was also equally important to enhance the quality of product and efficiency of the process. The results indicated that the system integrating the two processes with process control measures resulted in a product that was of better quality and it conformed to the Australian Standard specification for vermicompost. This entire process of making vermicompost from household waste was proved as a practically feasible process , and suitable for small scale handling at household level. Also the Initial investment was very low and it provided advantages in waste handling, while producing an environment friendly product with value addition for waste.