



Research Article

VERMICOMPOSTING: SUCCESS STORY OF FARMER FOR REVENUE AND EMPLOYMENT GENERATION

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Abstract- Vermicompost is a fine granular, dark brown/black coloured organic product prepared by earthworms by using animal dung and organic wastes which is much useful for soil health. It has biological properties as rich in population of soil micro-organisms compared with those in conventional composts. Vermicompost has adequate amount of micronutrient and macronutrients depending on sources of earthworm's feedstock. Earthworm promotes soil fragmentation and increase aeration of soil by volume 8-30 per cent. Vermicompost has at least four times more plant nutrients than conventional cattle dung compost. Vermicomposting is a source of creating self employment and revenue generation. This is an easy and faster process of converting organic matter into compost than other conventional methods. A farmer, Shri Bhikhari Mehta opted vermicomposting for his livelihood and started from a very small scale and became a successful producer of quality product. He argued that his product is demanded by nearby farmers, NGO's and government organizations of Bihar. Moreover, he is encouraging interested farmers to prepare this multifunctional quality product on their own farms so that farming community can be benefitted.

Keywords- Vermicompost, Worms, Humus, Soil, Micronutrient.

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Introduction

Vermicompost is an organic fertilizer obtained from the earthworms by passing out the organic wastes through the digestive systems. The process of preparation of this organic fertilizer may be called as vermicomposting. Earthworm improves and restores soil fertility and boost up crop productivity by the use of their excretory products known as vermicast. Vermicast is popularly known as Black gold because of rich in nutrients, growth promoting substances, beneficial soil micro flora, having properties of inhibiting pathogenic microbes and synergistic relationship in plant rhizospheres. Being stable, multifunctional organic manure which enriches the soil quality by improving physio-chemical and biological properties it must be promoted [1]. Vermicompost is becoming popular day by day as it provides quality products through major component of organic farming system [2]. Mixture of leguminous and non-leguminous crop residues enriches the quality of vermicompost. Its moisture content remains in between 45- 65% which is ideal for land applied compost and pH values near neutral due to the production of CO₂ and organic acids. Other by products of microbial activities are also known which promote plant growth, disease antagonists and growth influencing substance like hormones.

Vermicompost is a safe, non-polluting and one of the most economical and convenient way of solving the waste disposal problems and recycling of organic waste. It is an excellent form of natural manure which is cost effective, easy to make, handling and contain high nutrients with growth hormones and are 4-5 times powerful growth promoter than all other organic fertilizers and over 30-40% higher than the chemical fertilizer [3,4]. Various workers reported that vermicompost contain 17-36 % Humic acid and 13-30% Fulvic acid of total

concentration of organic matter. Besides, vermicompost has adequate amount of micronutrient and macronutrients depend on sources of feedstock. Earthworms and vermi-compost can promote growth 50-100 per cent than compost and 30-40 per cent over chemical fertilizers [5]. Keeping in view the above facts and properties of vermicompost Mr. Bhikhari Mehta, a progressive farmer, adopted as an occupation for his livelihood and generated employment for numerous agog farmers of nearby areas.

Methods and Materials

Success story of Bhikhari Mehta

Sri Bhikhari Mehta S/o Late Sanai Mehta, born in 1966 and completed his education up to Matric, is resident of Birpur village under Basantpur block of Supaul district (Bihar). He opted the Agriculture occupation for his livelihood instead of higher education. He started commercial cultivation of vegetables and banana at very small scale but always tried to incorporate recent technologies in practice. In 2008, boisterous flood changed the scenario and devastated by damaging all crops and converted fertile land into silted sand condition but Sri Mehta tried to overcome these natural vagaries by rejuvenating cultivation in those areas through implementing the vermicomposting. In this situation, he started growing Horticultural crops on advise and techniques provided by Rajendra Agricultural University, Pusa and Central Institute of Medicinal & Aromatic Plants, Lucknow. He initiated production of vermicompost with the technical help of Krishi Vigyan Kendra, Supaul at very small level i.e. with ten units in 2007 and during 2014-15 he reached at about 430 units at his Ranipur farm and producing over 3500 metric tons of quality vermicompost per annum. He started supply surplus

amount to the Bihar Government, non-governmental organizations and farmers community. Moreover, he established a forum of Himalaya herbal organic farming group, Ranipatti with collaboration of local farm stake holders. His success story is inspiring to the farmers working in Agriculture and allied sectors. Keeping in view of his devotion and contribution, Government of Bihar conferred prestigious Award "Kisan Bhusan" of Supaul district and Bihar Agriculture University, Sabour, Bhagalpur (Bihar) recognized his activity and awarded with "Innovative Farmer Award in 2012".

Preparation Method adopted

There are about 240 genera of worms worldwide, among them about 50 species are available in India. On the basis of habitat, worms can be categorized into three groups:

(A) **Epizoic:** It is known as manure worms or compost worms which have short life span and rapid breeding ability. Epizoic worms obtain their food from upper surface of half decomposed organic matter and move downward. *Eisenia foetida* (Red earthworm), *Eudrilus eugeniae* (night crawler), *Perionyx excavatus* etc. are under this group. *Eisenia foetida* is selected because of its high multiplication rate and converts abandoned amount of organic wastes into vermicompost. Red earthworm have body length 3-10cm, body weight 0.4-0.6g, maturity 50-55days, conversion rate 2.0 q/1500worms/2 months, cocoon production 1 in every 3 days and incubation period is 20-23days.

(B) **Endozoic:** Endozoic worms, known as field worm, consume food from lower portion and prefer soil than organic matter. Endozoic worm help in churning of soil, air circulation in soil and mixing of organic matter

(C) **Anesic:** Anesic form hole and stay in it. Lives of anesic is very complex and prefer leaves.

Vermicomposting unit (size 6x2x2 feet) was established in a cool, moist and shady place. Number of units increased according to availability of raw materials and requirements. Cow dung and chopped dried leafy materials were mixed in the proportion of 3: 1 and kept for 15 – 20 days for partial decomposition. During this period, heap kept moist by sprinkling of water so that temperature can be favorable to worms. A layer of 15-20cm of chopped dried leaves/grasses kept as bedding material at the bottom of the bed. Each bed contained 1.5-2.0q of raw material. Now 1500-2000 Red earthworms released on the upper layer of the pit/bed and covered with gunny bags/paddy straw so that worms can be saved from predators. Water sprinkled immediately after releasing worms and kept it moist by frequent sprinkling as per need. Bed turned once after 20-30 days for maintaining aeration and proper decomposition. A reddish colour liquid, with an alkaline reaction having dissolved nutrients, called vermiwash collected in the small chamber connected through drainage pipes fitted at the bottom of the tank. By this way vermicompost was ready in 45-50 days and amounting by weight $\frac{3}{4}$ th of the raw materials used. Moreover, vermiwash was additional product which was abandoned in nutrition having plant growth hormones, micronutrients and organic acids. For value addition of vermicompost, rock phosphate, azolla etc. added accordingly.

Preventive measures during production:

- Selection of site was most important according to purpose of production either commercial or personal.
- Producer was trained by scientists of Krishi Vigyan Kendra, Supaul, Bihar before start the production.
- According to purpose, vermicompost unit pit/floor was prepared and it kept compact to prevent downward migration of worms.
- 15-20 days old cow dung used to avoid excess heat.
- Avoid fresh dung and waste because worms would die in fresh cow dung, citrus rinds avoided carefully.
- The organic wastes were free from plastics, chemicals, pesticides and metals etc.
- Aeration was maintained for proper growth and multiplication of earthworms.

- Optimum moisture level (30-40 %) and temperature (18-25° C [6]) maintained for proper functioning of worms.
- Ants are dangerous enemy of worms, so charcoal powder was mixed to the raw materials to escape from them.
- Activities of worms were monitored frequently for producing quality produce.
- All works from production to packaging was done in shade and stored the products in shaded, spacious and 4-5 racks height in poly bags.



Results and Discussion

The success of any production system is basically depend on need, availability of inputs and marketing channels by which one can marketed with remunerative price by using locally available resources. The key to the success of organic farming system is the production of all inputs like, manures, plant protection etc., and on-farm utilizing the local resources wherein animal husbandry plays a catalytic role. The study on economics of vermicompost production indicated that it is 50-57% economical enterprise as compared to costly chemical fertilizers. Direct marketing of vermicompost from producer to consumer was found to be strongest marketing channel however marketing through cooperatives and trader was also found in few instances. Economics of vermicompost production was carried out in Coorg district of southern Karnataka, India to compare benefit cost ratio and observed 1.78 and 1.52 for wet method and heap method, respectively [7]. Specialized market for vermicompost was not observed in the study area but obvious that about 85 % vermicompost was marketed directly from producers to local consumers. It is essential to clearly define a national policy on organic farming by supporting private sector groups, NGOs or associations, and encouraging farmers to produce their own fertilizer in respective country [8]. Data collected from farmer's field and its statistics is depicted in [Table-1] which clearly indicated that benefit and cost ratio is 1.87:1 which is profitable enough for farmers.

Table-1 Benefit and Cost ratio of vermicompost production.

Cost of vermicompost production (Rs.)	Gross income(Rs.)	Net income(Rs.)	B.C. Ratio	Total -350 units working, 8 q/unit were produce ,total compost produced-2800 Q, sale of vermicompost@600/Q.
584418.60	1680000.00	1095581.4	1.87:1	

Conclusion

By this case study it can be concluded that dashing people like Mr. Bhikhari Mehta are selecting vermicompost production, enhancing their livelihood status, improving soil health and conserving beneficial soil micro-organisms. He argued himself by his quality product which is demanded by nearby farmers, NGO's and government organizations of Bihar. Moreover, he is encouraging interested farmers to prepare this multifunctional quality product on their own farms so that farming community can be benefitted. Data collected from farmer's field indicated that benefit and cost ratio (1.87:1) is significantly higher and can boost-up eco-friendly Indian economy which is today's essential need.

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Conflict of Interest: None declared

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