Int.J.Curr.Microbiol.App.Sci (2019) *8*(4): 1283-1288

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 8 Number 04 (2019)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2019.804.147

A Success Story of Farmer's using Vermicomposting for Revenue and Employment Generation in Trans-Himalyas of Cold Arid Region

Jigmet Yangchan*, S.A. Ganie, M.A. Wani, V. Gupta, Anil Kumar and Yogesh Kumar

High Mountain Arid Agriculture Research Institute, Leh (SKUAST-Kashmir), India

**Corresponding author*

Keywords

Vermicompost, Worms, Humus, Soil, Micronutrient, Cattle dung

Article Info

Accepted:
10 March 2019
Available Online:
10 April 2019

A B S T R A C T

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 Skalzang Tundup adopted 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 Ladakh. Moreover, he is encouraging interested farmers to prepare this multifunctional quality product on their own farms so that farming community can be benefitted.

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 (Datta *et al.*, 2016). Vermicompost is becoming popular day by day as it provides quality products through major component of organic farming system (Yadav *et al.*, 2013). 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 CO_2 and organic acids. Other by products of microbial activities is 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 (Narkhede *et al.*, 2011, Attarde *et al.*, 2012). Various workers reported that vermicompost contain 17-36 % Humic acid and 13-30% Fulvic acid of total concentration of organic matter. Besides, vermicompost has an 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 (Sinha *et al.*, 2010). Keeping in view the above facts and properties of vermicompost Mr. Skalzang Tundup a progressive farmer, adopted it as an occupation for his livelihood and generated employment for numerous agro farmers of nearby areas.

Materials and Methods

Success story of Skalzang Tundup

Sri Skalzang Tundup S/o Tsering Angchok, born in1969 and completed his education up to Matric, is resident of Thiksey village under Leh Tehsil of Leh district in Jammu & Kashmir, India. He opted the Agriculture occupation for his livelihood after got retirement from army. He came in contact with High Mountain Arid Agriculture Research Institute (HMAARI), SKUAST-K Leh in the year 2018 during Skill development programme of vermicompost. Till then he had been cultivating traditional crops of wheat, barley and some vegetable on a usual pattern and applied chemical fertilizer. After coming in contact with HMAARI scientists he started his own vermicompost unit at large scale on scientific basis. In the meantime he undertook training on vermicompost production, and this center supplied 7 bags of plastic vermibed and worms to this farmer to encourage his work, today with this setup of technology he is receiving more demand of vermicompost not only from line departments but also from farmers and hotel owners. Within one bag he earned Rs 20000/= in four months. After getting training and vermibags from HMAARI SKUAST-K Leh he earned around Rs 4 20,000 /=. Now he is willing to spread his business to large scale.

He is having his own agriculture land and a dairy farm with 12 cattles. He is also interested in raising crops in an organic way after successful capacity building through this training programme. Thiksey village soil is not so good because of salinity and hard crust and he is very satisfied with this technology because he is not only securing his livelihood but also sets an example for coming generation as well as for farmers community of Thiksey. Now he has become a role model for Thiksey village in the field of Agriculture. Beside that he received Award from Agriculture department during Kissan Mela 29/8/18.

Adopted preparation method

Earthworm, also called angleworm, any one of more than 1,800 species of terrestrial worms of the class Oligochaeta (phylum Annelida)—in particular, members of the

genus Lumbricus. Seventeen native species and 13 introduced species (from Europe) occur in the eastern United States, L terrestris being the most common. Earthworms occur in virtually all soils of the world in which the moisture and organic content are sufficient to sustain them. One of the most detailed studies of earthworm activities was conducted by English naturalist Charles Darwin. Some studies said that there are about 240 species of generally worms worldwide, among them about 50 species are available in India. On the basis of habitat, worms can be categorized into three groups:

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 abundant 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.

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

Anesic

Anesic form hole and stay in it. Lives of anesic are very complex and prefer leaves.

Vermicomposting unit size (1.50cm X 1.30 cm X 70cm) was established in a warm place under Ladakh condition where temperature goes to -30^0C to $+35^0$C. 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 20-30 days for partial decomposition. During this period, heap was kept moist by sprinkling of water so that temperature can be favorable to worms. A layer of 15-20cm of chopped dried leaves/grasses was kept as bedding material at the bottom of the bed. Each bed contained 4-5q of raw material. Now 1500-2000 Red earthworms were released on the upper layer of the bed and covered with gunny bags/paddy straw so that worms can be saved from predators. Water was sprinkled immediately after releasing worms and it was kept moist by frequent sprinkling as per need. Bed was turned once after 15-20 days for maintaining aeration and proper decomposition. A reddish colour liquid, with an alkaline reaction having dissolved nutrients, called vermiwash was collected in the small chamber connected through drainage pipes fitted at the bottom of the tank. By this way vermicompost was ready in 4months and amounting by 350-450 kg were harvested from one bag. Moreover, vermiwash was additional product which was abundant in nutrition having plant growth hormones, micronutrients and organic acids. For value addition of vermicompost, rock phosphate, azolla etc. was 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 High Mountain Arid Agriculture Research Institute SKUAST-K Leh before start the production.

At least 30 day's old cow dung used to avoid

excess heat.
Avoid fresh dung and waste because worms would die in fresh cow dung.
The organic wastes were free from, chemicals, pesticides and metals etc.
Aeration was maintained for proper growth and multiplication of earthworms.
Optimum moisture level (50-60 %) and temperature 25-32^{0}C (Sharma, 2009) was 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 the products were stored in shade and one kg poly bags or 50 kg poly bags were used for marketing.

Results and Discussion

The success of any production system basically depend on need, availability of inputs and marketing channels by which one can get the 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 (Reddy *et al.*, 2009). 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 (Ranaivoarisoa *et al.*, 2016).

Data collected from farmer's field and its statistics is depicted in (Table 1) which clearly indicated that benefit and cost ratio is 1:2.4 which is profitable enough for farmers (Fig. 1–3).

Table.1 Cost:Benefit ratio of vermicompost

Cost of vermicompost production per bag in 4 month (Rs.)	**Gross Income(Rs)**	**Net Income(Rs) Per bag**	**B.C. Ratio**	**Total -7 unit working, 450kg/unit were produce ,total compost produced-3150kg, sale of vermicompost@400/Kg**
18000	126000	7500	1:2.4	

Fig.1

Fig.2

Fig.3

By this case study it can be concluded that farmers like Mr. Skalzang Tundup adopted vermicompost production, enhanced his livelihood status, improved soil health and conserved beneficial soil micro-organisms. He argued himself by his quality product which is demanded by nearby farmers, NGO's and government organizations of Ladakh. 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 (1:2.4) is significantly higher and can boost-up Ladakh economy which is today's essential need.

Acknowledgement

I am highly obliged to the High Mountain Arid Agriculture Research Institute SKUAST-K Leh for providing opportunity to farmers who adopted scientific methods of vermicomposting for their self employment.

References

Attarde, S.B., S.D. Narkhede, R.P. Patil, and Ingle, S.T. 2012. Effect of organic and inorganic fertilizers on the growth and nutrient content of *Abelmoschus esculentus* (okra crop). International J. of current research. 4(10): 137-140.

Charles Robert Darwin https://www.britannica.com/biography/ Charles-Darwin

Datta, S., J. Singh, S. Singh, and Singh, J. 2016. Earthworms, pesticides and sustainable agriculture: a review. Environmental Science and Pollution Research. 23(9): 8227–8243 https://doi.org/10.3390/horticulturae3010002

Narkhede, S.D., S.B. Attarde, and Ingle, S.T. 2011. Study on effect of chemical fertilizer and vermicompost on growth of chilli pepper plant (*Capsicum annum*). Journal of applied sciences in environment sanitation. 6 (3): 327-332.

Ranaivoarisoa, H., S. Ravoninjiva, S. Ramananarivo, and Ramananarivo, R. 2016. Vermiculture for Sustainable Organic Agriculture in Madagascar. Horticulturae. 3(2): 1-8.

Reddy, B.V., C. Honnaiah, P.N.S. Reddy, R.D. Kale, and Balakrishna, A.N. 2009. Economics of vermicompost production and marketing in Southern Karnataka, Mysore J. Agric. Sci. 43(1): 125-131.

Sharma, A.K. 2009. Vermiculture in Biofertilizers for Sustainable Agriculture. Agrobios India., 41-66.

Sinha, R.K., S. Agarwal, K. Chauhan, and Valani, D. 2010. The wonders of earthworms & its vermicompost in farm production: Charles Darwin's 'friends of farmers', with potential to replace destructive chemical fertilizers from agriculture. Agricultural Science. 1(2): 76-94.

Yadav, S.K., S. Babu, M.K. Yadav, K. Singh, G.S. Yadav, and Pal, S. 2013. A review of organic farming for sustainable agriculture in northern India. International Journal of Agronomy, 2013, Article ID 718145.

How to cite this article:

Jigmet Yangchan, S.A. Ganie, M.A. Wani, V. Gupta, Anil Kumar and Yogesh Kumar. 2019. A Success Story of Farmer's using Vermicomposting for Revenue and Employment Generation in Trans-Himalyas of Cold Arid Region. *Int.J.Curr.Microbiol.App.Sci.* 8(04): 1283-1288.
doi: https://doi.org/10.20546/ijcmas.2019.804.147