

Efforts for quality biomass of earthworm *Eudrilus eugeniae* by using tomato powder

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ABSTRACT

Earthworm species *Eudrilus eugeniae* is very excellent worm for vermicomposting and rich in protein, lipid and carbohydrates. Also rich in vitamins, similarly earthworms are soil inhabiting organisms and can-do wonderful job for man and biosphere. Therefore, present piece of work has been conducted to explore the effect of tomato powder on the growth and reproductive potential of earthworm species *E. eugeniae*. Earthworm feed along with tomato powder for 72 hours and used for vermicomposting of soil, cow dung, tomato powder. At the end of 60 days of experiment worm shown significant increase in weight of worms, increased no. of cocoons and juveniles. The result indicates that tomato powder is found to be good for growth of earthworm biomass. It is a feasible technology for tomato growers, earthworm growers, farmers, traders and for pharmacists.

Key words: Tomato powder, Soil, Cow dung, *Eudrilus eugeniae*.

INTRODUCTION

Earthworm has dynamic potential and can do wonderful jobs for man and biosphere (Tripathi, 2003, Patole and More, 2016.). Earthworms are used as protein rich sources of animal feed. They contain 70-80% protein in a dry weight and also contain essential amino acids, especially lysine rich. The amino acid composition of earthworm is superior for fish meal (Bhorgin, 2012). Earthworms contain all five types of food for human consumption (Julka, 1988). Earthworms are known to be associated with medicines since ancient time to cure various human diseases. In India paste of dried worm were prepare for curing disease in Unani system of medicines for treating wounds, chronic boils, piles, hernia and impotency when applied externally and also have been used in folk medicine to treat pyorrhoea and small pox diseases (Edwin et al, 2012). Earthworms have found to be excellent in vitamin B-complex. Among all these niacin and vitamin B₁₂ are of significant value (Edward, 1985 and Antha et al., 2012). Modern society is unable to

manage the earthworm amount of household, industrial and agricultural waste that it creates a large fraction of this waste is organic in nature, especially the agricultural and household waste. India produces 3000 million tons of organic waste every year. Actually, this waste has great value and should be used feed stock for making useful items, such as energy, vermicomposting is a simple biotechnological process of composting in which certain species of earthworms are used to enhance the process of waste conversion and produce a better end product (Gandhi *et al.* 1997).

Tomato is the world largest vegetable crop after potato and sweet potato. India has 4th rank in the tomato production. It is a very cheap and good source of vitamins. It also contains large quantity of water, Ca, Niacin and minerals that protect the body from various diseases (Taylor, 1987).

Lycopene is a bright carotenoid pigment found in tomato and other red fruits. Lycopene was discovered by DOGGAR. Its name derived from the tomato's species, *Solanum lycopersicum*. Lycopene is the essential nutrient for man. It is a potent antioxidant, preventing cancer and effective on osteo-proteins etc. Constant intake of tomato and its products can improve the disease conditions and can reduce the risk of diseases (Madhava *et al.* 2011).

Harvest and post-harvest loss of India's major agricultural product is estimated as Rs. 92,651 crore data published by ministry of food processing industries on Aug 9, 2016. Out of this tomato post-harvest loss is more.

Therefore an attempt is made to find out the performance of fully ripped tomato powder on the growth and reproduction of earthworm species, *E. eugeniae*.

MATERIAL METHODS

Collection material:

The earthworm species *Eudrilus eugeniae* was obtained from governmental agricultural nursery (Sakri) (M.S) India. They were maintained and acclimatized in the mixture of organic compost containing soil and month old cow dung for two weeks. Quality soil and month old cow dung collected from agricultural field and cow shade respectively. Ripped tomato were cut into small pieces and dried in sunlight then crushed in mixer. Dry powder was used in the experiment.

Experimental set up:

For this experiment 100 preclitellar worms were selected, washed in distilled water and they were kept on ordinary gel filter paper in a plastic tough which is covered by aluminum foil with pin holes. After 24 hours the gut was cleared of organic matter on they feed. i.e. filter paper. Again, they were washed then placed 50 worms in the plastic tough containing 10gm wet powder of tomato i.e. experimental group. For control group only dry cow dung powder was used and both the tough were covered with aluminum foil with pin holes and was kept for 3 days (72 hrs). The worms feed on that organic matter.

The vermicomposting experiment was performed in dark coloured plastic tough with 5 kg capacity. A total 6 vermibeds were prepared i.e. 3 for control and 3 for experimental. The vermibed content is tabulated table 1. The 50 tomato feeded experimental animals and 50 control animals were released on these vermibed. All the beds were kept for 60 days. At the end of experiment weight of worms, no of juveniles, weight of juveniles and number of cocoons were measured and tabulated (table2).

Percent increase was calculated (Suthar, 2017)

$$\% \text{ increase} = \frac{\text{Worms counted} - \text{Worms introuced}}{\text{Earthworms counted}}$$

RESULTS & DISCUSSION

From table 2, it is noticed that in both the groups the growth of worms was normal, no mortality seen, Results also shown gradual increase in weight of worms and preclitellar worm transformed into clitellar worm in both the groups but significant increase in weight is seen in experimental vermibed as compare to control bed. Similarly maximum number of juveniles and cocoon were recorded in the experiment vermibed. It means tomato powder contains lycopene and other nutrients which is good for increase in earthworm biomass.

Our results are corroborated with More, and More, 2017 that soil of Banyan tree, cow dung and grasses composted along earthworm *Eudrilus eugeniae*, it shows good growth and reproduction of earthworm. Similarly composting of leaf litter of *Sesbania sesban* and *Frutolaria juneca* with micro-organisms gives good growth of worms and quality biofertilizer rich in micro and macro nutrients (More and Patole, 2014).

Table 1: Vermibed groups

Sr. No.	Groups	Biomass
1	Control	Soil + Cow dung 50% + 50 Worms
2	Expt	Soil 50% + Cow dung 45% + 5% Tomato powder + 50 Worms

Table 2: Earthworm Biomass (Weight of juvenile and cocoons)

Groups	Weight of 50 worms		% Increase	No. of Juveniles	Weight of Juveniles	No. of Cocoon
	Initial	Final				
Control	16 gm	23 gm	43.75%	50	4 gm	38
Expt	17 gm	28 gm	64.70%	66	6.5 gm	57

Kitchen waste is rich in organic material, if composted along with cow dung in the ratio of 1:1. Increase was found in micro and macronutrients and in biomass (Mohamed Omer Albastia *et al.* 2015). More et al 2016 reported growth, reproduction and nutrient content of worm *Eudrilus eugeniae* in the degradation of silver coated paper dishes.

CONCLUSION

By the research work, we concluded that tomato powder feeded earthworms and vermibed containing soil, cow dung, tomato powder is found to be excellent for the biomass and reproduction of earthworms. It is the feasible technology for tomato growers, earthworm growers, for municipal market yard or tomato market were ripped tomato some time thrown by the farmers or traders.

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