

Green Cleaning of Garbage to Compost by Eisenia Fetida

Dr. Parag Dalal

Asst. Prof. School of Studies in Environment Management, Vikram University Ujjain

Abstract – Ujjain was described as one of the most significant megacity of the India as Singhashta 2016 just passed by which is a event were Billions of devotees come to take a dip in holy River Shipra for whole One month. In Ujjain average total solid waste generation is ~ 320 Metric tons per day in the megacity. A lot of plutocrats is spent by the government on the solid waste operation transportation to near trenching grounds positioned within 20 km piecemeal from the megacity. Operation also produces colorful problems which produce a numerous issue with destruction of plutocrat; thus, a big need for the eco-friendly disposal fashion is there. So in this paper we're proposing a fashion known as Vermicomposting fashion which is a stylish result for treatment of organic solid wastes. We propose the declination of organic external solid waste by earthworm. In the exploration the temperature is maintained 25- 35 ° c, humidity content about 45- 55 and pH7.0-7.3. About 90-gram earthworms {Eisenia Fetida} per Kg. of external solid waste are being taken. The final result show that the organic external solid waste is been completely converted to compost in a period of 36 days threw vermicomposting and about 35 volume of external solid waste is reduced for transportation.

Crucial words – External solid waste, earthworms, vermicomposting, Eisenia Fetida, eco-friendly disposal fashion, pH, humidity, megacity, Shipra River.

PREFACE

External solid waste operation is critical issue day by day because of rapid-fire increase in population and changes in mortal conditioning. External solid waste is biodegradable or organic waste. It's not dangerous substance generated by the diurnal conditioning of mortal life. The major source of external solid waste is ménage, marketable, institutional, artificial, request etc. Vermicomposting is an eco-friendly and low-cost process. In this process use of earth worms for declination of the organic waste or convert into the compost. In this exploration we tried to find out a suitable option for MSWM. The current study explores external solid waste operation using by

earthworms and reduce a chance of external solid waste volume.

CURRENT STATUS OF EXTERNAL SOLID WASTE MANAGEMENT UJJAIN MEGACITY

The solid waste is increase due to the population explosion in Ujjain megacity; thus increase in waste 340 Kg per day (Dalal, 2005) to 320 Metric tons per day. Civic area is 151.8 sq. Km. of Ujjain megacity (Dalal, 2022) and Population is 5,77,215 according to 2011 tale. The civic area is divided into six zones and 54 wards. Waste generation rate per capita0.37-0.45 Kg per day (Dalal et al., 2017). The operation of external solid waste is done by the external pot of Ujjain now a day's two private consultancy are also involved for the operation of solid waste.

Collection of solid waste operation accepted by Ujjain external pot Ujjain in the collection process which is done by diurnal Door to Door collect the waste from ménage or marketable areas by mini-trippers, hand-craft etc. the outfit are inversely distributed in all over areas in megacity according to the mass viscosity rate of solid waste. Transportation process is done using by heavy vehicles for bulk transportation. Two modular transfer stations are positioned at MR- 5 Maksi road bypass and Gaughat conforming of compactor, hook payload etc. This contract for transportation of external solid waste, Door to Door vehicle collection lifting and the transportation of external solid waste from Ujjain Municipal Corporation Ujjain are done for term of 10 times according to MSW rules 2000. 76mini-tippers with the size of 3 boxy measures and 15 compactors with the capacity of 1300 kg each are being used by Ujjain Municipal Corporation.

Table 1: Types of vehicles engaged in the Ujjain megacity cleaning

S. No	Types of Vehicles	No. of Vehicles	No. of trips per day
1	Mini Tippers	116	2
2	Hook Loader	12	1
3	Compactors	20	2
4	Dumper Placer	10	1

Collected external solid waste has been transported to Gondiya trenching ground about 20 km stream down from the Ujjain megacity. MSW are being reused. First the waste sends to fetter for isolation process where 100 mm of organic waste is insulated from the remaining plastic, paper etc. This insulated organic waste goes for the window composting and the waste which will be turn into final affair is organic compost size between 2- 4 mm are being vended in the request. The undressed waste is being dump in four cadence deep recesses. Hole is 140 m long and 120 m wide. Presently external solid waste factory is functional at Gondiya in Ujjain. The cost of all operation of MSW is veritably high. This cost can be reduced by using the eco-friendly technology for MSW proposed in this research paper.

EXPERIMENTAL STYLES OF EXTERNAL SOLID WASTE TREATMENT

The organic waste demanded for data is collected on diurnal base from domestic areas. The vermicomposting process is done in two reactors and third reactor is taken as control. Size of each reactor is 50 cm × 30 cm × 30 cm to the total capacity of 0.045 boxy measures (Dalal 2012). These reactors are filled by the MSW or varied weight of earth worms are loaded in them. In the control reactor earth worms

doesn't contain with MSW. The earth worms feed an organic material or excrete out grainy mounds of worm cast. These earth worms are breakdown of complex substances or convert into noncomplex water answerable substances. Earth worms are responsible for all this process (Hidalgo et al., 2006). The enzymes are also helpful in this response are present symbiotic microbes. Vermi-cast contains all essential nutrients including micro-nutrient which can be used as a bio-fertilizer in husbandry and gardening etc (Pramanik et al., 2007).

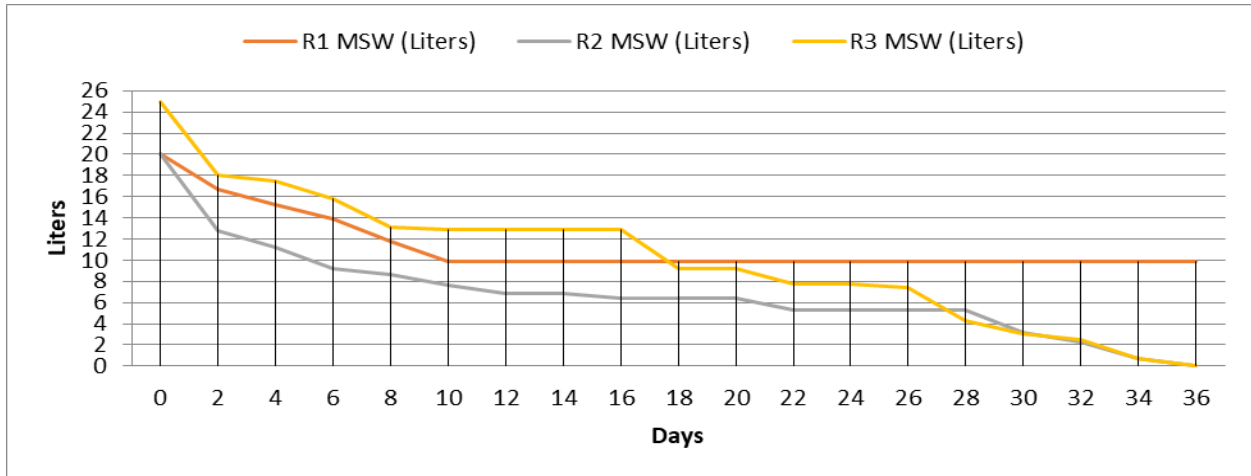
THE SETUP

Three Vermi-reactor are designed each of confines 50 cm × 30 cm × 30 cm having capacity of 0.045 boxy cadence and small opening for aeration and drainage system of water inside and bottom. The water is sprinkled from the top to maintain the high humidity and the pH remains near to 7. It's utmost familiar conditions for the vermicomposting process. Organic material of MSW 10Kgs were filled in each reactor with earth worms lading of 0.0 Gms. In first reactor R1, 500gms in alternate reactor R2 and 1000gms in third reactor R3 also performance is observed for about five weeks(35- 36 days).

RESULTS AND CONVERSATIONS

Table no. - 2 – Reactors and Manure with Standard deviation

Days	R ₁ MSW	R ₂ MSW	Manure	± SD	R ₃ MSW	Manure	± SD
	(Liters)	(Liters)			(Liters)		
0	20.000	20.000	0.000	0.000	25.000	0.000	0.000
2	16.647	12.831	0.348	0.020	18.059	1.945	0.120
4	15.252	11.238	1.576	0.100	17.460	2.610	0.160
6	13.950	9.178	1.996	0.120	15.755	2.682	0.170
8	11.811	8.616	1.996	0.120	13.083	2.682	0.170
10	9.858	7.586	1.996	0.120	12.899	2.682	0.170
12	9.858	6.837	2.047	0.120	12.899	2.682	0.170
14	9.858	6.837	2.170	0.130	12.899	2.682	0.170
16	9.858	6.462	2.457	0.150	12.899	2.682	0.170
18	9.858	6.462	2.457	0.150	9.214	3.890	0.241
20	9.858	6.462	2.457	0.150	9.214	3.890	0.241
22	9.858	5.245	3.992	0.241	7.739	4.269	0.261
24	9.858	5.245	3.992	0.241	7.739	4.269	0.261
26	9.858	5.245	3.992	0.241	7.371	6.858	0.421
28	9.858	5.245	3.992	0.241	4.238	7.319	0.451
30	9.858	3.184	4.606	0.281	3.041	8.189	0.501
32	9.858	2.248	7.114	0.431	2.488	8.220	0.511
34	9.858	0.749	7.523	0.461	0.737	8.261	0.511
36	9.858	0.000	8.312	0.501	0.000	8.384	0.521

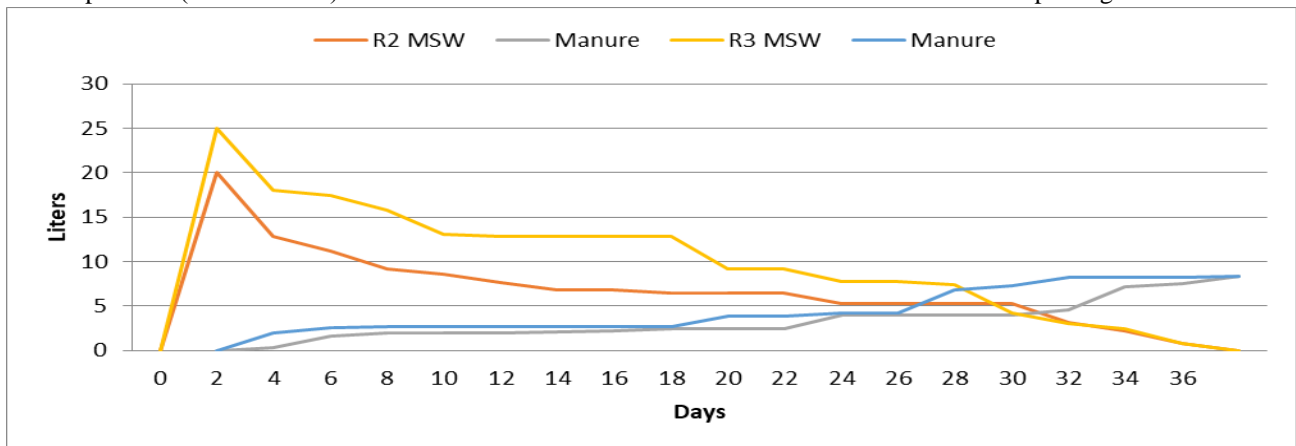


Graph 1 – Reactors comparison of MSW

Vermicomposting result shows that the bioconversion of waste sludge is done into two useful products, earthworm’s biomass or vermicompost. The viability of using earthworms as a treatment fashion for multitudinous waste aqueducts besides producing organic diseases, In this exploration it's indicated that during vermicomposting the pH declines (from 7.0 to 7.3) with the advancement of vermicomposting period(from 0 to 36 days). It's easily apparent from the all observation. First day we see that not any small changes in reactor R1 but in R2 and R3 show that starting of changes. Alternate day we see that not any changes in R1 but in R2 the waste are convert into 0.35 lit. Manure and in R3 the waste are convert into 1.95 liter. The earthworms are peregrination to downcast direction with the color changes in same direction. The green waste is starting to convert into black/ pales brown in R2 and R3 (from 4- 10 days) and R1 reactor remains greenish. During all five weeks we maintain the temperature (25°C to 35°C) for earthworms. Third

week we observe that 2.45 liter compost are present in reactor R2 and 2.68 liter compost are present in reactor R3.

After five weeks volume reduction in first reactor R1 is about 49% as no vermicomposting is there also the color of the source doesn't change remains greenish. In alternate reactor R2 were we put 500gms of worms {Eisenia Fetida} the color start changing from fourth day and the volume of compost after 36th day is 8.32 liters which is about 60 of the declination. In third reactor R3 we've put 1Kg worms {Eisenia Fetida} which affect show that 0.0 liters of MSW and the compost is 8.39 liters which gives the declination about 67.5. The original color and appearance of MSW changes from green color to brown which changes from top to bottom with the downcast direction of earthworms the total time period is 36 days and the temperature and moisture is maintained by sprinkling from top. The MSW is reduced to 52 of reactor first to 32.5 for vermicomposting.



Graph 2 – Reactors with Manure Comparison

CONCLUSION

Material for vermicomposting is fluently available so it can, be rehearsed at marketable area as well as individual homes with veritably little cost. The practice of vermicomposting has numerous benefits it reduces the cost on the overall solid waste operation system of the government and introduces on point recycling of the waste or manual toxin is ready for our theater. Toxin is ready for our theater. We can construct a simple reactor for vermicomposting in each house for biodegradable waste putrefying.

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