International Journal of Scientific Engineering and Applied Science (IJSEAS) – Volume-7, Issue-4, April2021
ISSN: 2395-3470
www.ijseas.com

Impact of Physical Factor on Floral Waste Pre Decomposition through Search Experiment

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Abstract: - Environmental pollution is major problem of world. Various wastes creates many gases and disease, which are hazardous to human health and others animals. Generally various common waste present in the environment to create unhygienic conditions. Temple waste is one of the most commonly occurring waste presents in the environment. Temple waste normally contains floral, leaves, coconut, Agarbati, Dhoop and milk product like “Abishek waste water”, and it is the most important issue in the world. Floral waste is generated in large quantity due to increase in populations are commonly treated using different types of methods of composting or vermicomposting. The parameters like temperature, pH, and colour are carried out. The main objective of this study is to minimize the problem of floral waste management with the help of physical factors.

Key words: Vermicomposting, Floral waste, Eudrilus eugeniae.

Introduction

Earthworms play major role in nutrient recycling of soil complex ecosystem. Darwin observed the tremendous role of earthworm in the formation, structure, texture, water seepage, fertility of the soil and aeration. Later on presence of earthworm on earth was reduced due to use of chemical fertilizer and pesticides, resulting destruction of earthworm fauna in the soil. Every day, huge amount of organic waste is generated in India, most of which enters into rivers, streams or drainage system or lie on the roads which contaminates the environment. Earthworms are nature’s excellent ploughmen (nature’s tractors) since they make the soil porous by their burrowing activities, and they are ‘plant-root friendly. The daily per capita solid waste generated in India ranges from about 100 grams in small towns to 500 grams in large towns. Estimated quantity of municipal solid waste in India is 27.4 million tons per year. Total annual waste biomass production in the country is about 2500 million tons, out of this; animal dung alone

constitutes about 60% (Dash and Senapati, 1986). Gandhi *et al.* (1997) reported that approximately 700 million organic wastes are generated annually in India which is either burned or used as land filled. Chitdeshwari and Savithri, (2004) reported that approximately 105 metric ton sludge was generated in India. Such large quantities of organic wastes generated also pose a problem for safe disposal. In India, nearly 7,000 million metric tons of organic materials such as farm wastes, kitchen wastes and dairy wastes are produced yearly (Bhaiday, 1994) and they have a large potential for the production of organic manures by vermicomposting. Vermicomposting is the process by which earthworm are used to convert organic waste material into useful fertilizer known as vermicomposting. A lot of study has been carried out in Vermicomposting Centre of Department of Zoology, Jiwaji University, Gwalior. Epigeic earthworm's four species (*Eudrilus eugeniae, Perionyx cressiseptatus, Perionyx excavates* and *Eisenia fetida*) are available in the Vermicomposting center for different types of waste material including cattle dung, animal waste, Sugarcane waste, house waste, pea waste, paper waste, kitchen and food waste, temple waste, sewage sludge, garden waste etc. On the basis of different research work, the performance of Eudrilus eugeniae is the best, out of the four species. Only few studies have been done by Indian workers dealing with temple waste aspects of earthworms.

Materials and Methods

A preliminary search experiment was first conducted to find our seasonal flower waste is suitable for vermicomposting. During March-April, 4 kg of flower waste was maintained in 10 plastic containers, covered by net clothing for a period of 40 days. The plastic containers were punched with 5 holes at bottom for removal of excess of water. In another set (control) of 10 similar holed containers, cattle dung was maintained since it is considered to be a best medium for vermiculture. No water was sprinkled in both the media for initial 5 days, since it had enough moisture content. It was observed that most of the water sprinkled on flower was not retained and freshness of the flowers was maintained for some days and no signs of decay were observed for 5 days.

While dung started decaying within 2 days and stuff became hot and large number of flies got attracted towards it. The heating phase continued with a peak at about 10 days and during heating phase watering was required so that requisite moisture (40%) could be retained. Gradually medium begin to cool down to ambient temperature in about 15 day time. The flower

waste stuff showed signs of decay after 10 days. The material becomes softer and the volume gets reduced with heating. The temperature of the medium continued to increase up to 6 days in FW and 10 day in DU+DL and it becomes soggy due to release of leachate and due to higher moisture contents its sponginess / porosity was low. It also takes longer time (30 days) to cool down it also attract lot of flies which lay by eggs to produced maggots. These observations indicate that as compared to other waste (dung) suitable for composting / vermicomposting flower waste are slower to degrade.

Observations and Results

A preliminary search experiment was first conducted to find out whether seasonal flower waste is suitable for vermicomposting or not. It was observed that most of the water sprinkled on flower was not retained and freshness of the flowers was maintained for some days in FW alone and no signs of decay were observed for 3 days. While dung started decaying within 2 days and stuff became hot and large number of flies got attracted towards it. The heating phase continued with a peak at about 10 days and during heating phase watering was required so that requisite moisture (40%) could be retained. Gradually medium began to cool down to ambient temperature (20-25^{0}C) in about 15 day's time. The flower waste stuff showed signs of decay after10 days. The material became softer and the volume got reduced with heating. The temperature of the medium continued to increase up to 6 day in FW and 10 day in DU+DL and it became soggy due to release of leachate and due to higher moisture contents, its sponginess / porosity was low. It took longer time 28 days for FW and 26 days for DU+DL to cool down without turning procedure. It also attracts lots of flies which laid eggs to produce maggots. These observations indicate that as compared to other waste (dung), suitable for composting / vermicomposting, flower waste was slower to degrade.

Variation of temperature, pH and colour in flower waste

The initial first day temperature of FW was observed 25.76ºC, pH was 6.80 and colour was yellowish red. In second day, temperature increased up to 20ºC more than first day and went to 45ºC and pH was reduced up to 6.68. In fourth day observations, temperature again increased to 15ºC more than second day 60.40ºC, pH was reduced goes to acidic 5.00 and colour was yellowish red. In sixth day observation temperature increase in small points 60.76ºC, pH was

5.10 and colour was yellowish red. In eight day temperature get reduced to 5ºC goes to 55.48ºC, pH was 5.12 and colour was yellowish red. In tenth day temperature again decreased 5ºC goes to 50ºC, pH was increases 6.20 and colour was yellowish red. In twelfth day temperature again decreased 4ºC goes to 46.23ºC, pH goes to neutral 7.00 and colour converted to brownish black. In 14th day temperature was decreased 40.24ºC and pH increases 7.30 and colour was brownish black. In 16th day temperature decreases 35.62ºC, pH increases 7.52 and colour goes to black. In 18th day temperature 35.23ºC, pH was increases 7.74 and colour black. In 20th day temperature 35.10ºC, pH was increases 7.30 and colour black. In 22nd day temperature 34.62, pH was increases 7.50 and colour black. In 24th day temperature 33.23ºC, pH was increase 7.60 and colour black. In 26th day temperature 30.20ºC, pH was increase 7.50 and colour black. In 28th day temperature 25.65ºC, pH was increase 7.52 and colour black. In 30th day temperature 25.37ºC, pH was increase 7.51 and colour black. In 32nd day temperature 24.20ºC, pH was increases 7.53 and colour black. In 34th day temperature 24.14ºC, pH was increases 7.52 and colour black. In 36th day temperature 23.56ºC, pH was increases 7.52 and colour black. In 38th day temperature 22.76ºC, pH was decreases 7.51 and colour black. In last 40th day temperature 21.45ºC, pH was again increases 7.52 and colour black.

Variation of temperature, pH and colour in dung +dry leaves

The initial first day temperature of DU+DL was observed 25.75ºC, pH was 6.80 and colour was greenish dark brown. In second day temperature increases up to 7ºC more than first day and goes to 32.27ºC and pH was increased 6.86. In 4th day observations temperature again increases to 10ºC more than second day 42.24ºC, pH was increased 6.98 and colour was greenish dark brown. In 6th day observation temperature increase 43.28ºC, pH was goes to neutral 7.01 and colour was greenish dark brown. In 8th day temperature get increases 45.65ºC, pH was 7.21 and colour was greenish dark brown. In 10th day temperature again increases to 50.08ºC, pH was increased 7.34 and colour was greenish dark brown. In twelfth day temperature start decreasing 44.8ºC, pH was 7.36 and colour greenish dark brown. In fourteenth day temperature was decreased 36.2ºC and pH increased 7.76 and colour was dark brown black. In 16th day temperature decreases 35.62ºC, pH increased 7.52 and colour goes to dark brown black. In 18th day temperature 35.0ºC, pH was increased 7.56 and dark brown black. In 20th day temperature decreases 34.32ºC, pH was increased 7.45 and dark brown black. In 22nd day temperature

decreases 33.02, pH was increases 7.16 and colour converted into black. In 24th day temperature 30.21ºC, pH was increases 7.16 and colour was black. In 26th day temperature 25.02ºC, pH was 7.24 and colour was black. In 28th day temperature 22.02ºC, pH was increases 7.26 and colour was black. In 30th day temperature 22.03ºC, pH was constant 7.24 and colour was black. In 32nd day temperature decreases 21.10ºC, pH was decreases 7.23 and colour was black. In 34th day temperature 21.02ºC, pH was increased 7.30 and colour was black. In 36th day temperature was 21.02ºC, pH was decreases 7.20 and colour was black. In 38th day temperature 21.01ºC, pH was increased 7.22 and colour was black. In last 40th day temperature was 21.01ºC, pH was increased 7.23 and colour was black.

Table.4.1.1:- Periodic observations of maintenance of flower waste and dung +dry leave in plastic containers.

S.N0.	Days & action	Flower waste(4 kg)			Dung + dry leaves (4 kg)		
		Physical parameters			Physical parameters		
		Colour	pH	Temp.	Colour	pH	Temp.
1.	First Day	Yellow/Red	6.80	25.76	Greenish/Dark brown	6.27	25.75
2	Second Day	Yellow/Red	6.48	45.35	Greenish/Dark brown	6.86	32.27
3	Fourth Day	Yellow/Red	5.00	60.40	Greenish/Dark brown	6.98	42.24
4	Sixth Day	Yellow/Red	5.10	60.76	Greenish/Dark brown	7.01	43.28
5	Eighth Day	Yellow/Red	5.12	55.48	Greenish/Dark brown	7.21	45.65
6	Tenth day	Yellow/Red	7.20	50.56	Greenish/Dark brown	7.34	50.08
7	Twelve day	Brown/Black	7.00	46.23	Greenish/Dark brown	7.36	44.80
8	Fourteen day	Brown/Black	7.30	40.24	Dark brown /Black	7.76	36.20
9	Sixteen day	Black	7.52	35.62	Dark brown /Black	7.86	35.14
10	Eighteen day	Black	7.74	35.23	Dark brown /Black	7.56	35.0
11	Twenty day	Black	7.30	35.10	Dark brown /Black	7.45	34.32
12	Twenty two day	Black	7.50	34.62	Black	7.16	33.02

13	Twenty forth day	Black	7.60	33.23	Black	7.16	30.21
14	Twenty sixth day	Black	7.50	30.20	Black	7.24	25.02
15	Twenty eighth day	Black	7.52	25.65	Black	7.26	22.02
16	Thirty day	Black	7.51	25.37	Black	7.24	22.03
17	Thirty Two day	Black	7.53	24.20	Black	7.23	21.10
18	Thirty Fourth day	Black	7.52	24.14	Black	7.30	21.02
19	Thirty six day	Black	7.52	23.56	Black	7.20	21.02
20	Thirty Eight Day	Black	7.51	22.76	Black	7.22	21.01
21	Forty day	Black	7.52	21.45	Black	7.23	21.01

Fig.4.1.1:- Showing changes in pH of flower waste and dung + dry leaves mixture.

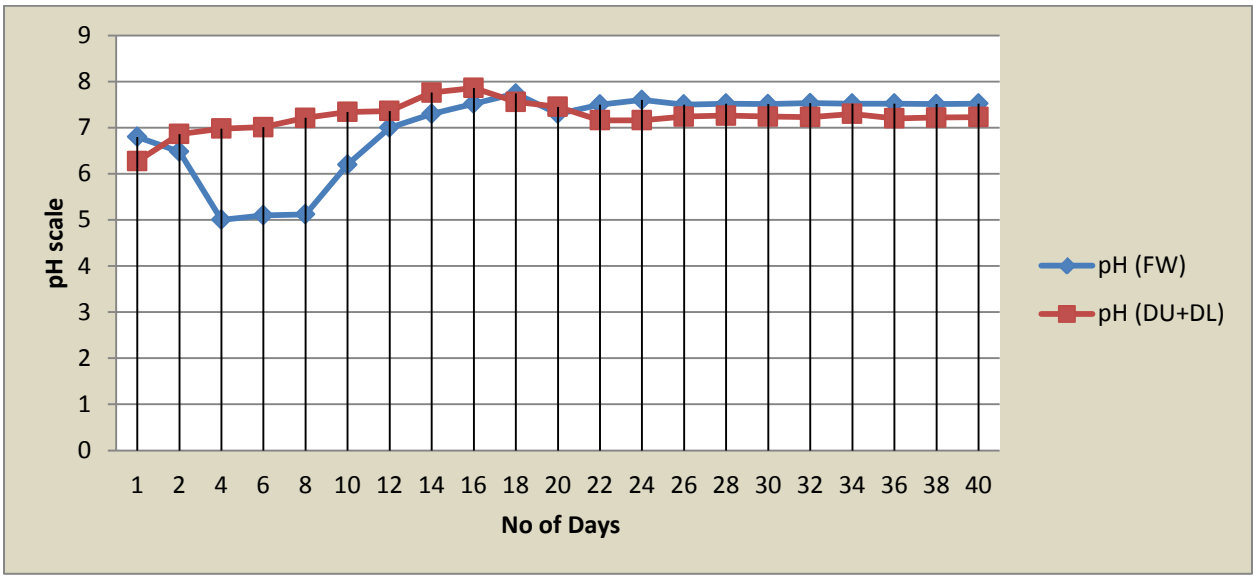
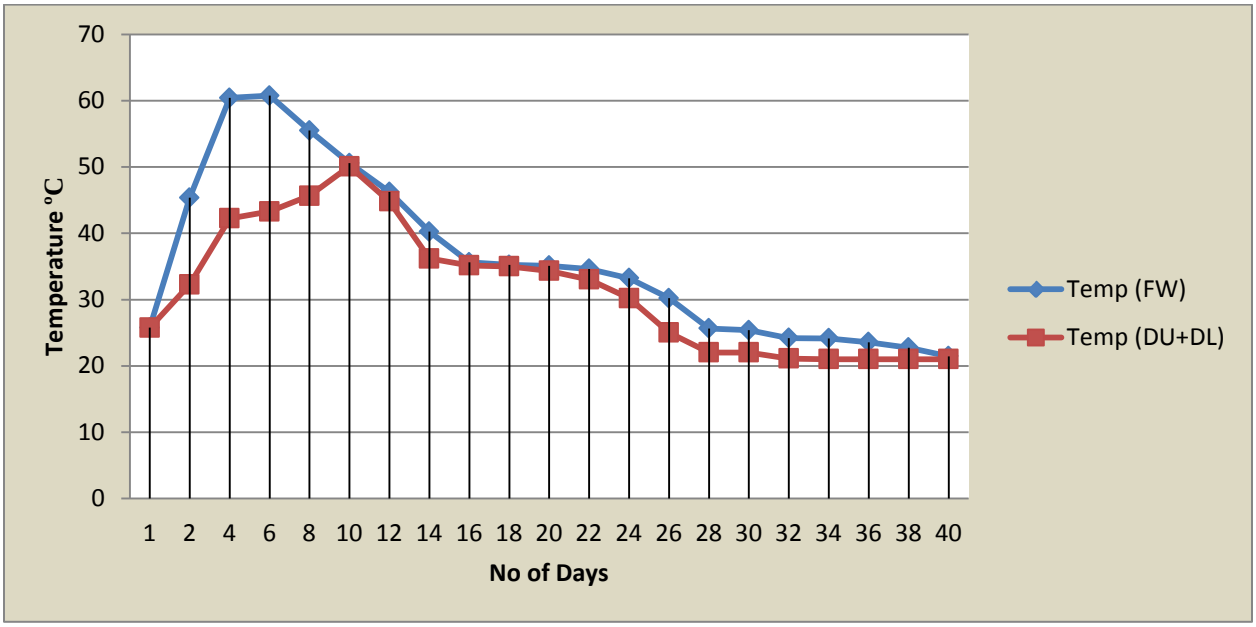


Fig.4.1.2:- Showing changes in temperature of flower waste and dung + dry leaves mixture.



Discussion

A preliminary search experiment was first conducted to find our seasonal flower waste is suitable for vermicomposting. For this purpose 20 plastic containers were selected for flower waste and dung+ leaves. Culture was maintained of 40 days in conditions. Physical parameters (Temperature and pH) were observed. No water was sprinkled in both the media for initial 5 days, since it had enough moisture content. It was observed that most of the water sprinkled on flower was not retained and freshness of the flowers was maintained for some days and no signs of decay were observed for 5 days.

While dung started decaying within 2 days and stuff became hot and large number of flies got attracted towards it. The heating phase continued with a peak at about 10 days and during heating phase watering was required so that requisite moisture (40%) could be retained. The flower waste stuff showed signs of decay after 10 days. The material become softer the volume gets reduced with heating. The temperature of the medium continued to increase up to 20 days and it becomes soggy due to release of leachate and due to higher moisture contents its sponginess / porosity was low. It also takes longer time (30 days) to cool down it also attract lot

of flies which lay eggs to produce maggots these observations indicate that as compared to other waste (dung) suitable for composting / vermicomposting flower waste are slower to degrade.

Several earlier workers also conducted many experiment to demonstrate physical parameter of flower waste vermicomposting. Shouche *et al*., (2011) studied the changes in physical parameters during vermicomposting of floral wastes and the findings of our study showed similarity with their results. She noticed that pH of temple waste alone in the initial stage was 6.8 in 100% flower waste and 8.01 in 100% cattle dung. She also found that the pH values of the composting mixture decreased slightly from alkaline (8.3) to acidic (4.9). The pH increased steadily and was maximum at the last phase of composting. Similarly in our results, pH of flower waste alone was decreased from first day to eighth day than increased neutral and at the end of experiment above neutral. Kohli and Hussain, (2016) observed that during the vermicomposting of flower waste the initial pH was found to be alkaline (8.9) which reaches to a more neutral condition (7.53) at the end of experiment. Albanell *et al*., (1988) reported that vermicomposts tended to have pH values near neutrality which may be due to the production of CO_2 and organic acids produced by microbes present in vermicopost during their metabolism. Kadam (2004) reported that minimum biomass and cocoon production was obtained at pH 5 and 9 while earthworms were killed at pH below 5 and above 9 and maximum biomass and cocoon production of *E. eugeniae* was obtained at pH 7.0 which is consistent with present findings. Madign and Martinko (2005) reported that pH range of 5.6 - 9.2 was optimal for the biomass production of *E. eugeniae*. Gestel *et al*., (1992) reported reduce cocoon production at pH 9.0. Bevacqua and Mellano (1993) reported that compost-treated soils had lower pH and increased levels of organic matter, primary nutrients, and soluble salts which may support for the production of biomass and cocoon of earthworm.

The temperature variations indicate that temperature was higher in pure floral waste and it reduces as the amount of cattle dung increases in composting mixture. Another significant observation was that temperature was generally increased in earlier period of composting *i.e.* within 2-3 days when it increased from initially 25ºC to 45-60ºC depending upon the composting mixture and then reduced in later period. At last *i.e.* after 35-40 days temperature in all composting mixture was 25ºC. Olayinka and Adebaya, (1984) reported that the temperature is another important factor which play an important role in lignin degradation so that organic

material can be melt at faster rate therefore earthworm can eat them as their food. The rate of carbon mineralization of saw dust increased with temperature from 25°C to 40°C with the optimum range between 30 to 35°C. Taiwo and Oso (2004) studied that the optimal temperature (25°C - 40°C) increased the colonization of mesophile bacteria specially thermo-tolerant *Coprinus cinereus* which in turn utilize both cellulose and lignin and convert organic material in a way so that earthworm can take up them as their food.

Conclusions

On the basis of search experiments, it can be concluded that the pH of starting day (Flower waste and Dung+ dry leaves) was observed near to normal. After first day the temperature was increases in both the experiments and pH was decreases in flower waste and increases in Dung+ dry leaves. At the last day of experiments pH of flower waste and Dung + dry leaves was near to alkaline. So it can be concluded that the pH and Temperature to play major role in vermicomposting of temple waste and dung mixture. Also provide the suitability of earthworms for vermicomposting process.

Acknowledgements

1. The authors are highly thankful to Shri Sai Baba Prabandhan Samati, Gwalior (India) for providing flower waste for Charak Udyan Jiwaji University Gwalior.

2. Author is also thankful to M.P. Higher Education for providing Financial Support.

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