

Chemical Analysis of Vermicomposts / Vermiwash of Different Combinations of Animal, Agro and Kitchen Wastes

¹Gorakh Nath, ²Keshav Singh and ²D.K. Singh

¹PhD Scholar Department of Zoology, D.D.U. Gorakhpur University, Gorakhpur -273009, U.P., INDIA

²Department of Zoology, D.D.U. Gorakhpur University, Gorakhpur -273009, U.P., INDIA

Abstract: In India million tons of livestock excreta, agro and kitchen wastes are produced every year which are serious problems for society. This work to evaluate the potential of an epigeic earthworm *Eisenia foetida* to convert the different combination of variety of wastes in to rich nutrient vermicomposts/vermiwash and pre and post chemical analysis of feed mixtures. Vermicomposting results in significant decreased in pH, Total organic carbon (TOC), electrical conductivity (EC) and C:N ratio while significant increase in total Kjeldohl nitrogen (TKN) available phosphorus, exchangeable potassium and calcium in vermicomposts/vermiwash. The increased level of plant nutrients in final products in different organic resources demonstrated that the vermicompost/vermiwash of these wastes will be a valuable biofertilizer for sustainable land restoration practices. This study clearly indicates that vermicomposting of animal, agro/kitchen wastes not only produced a valuable vermicompost/vermiwash but also increased level of plant growth supplements in final vermicompost.

Key words: Wastes, *Eisenia foetida*, Vermicomposting, vermiwash, Chemical analysis

INTRODUCTION

The excess uses of chemical fertilizers and pesticides have made our soil sick and problematic and cause environmental hazards which affect the human health and environment. Million of tons of animal, agro and kitchen wastes are produced annually and have odor and pollution problems (Gupta, 2005; Reinecke *et al.*, 1992; Garg *et al.*, 2006). Much attention has been paid in recent passed years to manage different organic wastes resources at low input as well eco-friendly basis. Vermicomposting, through earthworms, is an ecobiotechnological process that transforms energy rich and complex organic substances in to a stabilized vermicomposts (Bentize *et al.*, 2000). Vermicomposting is stabilization of organic material involving in the joint action of earthworms and micro organisms. Although microbes are responsible for the biochemical degradation of organic matter, earthworms are the important derivors of the process, conditioning the substrate and altering the biological activity (Aira *et al.*, 2002). The epigeic earthworm were utilize for organic wastes management (Suthar, 2006; Benitez *et al.*, 2005; Garg and Kaushik, 2005; Benitez *et al.*, 2005). The epigeic earthworm were utilize for organic wastes management (Suthar, 2006; Garg and Kaushik, 2005; Benitez *et al.*, 2005). During vermicomposting the nutrients are released and converted into soluble and available forms to plants (Ndegwa and Thompson, 2001).

The vermicomposting through different species of earthworm has been studied (Edwards *et al.*, 1998; Kale *et al.*, 1982). The earthworm *Eisenia andrei* converted paper-pulp mill sludge mixed with primary sludge in to the vermicompost (Elvira *et al.*, 1996). Suthar (2008) studied that the post harvest crop residues and cattle shed manure were recycle through vermicomposting by using the epigeic earthworm *Eudrilus eugeniae*. It has been well established that epigeic forms of earthworms can hasten the composting process to a significant extent with production of better availability of vermicomposts (Ndegwa and Thomson, 2001). The epigeic earthworm *E. foetida* is a suitable species for management of wastes which are utilized successfully in vermicomposting (Gunadi and Edwards, 2003; Chaudhari and Battacharjee, 2002; Garg *et al.*, 2003; 2004).

The aim of present study to explore the suitability and potential use of *Eisenia foetida* to management of animal, agro and kitchen wastes with the production of vermicompost/vermiwash.

Corresponding Author: Dr. Keshav Singh, Department of Zoology, D.D.U. Gorakhpur University, Gorakhpur - 273009, U.P., INDIA

Phone no. 09450433313

Email: Keshav26Singh@rediffmail.com

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MATERIALS AND METHODS

Collection of Wastes:

Animal wastes (cow, buffalo, sheep, horse, goat dung) were collected from different cattle farms and different agro/ kitchen wastes were collected from rural and urban parts of Gorakhpur district. After the collection, the different combinations of organic wastes sprayed in a layer of 1-2 feet and exposed to sun light for 5 to 10 days to removing the various harmful organisms and noxious gases (Bhatnagar and Palta 1996).

Collection of Earth Worm:

Earth worms *Eisenia foetida* were collected from U.P. agro, states industrial area, Gorakhnath, Gorakhpur. The collected earthworms acclimatized in the laboratory conditions.

Experimental Design for Vermicomposting:

The experiment for vermicomposting was conducted on cemented earth surface. For the vermibed of each different combination of animal, agro/ kitchen wastes in 1:1 ratio, in the size of 3m x 1m x 9cm. After this moistened it and inoculated at least 2kg of cultured *Eisenia foetida* in each vermibed, then covered the bed by jute pockets. Moistened the vermibed daily up to 40 to 45 days for maintaining of moisture. After one week interval turned the mixture of bed manually up to 3 weeks. After 50 to 60 days granular tea like vermicompost appear on the upper surface of beds.

Extraction of Vermiwash:

Vermiwash extracted through vermiwash collecting device which is made up of plastic or metals drum having capacity of 5 liter and a tap at the bottom the drum filled with broken breaks, about 10cm thickened which is followed by sand layer of 2-3cm thickness lastly with filled with vermicompost with heavy population of earth worms simultaneously added fresh water in to drum and a container kept bellow the tap of drum. The watery yellowish to black extract of vermicompost, vermiwash drainage out off drum. After 1to 2 days the process of extraction has been completed. The different concentrations of collected vermiwash were used for chemical analysis.

Chemical Analysis:

The chemical analysis of raw organic wastes and final vermicompost/ vermiwash of different wastes were observed. Total organic carbon (TOC) was measured using the method of Nelson and Sommers (1982). Total Kjeldahl nitrogen was determined by Bremmer and Mulvaney (1982) procedure. Total available phosphorus (TAP) was determined by colorimetric method (Bansal and Kapoor 2000). Total Potassium, Sodium and Calcium was determined by flame photometer (Bansal and Kapoor 2000). The pH and electrical conductivity (EC) were determined by the method of Garg *et al.* (2006) a double distilled waster suspension of vermiwash/ vermicomposts in ratio of 1:10 (w/v) that had been agitated mechanically for 30 minute and filtered through whatman No.1 filter paper.

Statistical Analysis:

The data have been expressed as mean \pm SE of 6 replicates. Two way analysis of variance (ANOVA) was applied to determined any significant ($P < 0.05$) difference among the parameters observed in vermicomposts bed (Sokal and Rohlf, 1973).

RESULTS AND DISCUSSION

The vermicompost was much darker in color than originally and had been processed more or less in to homogenous mixture after 50 to 60 days of earthworm's activity. The vermicomposting significantly changed the physio-chemical properties of different feed mixture tested. There were little changed in pH of feeds of all vermibed (Table 1, 2). The pH decreased from alkaline to acidic or neutral (7.6 ± 0.04 - 6.5 ± 0.05). The pH shift toward acidic condition was attributed to mineralization of nitrogen and phosphorus in to nitrates /nitrites and ortho-phosphates; bioconversion of organic materials in to intermediate species of organic acids (Ndegwa *et al.*, 2000). Production of CO₂ and organic acid by microbial decomposition during vermicomposting lowers the pH of substrate (Garg, 2004; Haimi and Hutha, 1986; Elvira *et al.*, 1998; Hartenstien and Hartenstien, 1981).

All the treatments show a similar pattern on of change in EC. The initial electrical conductivity in feed mixture were from $0.94 \pm 0.04 - 2.94 \pm 0.14$ ds/m, while final EC was in ranged from $0.62 \pm 0.05 - 2.30 \pm 0.02$ ds/m. The EC was reduced in the range of 30 to 48% for different feeds after vermicomposting. The increased in EC might have been due to the loss of weight of organic matter and release of different mineral salts in available forms (Wong *et al.*, 1997; Kaviraj and Sharma, 2003).

The organic carbon (TOC) in all vermibeds declined (45 to 50) drastically compared to their initial levels (table 1, 2). Elvira *et al.*, 1998; Kaushik and Garg, 2003 have reported 20-45 % loss of TOC in the form of CO₂ from different industrial sludge during vermicomposting. The vermicomposting process refers to feeding of earthworm on organic matter and microbial degradation. Earthworms modify the substrate condition which consequently promotes the carbon losses from the substrate through microbial respiration in form of CO₂ and even through mineralization of organic matter. Elvira *et al.*(1998) stated that large fraction of organic matter in the initial substrate was as loss as CO₂ between 20 and 43% as total organic carbon by the end of vermicomposting. Kale *et al.*, 1982; Elvira *et al.*, 1998; Suthar, 2007 reported that body fluid and excreta secreted by earthworm (e.g. mucus, high concentration of organic matter, ammonium and urea) promote microbial growth in vermicomposting.

Total Nitrogen content was increased in between 8.0 ± 0.06 and 26.9 ± 0.08 g/kg in final products of different vermibed because of mineralization of organic matter (Table1 and 2). Hand *et al.*(1988) have been already reported that *Eisenia foetida* in cow dung slurry increased the nitrate-nitrogen content. Losses of organic carbon might be responsible for nitrogen addition in the form of mucus nitrogenous excretory substances, growth stimulatory hormones and enzymes from the gut of earthworms (Tripathi and Bhardwaj, 2004; Viel *et al.* 1987). These nitrogen rich substances were not originally present in feed and might have contributed additional nitrogen content. A decrease in pH may also be an important factor in nitrogen retention as this element is lost as volatile ammonia at higher pH values (Hartenstein and Hartenstein, 1981). Atiyeh *et al.*(2000) reported that by enhancing nitrogen mineralization, earthworms have a great impact on nitrogen transformation in manure, so that nitrogen retained in the nitrate form.

The C: N ratio one of the most widely used indices for maturity of organic wastes, decreased with time in all the experiment due to decomposition (table-1,2). Initial C: N ratio was in the range of $42.65 \pm 0.3 - 132.0 \pm 1.2$. Final C: N ratios were in the range of $8.8 \pm 1.06 - 27.0 \pm 1.40$. According to Senesi (1989) declined in C: N ratio to less than 20 which indicates an advance degree of organic matter stabilization and reflects a satisfactory degree of organic wastes. Suthar, (2008) reported that the C: N ratio of substrate material reflects the organic waste mineralization and stabilization during the process of decomposition. The loss of carbon as CO₂ through microbial respiration and added of nitrogenous excretory material between the C: N ratio of the substrate. C: N ratio is one of the most widely used indicators of vermicompost maturation, decreases sharply during vermic process (Kale, 1998, Gupta and Garg, 2007, Suther, 2008).

Total phosphorus was greater in final vermicomposts than initial vermibed mixture (Table 1,2). The maximum TP was observed in combination of horse dung with wheat bran 13.2 ± 0.01 g/ Kg followed by horse dung with rice bran. It is because of the physical breakdown of the earthworms (Mansell *et al.*, 1981). The increase of 25 % in TP of paper waste sludge, after worm activity is performed partly by earthworm gut phosphates and further release of TP and further release of TP might be attributed to the P-solubility microorganisms present in warm casts (Satchell and Martin, 1984).According to Lee (1992) the passage of organic residue through the gut of earthworm to the plant the released of phosphorus in available form is performed partly by earthworm gut phosphatases and further released of phosphorus might be attribute to phosphorus solubilizing micro organism present in worm cast.

Total potassium concentration was slightly increased in vermicomposts/vermiwash of all the combination of wastes than initial feed mixture (Table1, 2). Delgado *et al.* (1995) have reported a higher content of TK in the new sewage sludge vermicompost. Benitez *et al.*, (1999) studied that the leacheates collected during vermicomposting process had higher K concentrations. Kaviraj and Sharma (2003) observed that level of TK was increased 10% by *Eisenia foetida* and 5% by *L. maturitii* during vermicomposting. Shutar (2007) suggested that earthworm processed waste material contains high concentration of exchangeable K, due to enhanced microbial activity during the vermicomposting process, which consequently enhanced the rate of mineralization. Total Calcium concentration was higher in final products than initial feed mixture (table1, 2). Elvira *et al.* (1996) have reported no significant increased in T Ca for vermicomposting of paper mill sludge. It is suggested that gut process associated with calcium metabolism are primarily responsible for enhanced content of inorganic calcium content worm cast. However, the similar pattern of calcium enhancement is well documented in available literature (Heartenstin and Hartenstin, 1981; Garg *et al.* 2006).

Table 1: Nutrient content and different physio-chemical parameter in vermiwash obtained from initial feed mixture and final Vermicomposts of different combinations of animal and agro / bitchen wastes.

Combination	Initial feed mixture							
	TOC (g/kg)	TKN (g/kg)	C:N ratio	TK (g/kg)	TP (g/kg)	pH	EC ds/m	TCa (g/kg)
Cow Dung	480.35±4.21	6.0±0.02	86.2±2.40	4.7±0.07	3.7±0.03	8.0±0.02	2.15±0.03	1.3±0.2
Dung+Gram Bran	598.02±2.21	13.2±0.68	45.2±0.26	7.0±0.02	4.8±0.08	3.0±0.03	2.61±0.06	2.0±0.1
Dung+ Straw	635.04±4.32	8.6±0.08	73.8±0.04	6.4±0.08	3.7±0.03	8.8±0.08	2.89±0.08	2.1±0.3
Dung + Wheat Bran	681.00±3.04	12.8±1.00	53.2±1.03	6.9±0.10	7.7±0.04	8.4±0.03	2.63±0.07	1.5±0.2
Dung + Rice Bran	568.10±2.32	11.0±0.32	51.6±0.23	5.8±0.12	6.9±0.08	8.7±0.04	2.74±0.12	1.3±0.4
Dung + Vegetable Wastes	569.12±2.05	9.8±0.62	58.6±0.86	6.8±0.08	4.2±0.05	8.0±0.04	2.46±0.02	1.6±0.4
Dung + Barley Bran	482.14±2.03	10.4±0.04	46.3±1.20	5.9±0.12	4.9±0.01	8.3±0.02	2.80±0.06	1.2±0.1
Buffalo Dung	514.46±2.20	6.4±0.02	92.0±1.60	6.9±0.16	4.9±0.0	8.5±0.08	2.59±0.06	1.3±0.2
Dung + Gram Bran	647.12±2.42	13.7±0.37	47.1±0.38	7.6±0.12	6.9±0.04	8.6±0.02	2.64±0.12	2.2±0.2
Dung + Straw	684.02±3.14	8.8±0.06	77.1±1.08	7.3±0.16	4.9±0.02	8.5±0.14	2.94±0.13	1.6±0.4
Dung + Wheat Bran	734.00±2.62	13.4±0.10	54.8±1.62	8.6±0.17	9.0±0.03	8.2±0.05	2.47±0.08	1.3±0.4
Dung + Rice Bran	615.01±2.06	11.3±0.31	54.2±0.84	8.9±0.12	8.2±0.02	8.4±0.06	2.76±0.13	1.8±0.6
Dung + Vegetable Wastes	574.30±1.37	10.0±0.10	57.4±0.82	8.7±0.18	5.7±0.06	8.5±0.04	2.78±0.12	1.5±0.8
Dung + Barley Bran	509.06±2.32	11.8±0.04	43.1±1.36	8.0±0.13	6.3±0.07	8.0±0.04	2.96±0.18	1.6±0.3
Goat Dung	432.90±3.12	4.5±0.20	93.0±0.13	6.2±0.14	4.0±0.04	8.5±0.03	2.54±0.16	1.6±0.5
Dung + Gram Bran	556.00±3.17	12.8±0.25	43.4±1.20	7.0±0.14	5.6±0.09	8.5±0.06	2.48±0.12	1.5±0.4
Dung + Straw	596.12±0.62	7.2±0.06	78.9±0.09	6.8±0.18	4.5±0.05	8.5±0.20	3.00±0.12	2.2±0.1
Dung + Wheat Bran	601.00±3.05	11.0±0.31	54.60±0.5	8.0±0.12	8.5±0.06	8.3±0.04	2.80±0.14	1.3±0.3
Dung + Rice Bran	530.00±1.42	10.2±0.32	48.50±0.7	7.9±0.20	7.6±0.02	8.5±0.04	2.80±0.08	1.2±0.5
Dung + Vegetable Wastes	535.71±2.58	8.7±0.10	61.60±1.7	8.3±0.16	5.2±0.04	9.0±0.02	2.85±0.12	1.3±0.2
Dung + Barley Bran	468.70±2.87	9.0±0.13	52.00±1.2	7.8±0.15	5.4±0.06	9.0±0.08	2.74±0.16	1.7±0.4
Combination	Final Vermicomposts							
	TOC (g/kg)	TKN (g/kg)	C:N ratio	TK (g/kg)	TP (g/kg)	pH	EC ds/m	TCa (g/kg)
Cow Dung	199.00±0.84	15.2±0.05	13.1±1.71	4.8±0.07	7.0±0.05	6.8±0.31	1.30±0.02	1.9±0.3
Dung+Gram Bran	263.60±1.08	24.1±0.04	10.0±0.42	7.4±0.08	7.3±0.40	6.9±0.06	1.08±0.08	2.3±0.4
Dung+ Straw	218.40±5.46	18.0±0.25	12.1±0.62	6.8±0.02	5.5±0.05	7.2±0.03	1.20±0.06	2.2±0.3
Dung + Wheat Bran	303.20±4.21	25.0±0.22	12.2±0.25	7.6±0.05	9.8±0.06	7.3±0.02	1.10±0.04	2.4±0.1
Dung + Rice Bran	252.40±5.02	24.1±0.45	10.4±0.48	6.3±0.06	8.7±0.05	7.6±0.05	1.08±0.02	2.6±0.2
Dung + Vegetable Wastes	245.70±2.25	21.9±0.08	11.2±0.01	7.4±0.10	6.6±0.05	7.3±0.02	1.08±0.06	2.3±0.3
Dung + Barley Bran	216.40±2.06	24.6±0.08	8.8±1.06	6.4±0.02	7.4±0.05	7.2±0.01	1.16±0.04	2.1±0.3
Buffalo Dung	260.20±1.04	10.7±0.02	24.3±1.03	7.2±0.08	6.0±0.02	7.0±0.06	1.42±0.04	2.8±0.3
Dung+Gram Bran	318.00±2.13	23.9±2.26	13.3±1.06	8.1±0.13	7.5±0.06	7.0±0.06	1.04±0.08	4.2±0.4
Dung+ Straw	278.40±2.32	17.5±0.12	15.9±0.04	8.0±0.15	5.6±0.04	6.7±0.04	1.31±0.10	4.4±0.3
Dung + Wheat Bran	390.10±1.52	22.3±0.40	17.5±0.82	8.3±0.04	10.4±0.10	7.4±0.08	1.19±0.11	4.0±0.3
Dung + Rice Bran	340.28±2.48	23.6±0.42	12.9±0.08	9.0±0.12	9.0±0.08	6.5±0.04	1.15±0.02	5.8±0.1
Dung + Vegetable Waste	310.01±1.23	21.5±0.14	14.4±0.73	8.5±0.21	6.8±0.05	7.3±0.03	1.17±0.18	3.6±0.6
Dung + Barley Bran	294.25±2.45	21.0±0.06	14.1±1.40	8.7±0.15	7.9±0.08	7.4±0.06	1.26±0.17	3.5±0.4
Goat Dung	228.01±1.62	09.0±0.04	25.3±1.40	6.8±0.10	5.2±0.08	6.7±0.04	1.73±0.12	2.5±0.3
Dung + Gram Bran	298.00±0.08	24.4±0.14	12.2±0.81	8.7±0.14	7.0±0.04	7.2±0.01	1.20±0.08	3.2±0.4
Dung + Straw	254.06±1.37	18.4±0.04	13.8±1.20	7.2±0.05	4.8±0.08	7.0±0.02	1.46±0.02	3.6±0.2
Dung + Wheat Bran	362.02±1.15	26.9±0.60	13.5±0.20	8.6±0.17	8.3±0.06	7.0±0.02	1.28±0.15	3.0±0.1
Dung + Rice Bran	298.00±2.80	24.6±0.12	12.1±1.16	8.1±0.16	8.2±0.04	7.3±0.03	1.23±0.05	3.4±0.4
Dung + Vegetable Wastes	272.01±3.02	22.0±0.12	12.4±1.60	8.7±0.12	6.2±0.04	6.5±0.10	1.24±0.07	3.6±0.3
Dung + Barley Bran	254.00±2.53	25.1±0.14	10.1±0.81	8.3±0.13	6.2±0.10	7.1±0.04	1.39±0.17	3.0±0.2

Each value is the mean ± SE of six replicates. Significant variance (P<0.05) two way analysis of variance (ANOVA) was applied in between the different paramagnet of vermiwash of initial feed mixture and Final Vermicomposts.

Table 2: Nutrient content and different physio-chemical parameter in vermiwash obtained from initial feed mixture and final Vermicomposts of different combinations of animal and agro / bitchen wastes.s

Combination	Initial feed mixture							
	TOC (g/kg)	TKN (g/kg)	C:N ratio	TK (g/kg)	TP (g/kg)	pH	EC ds/m	TCa (g/kg)
Sheep Dung	321.01±1.80	4.1±0.08	85.81±0.8	6.9±0.12	3.0±0.05	9.0±0.06	0.94±0.04	1.3±0.3
Dung + Gram Bran	542.60±1.34	12.3±0.13	42.65±0.3	7.3±0.14	5.4±0.06	8.6±0.13	2.16±0.06	1.5±0.5
Dung + Straw	612.00±1.43	7.4±0.04	83.0±1.40	7.4±0.12	4.2±0.03	8.3±0.04	2.28±0.02	1.3±0.4
Dung + Wheat Bran	589.51±3.36	10.2±0.04	57.8±1.20	7.8±0.12	8.0±0.06	8.3±0.04	2.18±0.06	1.2±0.1
Dung + Vegetable Wastes	498.60±1.62	8.4±0.06	58.4±0.60	7.7±0.06	4.7±0.02	9.0±0.07	2.14±0.10	1.5±0.2
Dung+ Rice Bran	440.01±2.52	10.5±0.08	42.9±0.80	7.2±0.08	7.8±0.06	8.3±0.00	2.21±0.08	1.2±0.3
Dung + Barley Bran	438.00±1.42	8.2±0.01	54.8±1.20	7.2±0.08	5.9±0.06	8.0±0.04	2.24±0.18	1.6±0.2
Horse Dung	470.02±1.34	4.0±0.08	132.0±1.20	7.9±0.06	6.8±0.03	8.1±0.06	2.10±0.04	1.3±0.5
Dung + Gram Bran	627.01±1.42	12.5±0.62	50.2±0.20	7.7±0.06	8.7±0.05	7.9±0.14	2.69±0.12	1.5±0.2
Dung + Straw	650.21±3.10	7.2±0.12	89.3±0.12	7.9±0.08	5.5±0.07	8.5±0.14	2.94±0.12	1.2±0.2
Dung + Wheat Bran	715.01±3.13	10.6±0.06	67.5±1.40	7.9±0.09	11.1±0.1	8.0±0.06	2.74±0.15	1.4±0.5
Dung + Rice Bran	584.04±3.14	10.3±0.15	56.7±1.80	7.2±0.08	10.8±0.1	8.5±0.08	2.68±0.12	1.2±0.4
Dung + Vegetable Wastes	560.21±1.11	8.10±0.21	69.13±0.6	7.9±0.04	7.8±0.06	8.2±0.10	2.73±0.14	1.5±0.5
Dung + Barley Bran	492.10±1.45	8.20±0.12	60.0±0.80	8.0±0.05	8.2±0.06	8.4±0.04	2.88±0.12	1.2±0.3

Table 2: Continue

Combination	Final Vermicomposts							
	TOC (g/kg)	TKN (g/kg)	C:N ratio	TK (g/kg)	T P (g/kg)	pH	EC ds/m	TCa (g/kg)
Sheep Dung	216.01±2.62	08.0±0.06	25.7±0.60	7.4±0.13	6.2±0.08	7.3±0.08	0.78±0.02	3.1±0.3
Dung + Gram Bran	234.21±2.62	23.2±0.20	11.0±1.00	7.9±0.17	7.2±0.04	7.2±0.06	0.69±0.02	5.2±0.2
Dung + Straw	208.00±2.34	17.1±0.25	12.2±1.05	7.8±0.14	5.3±0.04	7.0±0.10	0.70±0.04	5.2±0.4
Dung + Wheat Bran	335.00±2.47	23.4±0.14	14.3±0.80	8.1±0.12	9.3±0.09	6.5±0.10	0.62±0.05	4.3±0.8
Dung + Vegetable Wastes	212.40±2.52	21.6±0.32	09.8±0.09	8.2±0.16	6.3±0.04	7.4±0.04	0.64±0.02	3.2±0.7
Dung+ Rice Bran	280.07±1.45	21.6±0.32	9.8±0.09	8.2±0.16	6.3±0.04	7.4±0.04	0.64±0.08	3.4±0.6
Dung + Barley Bran	230.11±2.43	21.2±0.20	10.9±1.30	8.0±0.08	6.8±0.04	6.9±0.02	0.68±0.02	3.2±0.4
Horse Dung	215.15±2.02	8.0±0.14	27.0±1.40	8.0±0.06	9.9±0.05	7.0±0.02	1.27±0.08	3.8±0.6
Dung + Gram Bran	252.01±1.82	21.0±0.25	12.0±0.60	8.0±0.02	10.3±0.06	7.0±0.06	1.06±0.05	5.2±0.8
Dung + Straw	200.71±1.02	16.7±0.42	12.0±0.22	8.4±0.10	7.9±0.06	7.3±0.17	1.27±0.08	5.6±0.2
Dung + Wheat Bran	348.30±2.17	22.0±0.42	15.8±1.50	8.2±0.12	13.2±0.02	6.9±0.04	1.90±0.05	5.0±0.3
Dung+ Rice Bran	260.41±1.62	22.0±0.82	11.8±0.61	7.9±0.06	12.6±0.07	6.5±0.10	1.20±0.03	5.0±0.4
Dung + Vegetable Wastes	239.01±1.41	20.8±0.14	11.5±0.3	8.2±0.06	9.0±0.08	7.4±0.02	1.15±0.05	4.4±0.3
Dung + Barley Bran	228.10±2.32	20.5±0.06	11.1±0.2	8.6±0.09	10.8±0.10	7.2±0.08	1.24±0.04	3.8±0.6

Each value is the mean ± SE of six replicates. Significant variance (P<0.05) two way analysis of variance (ANOVA) was applied in between the different paramagnet of vermivash of initial feed mixture and Final Vermicomposts.

Conclusion:

It is evident from results the significant increase of TKN, TP, TK and TCa and significant decrease in TOC, C:N ratio, EC and pH in final vermicompost of different animal/ agro and kitchen wastes by the use of earthworm *Eisenia foetida* is due to the vermic activity in laboratory conditions. It will suggested that the final product of which combination having potential amount of nutrients and that recognized combinations of wastes are suitable for particular deficient soil as biofertilizer for organic farming and also help in obtaining chemical composition of vermicomposts. Thus vermicomposting as an best technology for the recycling of wastes and production of biofertilizers from different wastes by use earthworms *Eisenia foetida*.

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