Solid waste management refers to garbage or trash management. Improper waste management has always been an issue since the humans have been living in settled communities. All potential waste materials cannot be dealt with in a sustainable manner by individual waste management methods and therefore, waste management methods cannot be uniform across regions and sectors (Staniskis 2005). In light of changing environmental, social and economic conditions waste management systems must be flexible (McDougall et al., 2001).

Different natural and anthropogenic wastes which have already been converted into useful compost by different species of earthworms include sewage sludges (Diaz-Burgos et al., 1992, Benitez et al., 1999); dairy processing plant sludge (Kavian and Ghatnekar 1991, Gratelly et al., 1996, Elvira et al., 1998); industrial sludge (Suthar, 2010) paper mill industry sludge (Elvira et al., 1998; Butt 1993) pig waste (Reeh 1992; Chan and Griffiths 1988); water hyacinth (Gajalakshmi et al., 2001a); paper waste (Gajalakshmi et al., 2001b, Gajalakshmi et al., 2002); brewery yeast (Butt 1993); crop residues (Bansal and Kapoor 2000); sheep manure (Albanell et al., 1988); cow slurry (Hand et al., 1988); cattle manure (Mitchell 1997); rice stubbles, mango leaves (Talashilkar et al., 1999).

In India on an average 4-5 kg of organic wastes are produced per day (Gupta et al., 1998) by every household. For maintaining maximum organic matter status and sustaining the health of the soil large amount and regular addition of soil is essential (Manna et al., 2005). In the sustenance of soil productivity and soil health, the beneficial roles of organic matter are well documented (Kumazawa 1984).

For prolonged soil productivity, maintenance of soil organic matter requires the input of crop residues, organic manures, green manures and other agricultural organic wastes. Agricultural activities produce crop residues and animal excreta. Improvement in soil physical conditions and environmental quality can be achieved by proper disposal of these wastes (Mishra et al., 1989; Bhardwaj 1995). Not much has been known about the use of crop residues for the production of vermicompost. In order to provide nutrients and an inoculum of microorganisms, crop residues which are poor in nitrogen are mixed with N-rich organic wastes (Mpoame and Nguekam 1994; Elvira et al., 1996).
According to MNRE (2009), generation of crop residues is highest in Uttar Pradesh (60 Mt) followed by Punjab (51 Mt) and Maharashtra (46 Mt) and among different crops, cereals generate maximum residues (352 Mt), followed by fibres (66 Mt), oilseeds (29 Mt), pulses (13 Mt) and sugarcane (12 Mt). According to MNRE (2009), crop residues generation in Rajasthan is 29.32 Mt/yr. and the surplus residues i.e., total residues generated minus residues used for various purposes, are typically burnt on farm is 8.52 Mt/yr. The quantity of crop residues burnt in Rajasthan is 1.78 Mt/yr. (Pathak et al., 2010).

Both on-farm and off-farm, a huge quantity of crop residues was produced due to the production of 104.6 Mt of rice, 20.7 Mt of millets, 93.9 million tons (Mt) of wheat, 8.1 Mt of fibre crops (jute, mesta, cotton), 21.6 Mt of maize, 357.7 Mt of sugarcane, 30.0 Mt of oilseeds crops and 17.2 Mt of pulses, in the year 2011-2012 (MoA 2012). According to IARI (2012) crop-wise the annual surplus crop residues of cotton stalk, pigeon pea stalk, jute and mesta, groundnut shell, rapeseed and mustard and sunflower were estimated to be 11.8 Mt, 9.0 Mt, 1.5 Mt, 5.0 Mt, 4.5 Mt, and 1.0 Mt, respectively. According to IARI (2012) around 70%, 7% and 0.7% of C present in rice straw is emitted as carbon dioxide, carbon monoxide and methane, respectively, while 2% of N in straw is emitted as nitrous oxide upon burning. On burning 1 ton of rice straw, about 3 kg particulate matter, 60 kg CO, 1460 kg CO₂, 2 kg SO₂ and 199 kg ash is released (Gadi et al., 2003). Crop residue of many crops (rice, sorghum, wheat, soybean, mustard etc.) has been utilized to produce vermicompost. Mustard (Brassica juncea) is mainly cultivated as an oil crop. It has also been examined recently for its biodiesel potential (Jham et al., 2009).

Vermicomposting is a low cost technology system for the processing or treatment of organic wastes (Hand et al., 1988). Vermicomposting could be an adequate technology for the transformation of sludges into valuable products (Elvira et al., 1997). Vermicomposting which is also known as worm composting is the transformation of decaying organic matter into worm castings by red worms. It is a natural process in which the earthworms play major roles in degrading the organic portion of the waste material. Vermicomposting or vermistabilization is the use of earthworm in sludge management (Edwards and Burrows 1988). Biological decomposition of the organic matter under controlled conditions is composting
Vermicomposting as a principle originated from the fact that earthworms in the process of feeding fragment the waste substrate and thereby increase its surface area for further microbial colonization (Chan and Griffiths 1988). During this process, the important plant nutrients, such as a nitrogen, potassium, phosphorous and calcium present in field material are transformed into forms which are much more soluble and available to plant than those in the parent compounds (Ndegwa and Thompson 2001; Edwards 1995) while the worms themselves provide a protein source in the form of animal feed (Sabine 1978, Hartenstein 1981). The extent of the transformation of phosphorus forms is considerably higher in the case of earthworm-inoculated organic wastes which showed that vermicomposting may prove to be an effective technology for providing better phosphorus nutrition from different organic wastes (Reinecke et al., 1992; Ghosh et al., 1999). As vermicomposting is easy to operate and requires less mechanization so it is preferred to microbial composting in small towns. In India, a few vermicomposting plants usually of small size have been set up in some cities and towns, the largest plant being in Bengaluru of about 100 MT/day capacity (Sinha 1996). The most important environmental factors in vermicomposting systems are temperature and moisture (Edwards 1998). For all composting species the optimum environmental conditions have been well researched and they are fairly similar. A balanced vermicomposting system is usually maintained at 15-25°C. Although Eisenia foetida has the wide temperature tolerance (Reinecke et al., 1992) but the optimum temperature for Eisenia sps. is generally regarded as 20°C (Edwards 1998). Hartenstein and Hartenstein (1981) in their lab-scale (10 cm-diameter Petri dishes) experiments on vermicomposting of activated sludge observed that approximately 1 g worm could convert 4 g of activated sludge observed that approximately 1 g worm could convert 4 g of activated sludge in five days.

Vermicomposting can be used for minimizing organic waste materials (Padmavathiamma et al., 2008). Various studies were conducted to select the most appropriate species of earthworm for vermicomposting, to improve the vermicompost quality by inoculating with beneficial microbes and to find out an economical and feasible method of vermicomposting. Earthworm spp. Eudrilus eugeniae, Eisenia foetida, Megascoleex chinensis, Perionyx sansibaricus and Pontoscolex earthworms
were compared for their efficiencies and \textit{E. eugeniae} was found to be an excellent agent.

Vermicomposting of food industry sludge mixed with biogas plant slurry using \textit{Eisenia foetida} shows that \textit{Eisenia foetida} was unable to survive in 100\% food industry sludge. So it was necessary to add of some other organic waste during vermicomposting. It was seen that the final vermicompost prepared had higher concentration of important plant nutrients. There was a significant decrease in organic matter, pH and C: N, but increase in N, P, and K was recorded after vermicomposting (Yadav and Garg 2010). Vermicomposting results in bioconversion of the waste streams into two useful products: the earthworm biomass and the vermicompost. The former product can be further processed into proteins (earthworm meal) or high-grade horticultural compost (Phillips 1988; Sabine 1988; Fisher 1988; Edwards and Niederer 1988). The latter product (vermicompost) is also considered an excellent product since it is homogeneous, has desirable aesthetics, has low levels of contaminants without having any adverse impact on the environment and it tends to hold more nutrients over a longer period. To promote organic farming, the Government of India in 1998 announced exemption from tax liability to all those institutions, organizations and individuals in India practicing vermiculture on a commercial scale (Annual Budget 1998).

A comparison between vermicomposting and composting systems have revealed that earthworms (specifically in trials conducted using composting worms) hasten the mineralization of organic matter, increase humification and lower the C: N ratio and bioavailability of heavy metals (Elvira \textit{et al.}, 1996, 1998; Dominguez and Edwards 1997; Edwards and Bohlen 1996). Gunathilagraj and Ravignanam (1996) reported the management of coir and sericultural wastes by earthworms in India. A comparison of vermicomposting and composting of household waste by a traditional Indian composting procedure revealed that within 30 days, vermicomposting converted household waste into compost, narrowed the C/N ratio and retained more N than traditional methods (Gandhi \textit{et al.}, 1997).

In conventional composting thermophilic bacteria predominate and in vermicomposting mesophilic bacteria and fungi. Conventional composting process
gets over in about 8 weeks but curing requires additional 4 weeks. Curing is a process wherein further aerobic decomposition of large particles, some compounds and organic acids takes place which are left after composting. It requires less water and oxygen. Insufficient curing of compost can damage crops. Vermicomposting requires nearly half the time of conventional composting; curing is not required and it can be straightaway used after production (Dominguez et al., 1997). Compared to ordinary compost, vermicompost has much finer structure and the nutrients in vermicompost are present in forms that are easily available for plant uptake. As compared to compost, vermicompost has excellent biological and chemical properties and contain plant growth regulators and diverse microbial populations (Edwards and Niederer, 1988; Edwards et al., 2004).

According to Atiyeh et al., (2000c) ‘ammonium’ was higher in conventional compost and ‘nitrates’ which is the more available form of nitrogen was higher in vermicompost. They also reported that on a weight loss basis N availability was higher and supply of several plant nutrients like potassium (K), phosphorus (P), magnesium (Mg) and sulphur (S) were significantly increased with addition of vermicompost as compared to conventional compost to soil (Atiyeh et al., 2000d). Vermicompost helps in retaining nutrients for longer duration and supplies them immediately whereas the conventional compost does not provide the required amount of macronutrients including N, P and K and micronutrients to plants (Bonkowski and Schaefer, 1997; Subler et al., 1998, Bhatia et al., 2000). Total organic carbon and pH declined while the percent of N, P, and K in vemicompost was found to increase as a function of the vermicomposting (Garg et al., 2006).

Compost helps in stimulating plant growth, provides balanced nutrients to plant roots, promotes root growth and assists in increasing organic matter of the soil including the humic substances (Canellas et al., 2000; Siminis et al., 1998). It improves the chemical and physical properties of the soil and adds useful microorganisms to the soil while providing food to the existing microorganisms and improving their biological properties (Ouédraogo et al., 2001; Shiralipour et al., 1992). Agronomic benefits of applying composts to soil are suppression of soil-borne disease organisms and removal of soil salinity (Hoitink and Fahy, 1986). Compost acts as ‘slow release fertilizer’ whereas chemical fertilizers release their nutrients quickly
in soil but soon get depleted. In organic matter nitrogen and phosphorus are resistant to decay and therefore, are not available to plant roots in the first year of their application. Phosphorus and potassium are as much effective as chemical fertilizers but nitrogen is only one half effective as compared to chemical fertilizers. The organic nitrogen is released at constant rate from the accumulated humus when compost is applied continuously and over a period of years the net overall efficiency of nitrogen is much greater than that of chemical fertilizers.

Pilot and field scale tests were conducted on vermicomposting of paper mill and municipal sludges at the CNR Instituto per la Chimica del Terreno in Pisa, Italy which evaluated the capability of vermicomposting as an economical alternative in sludge management. The vermicompost produced was a good quality humic product which can be used as a soil organic amendment (Ceccanti and Masciandaro 1999). Experiments on vermicomposting with *Eisenia foetida* of mustard residues and sugarcane trash mixed with cattle dung in a 90 day composting revealed that there was a significant reduction in C: N ratio and rise in mineral N (Bansal and Kapoor 2000). There was an improvement in the quality of vermicomposts (with respect to yield, C/N ratio, nutrients content and humus fractions) prepared from combined use of fresh cow dung/slurry and mustard (*Brassica juncea*) residue with pretreatments of submergence in water, nutrients (urea and low grade rock phosphate) supplementation, microbial (*Bacillus sp.*, *Trichoderma viride* and *Cellulomonas fimi*) inoculation (Shilpkar *et al.*, 2011).

Efficient pathogen control and sanitization are the advantages of a combined system to process urban green waste due to increased rates of stabilization, initial brief period of thermophilic composting and the earthworm production and vermicompost (Jadia and Fulekar 2008). Through the process of composting and vermicomposting stabilization of green waste such as vegetable waste and yard waste has been carried out (Jadia and Fulekar 2008; Karthikeyan *et al.*, 2007).

The nutrient status of the different agro industrial waste such as press mud, bagasse, coir waste, rice husk and groundnut shell was also assessed and it was found out that vermicompost samples prepared from agro industrial waste recorded fairly higher level of nutrients (Kitturmath *et al.* 2007). Concentration of major nutrients in
Vermicompost of floral and vegetable market waste processed by three species of earthworms namely, *Eisenia fetida*, *Eudrilus eugeniae* and *Perionyx excavatus* was more as compared to the compost for all the earthworm species and both the wastes (Pattnaik and Reddy 2010). A study conducted in Bangalore revealed that earthworms successfully decomposed sugar factory residuals and turned them into a soil nutrient that allowed farmers using the material to reduce chemical fertilizers by 50% (Logsdon 1994).

Vermicompost is a finely-divided mature peat-like material with high porosity, aeration, drainage, water-holding capacity and microbial activity which are stabilized by interactions between earthworms and microorganisms in a non-thermophilic process (Edwards and Burrows 1988). Stolyarenko *et al.*, (1992) reported that the application of vermicompost stimulated root and shoot growth of maize plantlets. Vermicompost is rich in microbial populations and diversity, particularly fungi, bacteria and actinomycetes (Edwards 1998; Tomati *et al.*, 1987). Vermicompost has large particulate surface areas that provide many micro sites for microbial activity and for strong retention of nutrients (Shi-wei and Fu-zhen 1991). Vermicompost increases microbial diversity and populations (Barakan *et al.*, 1995). Vermicompost contains most of the nutrients such as nitrates, phosphates and exchangeable calcium and soluble potassium in plant available form (Edwards 1998; Orozco *et al.*, 1996). Compared to other media, vermicompost has a better structure and it contains plant growth hormones, soil enzymes, high microbial populations, and the earthworms selectively cull pathogens and harmful microorganisms in the soil (Benitez *et al.*, 1999; Edwards and Bohlen 1996). Vermicompost is natural organic manure generated from the excreta of earthworms which feed on scientifically semi-decomposed organic waste. Use of organic amendment, such as traditional thermophilic composts, has long been recognized as an effective means of improving soil structure and enhancing soil fertility (Follet *et al.*, 1981).

Independent of nutrient availability, vermicompost consistently promotes biological activity which helps the plants to germinate, flower, grow and yield better than in commercial container media (Arancon *et al.*, 2004; Atiyeh *et al.*, 2000 a, b).
Vermicompost is considered as a nutritive organic fertilizer which is rich in nitrogen (2-3%), phosphorus (1.55-2.25%), potassium (1.85-2.25%), beneficial soil microbes like ‘nitrogen-fixing bacteria’, mycorrhizal fungi and micronutrients and is scientifically proven as ‘miracle growth promoter and protector’ (Sinha et al., 2009). Worm’s vermicast contains as high as 7.37% N and 19.58% P₂O₅ (Kale et al., 1982). Suhane (2007) reported that exchangeable K was 95% higher in vermicompost besides good amount of calcium (Ca), manganese (Mn), zinc (Zn) and magnesium (Mg). In addition to it vermicompost contains enzymes like amylase, cellulose, lipase and chitinase which continue to break down organic matter in the soil so that the nutrients are released and are available to plant roots (Chaoui et al., 2003; Lunt and Jacobson 1994; Tiwari et al., 1989). Tiwari et al. (1989) also reported that soil which is treated with vermicompost has significantly more electrical conductivity (EC) and near neutral pH. There is very ‘high porosity’, ‘vast surface area’, ‘aeration’, ‘drainage’ strong absorbability, retention of nutrients for longer period of time and higher ‘water holding capacity’ in vermicompost. Soil amended with vermicompost has greater ‘soil bulk density’ and hence is porous and lighter and does not compact. Pores in the range 30-50 μm and 50-500 μm have augmented and greater than this range have decreased due to greater permeability (Lunt and Jacobson 1994; Nighawan and Kanwar 1952).

Many reports have shown that waste worked upon by worms and their excretory products i.e. vermicast can induce excellent plant growth (Arancon et al., 2006; Arancon et al., 2008; Atiyeh et al., 2000a; Atiyeh et al., 2000b; Atiyeh et al., 2002). It impacts all yield parameters such as increased rate of seedling growth, improved seed germination, fruiting and flowering of major crops like wheat, corn, paddy, sugarcane, sunflower, brinjal, potato, tomato, okra, spinach, grape and strawberry as well as of flowering plants like petunias, marigolds, poinsettias and chrysanthemums. The vermicompost constitution of relatively small proportion i.e. 10%-20% showed best responses; on the other hand larger composition did not improve plant growth (Subler et al., 1998).

Nutrients in plant-available forms such as nitrates, phosphates, soluble potassium and magnesium, exchangeable phosphorus and calcium are present in vermicompost (Edwards and Niederer 1988, Edwards et al., 2004). There are large
particulate surface areas in vermicompost that provide many micro-sites for microbial activities and for the strong retention of nutrients (Arancon et al., 2004, Arancon et al., 2006). Vermicomposts are rich in microbial populations and diversity, specifically bacteria, fungi, and actinomycetes (Brown 1995; Chaoui et al., 2003; Scheu 1987; Tiwari et al., 1989). Teotia et al. (1950) and Parle (1963) observed 32 million bacterial count per gram fresh vermicast compared to the surrounding soil which consisted of 6-9 million bacterial count per gram. There was an increase of 90% in respiration rate in fresh vermicast which indicated rise in microbial population (Scheu 1987). Suhane (2007) reported that total bacterial count was more than $10^{10}$ per gram of vermicompost which included *Azotobacter, Actinomycetes, Nitrobacter, Rhizobium*, and phosphate solubilizing bacteria which ranged from $10^2$-$10^6$ per gm of vermicompost. There is a very significant role of phosphate solubilizing bacteria in making phosphorus ‘bio-available’ for plant growth promotion (Rodriguez and Fraga 1999). Phosphates are not available to plant roots unless solubilized although they are available in soils in rock forms.

Pramanik et al. (2007) reported in a study on microbial population in vermicompost prepared from cow dung and municipal solid wastes (MSW) as substrates (raw materials) that microbial population was in abundance in cow dung vermicompost wherein the total bacterial count was $73 \times 10^8$, the nitrogen-fixing bacteria was $18 \times 10^3$ and the cellulolytic fungi was $59 \times 10^6$. In the vermicompost obtained from municipal solid wastes microbial population was the least i.e. the total bacterial count was $16 \times 10^8$, the nitrogen-fixing bacteria was $5 \times 10^3$ and the cellulolytic fungi was $21 \times 10^6$. There was a rise in microbial population with application of lime in the substrate of all above mentioned microbes irrespective of the substrates used for vermicomposting. There is direct stimulation of plant growth promoting bacteria (PGPB) on growth, nitrogen fixation, production of growth hormones such as 1-aminocyclopropane-1-carboxylate (ACC) deaminase, solubilization of nutrients and indirectly by provoking pathogenic fungi by production of β-1,3-glucanase, siderophores, antibiotics, chitinase, fluorescent pigments and cyanide (Han et al., 2005). Microbes including fungi, yeasts, bacteria, actinomycetes and algae also produce plant growth regulators (PGRs) such as cytokinins, auxins, ethylene, gibberellins, and ascorbic acids in substantial quantities and large quantities of PGRs
are available in vermicompost as their population is raised by earthworms (Frankenberger and Arshad 1995).

Researchers reveal that vermicompost further stimulates plant growth even when plants are getting ‘optimal nutrition’. Arancon et al. (2004) reported that vermicompost has maximum benefit when it constitutes between 10 to 40% of the growing medium. Nair et al. (2007) based on a 21 days study and reported that a combination of vermicomposting and thermocomposting produced compost with acceptable C: N ratio and good homogenous consistency of a fertilizer. They also indicated that after three months storage vermicomposting resulted in greater pathogen reduction compared to samples with thermophilic composting.

Al-Dahmani et al. (2003) reported that vermicompost provides biological resistance in plants to protect them against various pests and diseases by killing them or by fighting through pesticidal action. Antibiotics and actinomycetes present in vermicompost helps in increasing the biological resistance against pests and diseases in the crop plants. There was significant reduction in pesticide spray where vermicompost and earthworms were used in agriculture (Singh 1993; Suhane 2007). Aqueous extracts of vermicompost depress the soil-borne pathogens and pests (Szczech et al., 1993; Orlikowski 1999; Rodriguez et al., 2000; Zaller 2006).

Earthworms play a major role in soil biology as they act as natural bioreactor to harness and destroy soil pathogens and converting the organic wastes into valuable bio-fertilizers, growth hormones, enzymes and proteinaceous worm biomass. The worms feed on all the biodegradable refuse such as kitchen waste, leaves, paper and vegetable refuse. After feeding on them the worms burrow deep into the soil and enrich the soil with a pre-digested bio-fertilizer rich in NPK by positioning its castings towards the surface of the soil. Vermicomposting requires a specific species of worms that is adapted to living in decomposing organic materials rather than the soil. Two such species are Eisenia fetida, more commonly known as the red worm, manure worm or red wiggler and Lumbricus rubellus.

Role of earthworms in the breakdown of organic debris on soil surface and soil turnover process was first highlighted by Darwin (1881). Earthworms in general
are highly resistant to many pesticides and have been reported to concentrate the pesticides and heavy metals in their tissues. They also inhibit the soil borne pathogens and work as detoxifying agents for polluted soil (Davis 1971). Study conducted on feeding rates of worms by Wright (1972) on *Lubricus terrestris* revealed that the feeding rates were dependent on the feed as well as the feed preparation or feed pretreatment. Neuhauser *et al.* (1980) studied the effect of population density on growth and production of *Eisenia foetida* and concluded that growth declined with increase in population density, while production increased with population density.

Analysis of castings of *Eisenia foetida* from sheep manure combined with cotton wastes for their chemical composition and properties every two weeks for three months revealed that mineralization rate was accelerated by earthworms and the manure was converted into castings with higher degrees of humification and nutritional value and exhibited good agronomic quality compared with the same manure but without earthworms (Albanell *et al.*, 1988).

A study was conducted on seven vermicomposts produced by the action of worms on poultry manure, sheep manure, dairy manure, kitchen scraps, a mixture of wastes (underfelt, lawn clippings etc.), another mixture (cardboard, wheat, meat etc.) and piggery solids (Handreck 1986). They were mixed at a rate of 30% by volume with a potting medium base (ground pine bark + sand, 4:1 by volume). These mixes were treated by acidification and/or the addition of various combinations of N, P, K, S and trace elements as basal fertilizer or in the watering solution. *Matthiola incana* (stocks) were grown in pots of the mixes. The nutrient concentrations and growth of the plants in the mixes indicated that a vermicompost supplied the full requirements for trace elements and P, and probably supplied initial requirements for K and S, but provided little or no N. There is a danger of toxicity from high levels of trace elements such as Zn, Cu and Mn (Handreck 1986).

Earthworm farming (vermiculture) is a bio-technique for converting the solid organic waste into compost. Vermiculture is derived from the Latin word *vermis* meaning worm which involves the mass production of earthworms for waste reduction and composting with ‘vermicast’ production (Kale 1991). Earthworm castings have a higher water-holding capacity and ammonium concentration than bulk
soil samples and they constitute sites of high denitrification potential (Elliot et al., 1990). The castings of earthworms may contain two to three times more available potassium than the surrounding soil (Basker et al., 1993).

Jayanthi et al. (2010) conducted a study on the processed mixed leaves litter in which the litter was mixed with cured cow dung in different proportions viz., 50:50, 60:40 and 70:30 (each concentration in triplicates) and filled in the plastic trays, individually. Hundred *Eudrilus euginiae* adult earthworms were introduced into each of these trays. Simultaneously a control for each of these concentrations was prepared and maintained without earthworms. The conversion ratio of mixed leaves litter into vermicompost was found to be more or less similar in all the concentrations. Further, vermicompost obtained from all the three concentration contained desired level of plant nutrients for uptake.

Riggle and Holmes (1994) noted that worms can consume as much as their own weight in 24 hours. Edwards and Bohlen (1996) demonstrated that the feed rates varied greatly not only with earthworm species but also with the feed type. They further observed that the amount of litter that the earthworms ingest seem to depend more on the total amount of suitable organic matter than on other factors.

Earthworms play an important role in the breakdown of organic matter and in the cycling of nutrients in natural ecosystems. They serve as "nature’s plowman" to facilitate these functions. In short they are capable of transforming garbage into ‘gold’. They are a part of a complex chain of biological, chemical, biochemical and ecological interactions. Earthworm mouthparts are not capable of biting or chewing, so they depend upon the decomposition of organic matter by microorganisms such as, bacteria, fungi, algae, protozoa, nematodes, rotifers and actinomycetes. They ingest microorganisms and depend on them as their major source of nutrients (Edwards and Bohlen 1996) but also, the earthworm gut secretes mucus and enzymes that selectively stimulates beneficial microbial species (Double and Brown 1998). Earthworms possess a grinding gizzard that fragments the organic residuals. Further, the microbial activity in the residuals is promoted by earthworms so that the faecal material, or casts that they produce, is much more fragmented and microbially active than what the earthworms consumed (Edwards 1995). Effectively, earthworms
inoculate the soil or organic matter with beneficial microorganisms and finely ground organic residuals which increase the rate of decomposition and allow further ingestion of microorganisms by earthworms. Studies by Dominguez and Edwards (1997) on the effect of stocking rate of growth and maturation of *Eisenia andrei* concluded that, whereas individual worms grew more and faster at the lowest population density, the total biomass production was maximum at the highest population density. At higher stocking rates, the worms sexually matured faster than in the lower rates.

Aira *et al.*, (2003) reported effect of two species of earth worms *Allobophora cligmosa* and *A. moller* on soil system including microfauna and biochemical properties. They revealed that microbial biomass and microbial activity as well as ammonium and carbohydrate contents were higher in casts than in the surrounding soil. The two species of earthworm, *Eisenia foetida* and *Eudrilus eugeniae* can be employed to degrade the agro-residues and vegetable waste. Chemical analysis of the vermicomposts prepared from vegetable waste revealed that the quantity of organic carbon was reduced from 42.1% to 31.19 and 30.19% by *Eisenia foetida* and *Eudrilus eugeniae*, respectively. The level of N, P, K and Ca was higher in vermicompost of vegetable waste processed by *Eisenia eugeniae* than *Eisenia foetida*. C/N ratio (27:44) was ideal in vegetable vermicompost processed by *Eisenia eugeniae* and also there was a positive alteration in the height, number and area of leaves, fruit length and weight of *Abelmoschus esculentus* (Alagesan and Vasuki 2010).