

ABSTRACT

The towns and cities have become the centers of population growth and require three essential services viz., water supply, waste water treatment and solid wastes disposal. The tremendous increase in population accelerates the amount of municipal solid waste (MSW) generation. Hence, the solid waste management (SWM) is one of the essential municipal services, to protect the environment, safeguard public health services and improve productivity. Improving SWM service level is a formidable task faced by most Indian municipalities, despite spending 20 to 35 percent of total municipal revenues on SWM. Urban solid wastes have become a threat to environment, both in developed and developing countries such as nuisance from odor, prevalence of unhygienic conditions, groundwater pollution etc.. Hence for a clean and healthy environment the MSW must be managed properly.

In this context the case study is carried out for the integrated solid waste management system for Hosur town, TN, India. The present population of the town is 2.44 lakhs and the projected population is about 3.51 lakhs with floating population of 35,000 per day.

The study reveals that the town generates about 77.42 tons of solid wastes per day and its annual production is about 28,258 tons. The study is been carried out for the characterization of MSW, to analyze the physical, chemical and biological characteristics of municipal solid waste.

The solid waste samples were collected from six sampling stations, and analyzed for physical and chemical characteristics. The average value of density of solid waste in the residential areas was 394.54 kg/m^3 . The moisture content of municipal solid waste varied from 30 percent to 40 percent and the pH of the MSW ranged from 5.99 to 6.7. The organic content in the solid waste is in the range of 40 percent to 50 percent a value slightly higher than other cities of India due to more waste inputs from farmer's regulated market and floriculture. The average percentage distribution of the physical composition of solid wastes like papers, plastics, clothes, hazardous wastes, metal, glass, combustibles, bones, stones, rubber and organic wastes were obtained as 4.32, 6.52, 3.72, 0.4, 0.15, 0.57, 4.41, 0.11, 31.2, 0.12, 47.91 respectively. The average value of MSW generation rate is 0.316 kg/capita/day.

The chemical composition of solid wastes shows that its pH value is 6.27, 1.70 percent of nitrogen, 2.8 percent of potassium, 1.975 percent of phosphorous, 1.11 percent of carbon, 1.56 percent of Kjeldahl nitrogen, 15.12 percent of hydrogen, 3.09 percent of oxygen, 2.465 millijoules/kg of calorific value, 1499°C of fusing point and 27.72 of Carbon: Nitrogen ratio.

The study focuses on Bethalapalli vegetable market waste management of Hosur town, by vermicomposting method. Composting is a biological process where fresh organic wastes are transformed by decomposition into stable humus substance. Composting yields a product, which contain plant nutrients (NPK) and as well as micronutrients. Bethalapalli vegetable market of Hosur town is generating a huge quantity of

market vegetable waste every day so, an attempt was made to study the quantity and properties of market vegetable waste and to convert it into useful product by vermicomposting method.

The total quantity of vegetables arrived to the market was estimated to be 200 MT per day and vegetable market wastes approximately generated to be 6 MT per day(3 percent). The waste consists of decomposable organic matter with high carbon nitrogen ratio. Hence the organic wastes are composted by vermicomposting process in order to convert the organic waste into bio-compost.

As a sample study, the market waste generated from Bethalapalli vegetable market was transported to Adhiyamaan Engineering Research Institute campus for vermicomposting by employing indigenous earth worm species. The earth worm used was *Eiseniafoetida* since as they are thermo-tolerant.

The study shows that the vermicomposting is an efficient process that stabilizes the vegetable market wastes, at the same time managing to solve the problems arising for their disposal and other adverse effects of vegetable wastes.

The study also includes that, the mango waste management from mango market near T.V.S Company near Hosur. The study reveals that, the bio-conversion of mango waste blended with poultry waste and cow dung into useful manure by aerobic composting. The work has been carried out to

convert the mango waste into useful product by mixing in different proportions.

Chemical properties of compost like pH, nitrogen, carbon, phosphorus and potassium were observed at different period 1, 21 and 35 days. Finally, the carbon to nitrogen ratio was compared with all the five samples to identify the best compost. The samples with ratio 1:1:1 and 2:1:1 consisting of mango waste, poultry waste and cow dung respectively without mango seeds were considered to be more reliable and efficient to be used as compost.

The study also reveals that, the effect of municipal solid waste dumpsite on groundwater quality and soil. The main objective of the present study is to evaluate the impact of domestic solid waste disposal on the groundwater quality.

For the present study land fill site at Thasepalli near Thorepalli which is 15 km away from Hosur town was selected. Groundwater samples were collected from a distance of about 100 feet away from the dump site and within 1 km radius from MSW dumping site. The groundwater sample at the dumping site was also collected and analyzed for physical, chemical and biological parameters. A microbial analysis of the leachate from the dump site, groundwater near the dumping site and groundwater 100 feet away from the dump site were analyzed for load of bacteria, fungi, actinomycetes and *Escherichia* by using serial dilution technique. The physico-chemical parameters namely pH, electrical conductivity, calcium, magnesium, sulphate, nitrate, chloride and total dissolved solids were determined and compared with

water quality standards. The impact of pollution on the soil also has been carried out for the various parameters for a sample of soil at 4feet depth at dumping site.

In order to improve the current solid waste management services it is essential to explore the various constraints or issues and to arrive to a suitable solution.

Therefore, the site suitability analysis using GIS (geological information system) is being carried out to identify the suitable site for SWM system. Results of the study are derived from different thematic layers such as, geomorphology, slope and vegetation. According to geological approach Nagaondapalli, Belagondapalli, Achattipalli regions of Hosur are suitable for solid waste dumping. A design for solid waste management system was proposed which includes waste segregation; treatment and disposal, capacity of engineered sanitary land fill required, liner and leachate collection system, design of composting yard, design of multiple chamber incinerator and layout of the facility.