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Solid Waste Management in Institutions-A Case Study of Sri Venkateswara University College of Engineering Hostels

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***Abstract*—Status of Solid Waste Management (SWM) in Sri Venkateswara University College of Engineering Hostels in Tirupati is presented in this paper. Quantity, physical components and chemical characteristics of Solid Waste and disposal practices are detailed. Further, Energy content of waste from boys and Girls hostels is found out and slightly higher energy content offers potential for Energy Recovery from Hostels solid waste.**

***Keywords*—Solid Waste Management, Institutions, Physical components, Chemical characteristics and Energy Recovery.**

I. INTRODUCTION

Solid Waste Management involves various activities associated with generation, storage, collection, transfer and transport, processing and disposal of Solid Wastes in an environmentally compatible manner adopting principles of economy, aesthetics, energy and conservation. Solid Waste Management is one among the essential services and is an obligatory function of Urban Local Bodies (ULBs) in India. Being a populated country, problem of Solid Waste Management is becoming severe day by day.

II. PRESENT STATUS OF SOLID WASTE MANAGEMENT IN HOSTELS OF SRI VENKATESWARA UNIVERSITY COLLEGE OF ENGINEERING IN TIRUPATI

Tirupati, the abode of Lord Sri Venkateswara is situated at latitude of $13^0\ 27^1$ N longitude of 79^0 E and is spread over an area of approximately 18 sq.km.

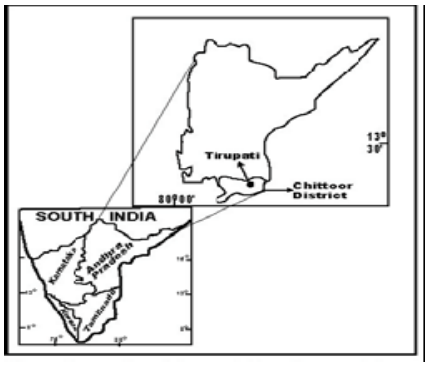

Figure 1: Location Map of the Tirupati

Dry Wastes that are generated from Boys and Girls Hostels of Sri Venkateswara university College of Engineering in Tirupati was burning openly and Wet (Food Waste) is sending as food for cattle.

III. QUANTITY AND WASTE CHARACTERISTICS

Quantity and Characteristics of solid waste depends upon various factors such as lifestyle, food habits, standard of living, the extent of industrial and commercial activities in the area, cultural traditions of inhabitants, climate etc. Several studies, Karthikeyan (2008), Prasad (2008), Prasad, Karthikeyan and Srivastava (2009) have assessed Quantity and Characteristics of Municipal Solid Waste generated in Tirupati. Rate of per capita generation of Municipal Solid Waste was determined as 0.337 kg/day. Average physical components and chemical characteristics of MSW are as given in Table 1.

IV. PRESENT STUDY:

In the present study, samples of Solid Waste from both Boys and Girls Hostels of S.V.U.C.E, Tirupati are collected and per capita Solid waste generation was estimated as 0.28Kg/person/day and 0.312Kg/person/day respectively. Also Solid Waste samples was analyzed for certain physical components and Chemical Characteristics, the results are presented in Table 2 and Table 3. Further, different components in Solid Waste are subjected to analysis to know the Energy content.

Table1: **Characteristics of Municipal Solid Wastes of Tirupati Town**

S. No.	Component/Parameter	Value,%
1.	Paper	11.61
2.	Plastics	12.25
3.	Rags	3.57
4.	Metals	0.25
5.	Rubber	0.09
6.	Glass	0.25
7.	Silt, fines and others	4.36
8.	Total Compostable matter	67.62
9.	Moisture Content	54.31
10.	Density, Kg/m^3	446.00
11.	Carbon	13.76
12.	Nitrogen	0.88
13.	Phosphorous as P_2O_5	0.575
14.	Potassium as K_2O	0.73
15.	pH	6.43
16.	Electrical Conductivity,mho/cm	5.76
17.	C/N ratio	15.64

Table 2: **Physical Components of Solid Waste of Boys and Girls Hostels of S.V.U.C.E**

Physical Components	Boys Hostel	Girls Hostel
Paper (%)	8.967	5.967
Plastic (%)	6.747	4.833
Metal (%)	2.44	0.933
Rubber (%)	3.733	0.747
Wood (%)	7.12	8.2
Glass (%)	3.247	1.92
Thermocoal(%)	0.367	0
Silt(%)	29.833	34.707
Organic Matter(%)	30.467	33.627
Stone(%)	2.533	7.133
Moisture Content(%)	32.36	38.40

Table3: **Chemical Characteristics of Mixed Solid Wastes from Hostels of S.V.U.C.E**

Chemical Characteristics	Boys hostel	Girls hostel
Carbon (%)	10	11.5
Nitrogen (%)	0.5	0.55
Phosphorous (%)	0.34	0.44
pH	6.1	6.15
Electrical conductivity(mMHO)	130	165

Table 4: **Calorific values of different types of Refuse from Boys and Girls Hostels of S.V.U.C.E**

Component	High Calorific Value (Kcal/Kg)	
	Boys Hostel	Girls Hostels
Mixed Sample	1900	1300
Paper	3740	3693
Wood	4107	4019
Organic Matter	3270	3160

From Table 2, Content of Organic Matter is more than other parameters. The Calorific value of Sri Venkateswara University Boys and Girls Hostel's Solid Waste was determined using Bomb Calorimeter and tabulated in Table 4. From Table4, The calorific value of wood is higher. The Calorific Value of Organic Matter, Wood and Paper is high in Boy's hostel solid waste samples than Girl's hostel solid waste samples. It follows from the Energy content analysis that the energy recovery from Solid Waste of Boys and Girls Hostels is high; therefore has a high potential for Energy Recovery.

V. CONCLUSION AND SUGGESTIONS

From the present investigation, following conclusions may be drawn:

1. Solid Waste Management in Sri Venkateswara University College of Engineering Boy's and Girl's Hostels in Tirupati is not satisfactory and deserves improvement.
2. Disposal of Solid Waste by open burning is not correct and is associated with health hazards and environmental pollution.
3. A proper scientific approach should be adopted for collection, transfer and transport, processing and/or disposal of Solid Waste with material and energy recovery wherever feasible.

Some suggestions in this regards are:

1. Two bin systems to collect dry and wet waste separately.
2. Wet waste can be subjected to Bio methanization to produce methane gas.
3. Recycle materials or Recover energy from dry wastes.

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