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Studies on solid waste generation and composition in the Residential area of Akhnoor town, District Jammu

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Abstract

The present paper deals with the analysis of solid waste generation and composition within the municipal limits of Akhnoor town which starts from the main bridge on the river Chenab and extends up to Sohal-Sungal turn. For purpose of studies, the residential area was divided into four zones and from each zone, five houses were selected at random for the sampling and analysis of solid waste for a period of one year. Characterization and management of solid waste alongwith methods of disposal of Municipal Solid Waste (MSW) were studied to analyze its impact on the environment and people inhabiting the area. Proper disposal methods have also been suggested so that the environment in general and the population inhabiting the area in particular is saved from the hazardous effects of fast increasing menace of the waste.

Keywords: *Solid Waste, MSW, Disposal, Hazardous*

Introduction

At present, there are so many environmental issues which have grown in size and complexity day by day, thereby, threatening the survival of mankind on this planet earth and the problem of solid waste pollution is one of them. According to Santra (2001), solid waste is a conglomeration of dust, ash, vegetable, putrescible matter, paper, packing of all kinds, rags and other fabrics, glass and other combustible and non-combustible debris. In Jammu and Kashmir, like other Indian states, at most of the places, refuse is dispersed all along the roads, streets, drains, open spaces etc. As per records of the Jammu Municipal Corporation based on a survey conducted by Environmental Engineers of Government of India (GOI) Public Sector Undertaking RITES, 8 lakh population falling under its jurisdiction, has been generating 450 tonnes of solid waste/day. Municipal solid waste of Jammu contains 54% biodegradable, 14% recyclable and remaining 32% material on dry weight basis with 45% moisture content (Daily Excelsior, June 26, 2006).Though a lot of work has been done on generation, composition and management of solid waste from India and abroad by various workers, but no work seems to have been done on solid waste generated in the residential area of Akhnoor town.However, some workers like Rampal *et al*. (2002), Kour (2004), Rampal *et al*. (2005), Gupta *et al*. (2007), Gupta *et al*. (2008), Jaswal (2008) and Kewal (2010) have provided some fragmentary information on the generation and characteristics of waste of Jammu Municipality. The present study will help to generate information on the generation, composition and management of municipal solid waste and place before the management, the problems arising out of its improper disposal.

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Material and Methods

Study Area

The present study was conducted within the municipal limits of Akhnoor town which starts from the main bridge on River Chenab and extends up to Sohal-Sungal turn. Geographically, Akhnoor lies at a latitude of 32.9^0N and longitude of 74.75^0 E, situated in the North-West part of India and eastern part of Pakistan and is about 32Km from Jammu. It has a total area of 1.5 sq Km with a population of 11346.

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Methodology

For the purpose of waste collection, the study area was divided into four different zones. Thus selecting five houses from each zone twenty houses were selected from the study area for purpose of studies. The sampling was done over a period of one year, i.e., from June, 2007 to May, 2008. Monthly sampling of solid waste was done by collecting waste from each household, segregated into different components and weighed separately with the help of spring balance. The various components of waste collected for analysis were identified as paperware, cardboard, clothware, jute, foliage, cotton, wood, food and garbage (biodegradable); plasticware, metallicware, glassware, thermocoal, rubber, leather, egg shells and bones (non-biodegradable) and inert wastes.During each sampling, the weight of solid waste generated per day in each house and the number of members of the house was recorded. The average weight of solid waste per capita per day was calculated by using the formula-

Solid waste generation (Kg/capita/day) =

$$\frac{\text{Solid waste generation per day at a particular household during 24 hours}}{\text{Total no. of residents of household during sampling}}$$

Results and Discussion

The results of 12 months data on solid waste generation and composition are presented in Table-1, 2, 3 and 4. Comparative study of average solid waste (Kg/capita/month) generation at four different study zones, i.e. Zone-I to Zone –IV containing 5 houses each (viz. H.1 to H.5) during one year has been made (Table 5).A critical evaluation of Table-5 has revealed that in the study area (i.e, Zone I to Zone-IV) the total solid waste generated (Kg/capita) was estimated to be 417.396 Kg with an average of 34.783 ±14.121 Kg out of which 342.276 Kg was contributed by biodegradable waste (82%) comprising of paperware, card board, clothware, jute, foliage, cotton, wood, food/garbage, etc. Non-biodegradable waste was calculated to be 64.416 Kg (15.4%) comprising of plasticware, metallicware, glassware, thermocoal, rubber, etc and 10.704 Kg of inert waste (2.6%) which comprised of hair, dust, pebbles, sand, gravels, etc with average values of 28.523±10.349 Kg,5.368±3.469 Kg and 0.892±0.302 Kg, respectively. The per capita generation of these various components have been depicted in Table 1-5.An overall study has revealed maximum percentage of biodegradable solid waste (82%) followed by non-biodegradable solid waste (15.4%) and inert solid waste (2.6%) which is in accordance with the finding of Rampal et al (2002), Kour (2004), Rampal et al. (2005), Gupta et al. (2008), Jaswal (2008) and Kewal (2010) who also recorded highest percentage of biodegradable waste.

When a comparative study of solid waste generated at all the four study zones was made, it was observed that the total average solid waste generated (Kg/capita/month) was found to be maximum in Zone-IV (71.961±37.476Kg) followed by Zone- I (28.735±8.866 Kg), Zone-III (19.396±4.777 Kg) and Zone-II (19.039±5.364 Kg). The minimum value (19.039±5.364 Kg) of waste generated was exhibited by Zone –II.Though the results have shown a variation in the solid waste generation in the study area during different months of the year, but no set pattern of waste generation was observed. From the studies, it has been observed that people don't dispose off the waste properly in the area rather throw it in open or vacant plots, on roadsides, streets or nallahs. Moreover, for the final disposal of wastes, open dump method is generally followed by the municipality. There are mainly two dump sites in the area. One is near the river Chenab and another in the outskirts of Akhnoor Town.

Thus on the basis of studies conducted in Akhnoor town, the following conclusions have been drawn:

1. The Municipal solid waste of Akhnoor town is highly heterogeneous in nature with high percentage of biodegradable material.

2. Although maximum percentage of solid waste generated within the municipal limits of Akhnoor town is biodegradable and organic in nature but its decay within the study area provide breeding ground for a no. of pathogens such a flies, mosquitoes, rodents etc. thereby posing threats to the health of the people residing in the area.

Table 1:- Qualitative and Quantitative Composition of Solid Waste (Kg/Capita/Month) in H.1-H.5 at Zone-I

Houses Zone I																			
No. of family members	**5**				**4**				**4**				**6**				**4**			
Months	**H.1**				**H.2**				**H.3**				**H.4**				**H.5**			
	Bio Degradable waste	**Non Bio Deg. waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Deg. waste**	**Non Bio Deg. waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Deg. waste**	**Non Bio Deg. waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Deg. waste**	**Non Bio Deg. waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Deg. waste**	**Non Bio Deg. waste**	**Inert Solid Waste**	**Total Solid waste**
June	29.850	2.250	0.600	**32.700**	18.900	0.750	1.200	**20.850**	13.980	0.300	1.050	**15.330**	48.600	5.400	2.100	**56.100**	4.500	0.300	0.750	**5.550**
July	36.060	7.830	0.780	**44.670**	14.880	3.600	0.960	**19.440**	20.820	2.730	0.390	**23.940**	53.400	6.240	0.360	**60.000**	10.200	0.930	0.480	**11.610**
August	46.710	6.930	1.140	**54.780**	39.420	0.870	0.780	**41.070**	18.480	1.560	0.960	**21.000**	56.460	3.690	0.630	**60.780**	35.220	1.830	0.540	**37.590**
September	44.400	2.490	0.600	**47.490**	13.530	2.040	1.050	**16.620**	18.420	3.210	0.750	**22.380**	49.830	3.690	0.660	**54.180**	11.640	0.660	0.630	**12.930**
October	37.590	3.360	0.420	**41.370**	11.250	0.630	0.390	**12.270**	13.830	1.620	0.300	**15.750**	37.470	2.850	0.720	**41.040**	11.640	0.570	0.420	**12.630**
November	33.660	2.190	0.360	**36.210**	10.320	0.570	0.300	**11.190**	10.350	1.560	0.270	**12.180**	36.300	2.520	0.600	**39.420**	11.010	0.750	0.360	**12.120**
December	43.320	5.640	0.930	**49.890**	14.490	0.540	0.840	**15.870**	15.990	3.210	0.540	**19.740**	50.130	3.090	0.870	**54.090**	12.210	0.840	0.780	**13.830**
January	46.710	5.820	0.360	**52.890**	18.990	1.380	0.480	**20.850**	11.160	1.620	0.330	**13.110**	37.980	3.060	0.840	**41.880**	11.460	1.980	0.360	**13.800**
February	36.480	3.540	0.870	**40.890**	13.650	1.050	0.540	**15.240**	11.010	1.740	0.390	**13.140**	31.920	4.140	0.540	**36.600**	8.430	0.480	0.450	**9.360**
March	32.760	5.700	1.260	**39.720**	14.700	2.130	1.140	**17.970**	12.600	3.630	1.080	**17.310**	31.590	4.140	1.140	**36.870**	13.980	2.400	0.870	**17.250**
April	40.560	4.860	1.530	**46.950**	21.240	2.220	1.230	**24.690**	14.130	2.850	1.170	**18.150**	39.630	4.680	1.170	**45.480**	16.890	1.770	0.930	**19.590**
May	27.480	2.760	0.960	**31.200**	15.030	2.010	1.170	**18.210**	33.120	0.420	1.110	**34.650**	42.090	4.050	0.570	**46.710**	3.750	0.390	0.840	**4.980**
Total	455.580	53.370	9.810	**518.760**	206.400	17.790	10.080	**234.270**	193.890	24.450	8.340	**226.680**	515.400	47.550	10.200	**573.150**	150.930	12.900	7.410	**171.240**
Total per month	37.965	4.448	0.818	**15562.800**	17.200	1.483	0.840	**7028.100**	16.158	2.038	0.695	**6800.40**	42.950	3.963	0.850	**17194.5**	12.578	1.075	0.618	**5137.200**
Per Month/ capita	7.593	0.890	0.164	**3112.560**	4.300	0.371	0.210	**1757.025**	4.039	0.509	0.174	**1700.10**	7.158	0.660	0.142	**2865.75**	3.144	0.269	0.154	**1284.300**
Total per day	1.266	0.148	0.027	**103.752**	0.573	0.049	0.028	**58.568**	0.539	0.068	0.023	**56.670**	1.432	0.132	0.028	**95.525**	0.419	0.036	0.021	**42.810**
Per day/ capita	0.253	0.030	0.005	**1296.900**	0.143	0.012	0.007	**585.675**	0.135	0.017	0.006	**566.700**	0.239	0.022	0.005	**1432.875**	0.105	0.009	0.005	**428.100**
Average	37.965	4.448	0.818	**7.576**	17.200	1.483	0.840	**7.751**	16.158	2.038	0.695	**6.240**	42.950	3.963	0.850	**8.888**	12.578	1.075	0.618	**8.443**
Std. Dev.	6.447	1.937	0.371	**8.755**	7.679	0.934	0.338	**8.951**	6.268	1.085	0.360	**7.713**	8.442	1.082	0.460	**9.984**	8.005	0.717	**0.012**	**8.734**

A.V. -Average

S.D.- Standard Deviation

Table2 :- Qualitative and Quantitative Composition of Solid Waste (Kg/Capita/Month) in H.1-H.5 at Zone-II

Houses Zone II																				
No. of family members	**2**				**4**				**3**				**5**				**5**			
	H.1				**H.2**				**H.3**				**H.4**				**H.5**			
Months	**Bio Degradable waste**	**Non Bio Degradable waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Degradable waste**	**Non Bio Degradable waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Degradable waste**	**Non Bio Degradable waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Degradable waste**	**Non Bio Degradable waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Degradable waste**	**Non Bio Degradable waste**	**Inert Solid Waste**	**Total Solid waste**
June	2.310	0.300	0.150	**2.760**	29.700	6.150	0.540	**36.390**	3.750	0.600	0.630	**4.980**	23.70	7.170	0.810	**31.680**	17.400	2.400	1.020	**20.820**
July	5.820	1.740	0.600	**8.160**	25.680	7.470	0.630	**33.780**	5.340	0.600	0.300	**6.240**	27.36	2.190	0.690	**30.240**	20.580	6.060	1.140	**27.780**
August	4.080	0.900	0.390	**5.370**	29.310	4.260	0.600	**34.170**	5.040	1.830	0.540	**7.410**	23.73	4.380	0.900	**29.010**	16.560	4.050	0.840	**21.450**
September	3.630	0.720	0.540	**4.890**	23.700	3.180	0.480	**27.360**	5.430	1.260	0.360	**7.050**	18.18	4.110	0.690	**22.980**	16.080	2.910	0.930	**19.920**
October	7.020	2.100	0.390	**9.510**	22.110	4.710	0.720	**27.540**	11.160	2.880	0.600	**14.640**	21.06	3.180	0.750	**24.990**	26.310	5.610	0.870	**32.790**
November	6.630	1.440	0.270	**8.340**	20.700	4.470	0.570	**25.740**	9.900	2.550	0.540	**12.990**	19.23	3.090	0.600	**22.920**	24.870	4.350	0.810	**30.030**
December	4.320	0.720	0.330	**5.370**	25.800	2.820	0.600	**29.220**	9.240	2.040	0.630	**11.910**	26.16	4.650	1.050	**31.860**	24.660	4.590	0.870	**30.120**
January	7.260	2.100	0.300	**9.660**	21.720	4.440	0.780	**26.940**	12.330	1.560	0.540	**14.430**	23.55	2.730	0.870	**27.150**	26.580	5.490	0.930	**33.000**
February	5.400	1.680	0.390	**7.470**	15.720	3.990	0.630	**20.340**	8.910	0.450	0.300	**9.660**	20.97	5.160	0.570	**26.700**	22.200	3.300	0.840	**26.340**
March	5.580	0.870	0.570	**7.020**	9.540	7.620	0.840	**18.000**	7.440	3.360	0.600	**11.400**	20.79	9.030	1.140	**30.960**	20.010	7.770	1.230	**29.010**
April	1.470	0.150	0.240	**1.860**	19.770	3.510	0.750	**24.030**	3.840	0.630	0.930	**5.400**	16.20	3.930	0.870	**21.000**	12.000	4.590	1.170	**17.760**
May	2.070	0.270	0.180	**2.520**	22.530	3.630	0.600	**26.760**	3.510	0.570	0.870	**4.950**	19.56	4.650	0.810	**25.020**	11.430	2.190	0.930	**14.550**
Total	55.590	12.990	4.350	**72.930**	266.280	56.250	7.740	**330.270**	85.890	18.330	6.840	**111.060**	260.49	54.270	9.750	**324.510**	238.680	53.31	11.580	**303.570**
Total per month	4.633	1.083	0.363	**2187.900**	22.190	4.688	0.645	**9908.100**	7.158	1.528	0.570	**3331.80**	21.708	4.523	0.813	**9735.30**	19.890	4.443	0.965	**9107.100**
Per Month/ capita	2.316	0.541	0.181	**1093.950**	5.548	1.172	0.161	**2477.025**	2.386	0.509	0.190	**1110.60**	4.342	0.905	0.163	**1947.06**	3.978	0.889	0.193	**1821.420**
Total per day	0.154	0.036	0.012	**36.465**	0.740	0.156	0.022	**82.568**	0.239	0.051	0.019	**37.020**	0.724	0.151	0.027	**64.902**	0.663	0.148	0.032	**60.714**
Per day/ capita	0.077	0.018	0.006	**182.325**	0.185	0.039	0.005	**825.675**	0.080	0.017	0.006	**277.650**	0.145	0.030	0.005	**811.275**	0.133	0.030	0.006	**758.925**
Average	4.633	1.083	0.363	**2.710**	22.190	4.688	0.645	**5.423**	7.158	1.528	0.570	**3.700**	21.70	4.523	0.813	**3.725**	19.890	4.443	0.965	**6.166**
Std. Dev.	1.974	0.705	0.148	**2.827**	5.599	1.582	0.106	**7.287**	3.082	1.012	0.196	**4.289**	3.283	1.926	0.169	**5.379**	5.266	1.631	0.142	**7.039**

A.V. -Average

S.D.- Standard Deviation

Table3 :- Qualitative and Quantitative Composition of Solid Waste (Kg/Capita/Month) in H.1-H.5 at Zone-III

Houses Zone III																			
No. of family members	**5**				**4**				**4**				**4**				**6**			
	H.1				**H.2**				**H.3**				**H.4**				**H.5**			
Months	**Bio Degradable waste**	**Non Bio Degradable waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Degradable waste**	**Non Bio Degradable waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Degradable waste**	**Non Bio Degradable waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Degradable waste**	**Non Bio Degradable waste**	**Inert Solid Waste**	**Total Solid waste**	**Bio Degradable waste**	**Non Bio Degradable waste**	**Inert Solid Waste**	**Total Solid waste**
June	18.480	6.450	1.320	**26.250**	20.310	7.530	0.930	**28.770**	12.870	6.630	0.810	**20.310**	19.590	5.850	1.560	**27.000**	24.900	2.040	0.360	**27.300**
July	19.440	4.920	1.050	**25.410**	11.850	2.250	0.690	**14.790**	12.330	1.110	0.930	**14.370**	19.800	3.870	1.980	**25.650**	24.300	3.900	0.450	**28.650**
August	13.500	5.250	1.230	**19.980**	12.090	5.250	0.900	**18.240**	7.740	1.170	0.600	**9.510**	15.780	5.520	1.470	**22.770**	24.030	4.290	0.630	**28.950**
September	14.730	2.670	0.870	**18.270**	12.540	1.590	0.750	**14.880**	10.260	0.960	0.660	**11.880**	15.450	2.490	1.980	**19.920**	22.680	4.560	1.170	**28.410**
October	14.700	2.280	0.630	**17.610**	12.660	1.380	0.540	**14.580**	10.800	0.870	0.600	**12.270**	17.520	2.430	1.560	**21.510**	21.810	2.130	1.020	**24.960**
November	14.010	1.470	0.420	**15.900**	11.460	1.080	0.510	**13.050**	10.320	0.690	0.450	**11.460**	15.660	2.100	0.750	**18.510**	19.470	2.220	0.870	**22.560**
December	15.960	3.660	0.960	**20.580**	11.790	4.590	1.260	**17.640**	7.560	2.340	0.750	**10.650**	13.530	3.690	1.230	**18.450**	20.100	7.410	0.570	**28.080**
January	16.650	4.620	0.930	**22.200**	14.340	6.570	0.570	**21.480**	14.850	4.530	0.600	**19.980**	13.530	4.320	1.050	**18.900**	20.070	4.830	0.270	**25.170**
February	13.590	1.830	0.540	**15.960**	13.110	2.010	0.600	**15.720**	12.330	2.640	0.630	**15.600**	10.260	3.330	0.960	**14.550**	20.490	4.920	0.300	**25.710**
March	11.940	5.220	1.470	**18.630**	10.560	4.830	1.530	**16.920**	12.300	3.540	1.260	**17.100**	9.690	4.530	2.130	**16.350**	14.850	6.150	1.260	**22.260**
April	11.790	4.500	1.260	**17.550**	11.760	3.660	1.380	**16.800**	11.640	3.870	1.170	**16.680**	13.230	4.680	0.840	**18.750**	17.520	1.800	1.590	**20.910**
May	13.320	3.480	1.200	**18.000**	12.990	3.210	1.230	**17.430**	8.130	3.960	0.840	**12.930**	12.120	5.220	1.440	**18.780**	18.000	1.740	0.540	**20.280**
Total	178.110	46.350	11.880	**236.340**	155.460	43.950	10.890	**210.300**	131.130	32.310	9.300	**172.740**	176.160	48.030	16.950	**241.140**	248.220	45.990	9.030	**303.240**
Total per month	14.843	3.863	0.990	**7090.20**	12.955	3.663	0.908	**6309.00**	10.928	2.693	0.775	**5182.200**	14.680	4.003	1.413	**7234.20**	20.685	3.833	0.753	**9097.20**
Per Month/ capita	2.969	0.773	0.198	**1418.04**	3.239	0.916	0.227	**1577.25**	2.732	0.673	0.194	**1295.550**	3.670	1.001	0.353	**1808.55**	3.448	0.639	0.125	**1516.20**
Total per day	0.495	0.129	0.033	**47.268**	0.432	0.122	0.030	**52.575**	0.364	0.090	0.026	**43.185**	0.489	0.133	0.047	**60.285**	0.690	0.128	0.025	**50.540**
Per day/ capita	0.099	0.026	0.007	**590.850**	0.108	0.031	0.008	**525.750**	0.091	0.022	0.006	**431.850**	0.122	0.033	0.012	**602.850**	0.115	0.021	0.004	**758.100**
Average	14.843	3.863	0.990	**3.386**	12.955	3.663	0.908	**4.156**	10.928	2.693	0.775	**3.563**	14.680	4.003	1.413	**3.602**	20.685	3.833	0.753	**3.126**
Std. Dev.	2.394	1.553	0.329	**4.276**	2.505	2.116	0.358	**4.980**	2.249	1.856	0.244	**4.348**	3.260	1.243	0.461	**4.964**	3.027	1.866	0.426	**5.319**

A.V. -Average

S.D.- Standard Deviation

Table4 :- Qualitative and Quantitative Composition of Solid Waste (Kg/Capita/Month) in H.1-H.5 at Zone-IV

No. of family members	4				4				5				4				3			
	H.1				H.2				H.3				H.4				H.5			
Months	Bio Degradable waste	Non Bio Degradable waste	Inert Solid Waste	Total Solid waste	Bio Degradable waste	Non Bio Degradable waste	Inert Solid Waste	Total Solid waste	Bio Degradable waste	Non Bio Degradable waste	Inert Solid Waste	Total Solid waste	Bio Degradable waste	Non Bio Degradable waste	Inert Solid Waste	Total Solid waste	Bio Degradable waste	Non Bio Degradable waste	Inert Solid Waste	Total Solid waste
June	193.500	6.360	1.200	**201.060**	155.970	3.000	0.750	**159.720**	93.300	7.830	1.500	**102.630**	75.960	5.820	0.450	**82.230**	25.980	0.300	1.050	**27.330**
July	165.450	61.800	1.950	**229.200**	131.160	53.520	1.860	**186.540**	100.620	6.090	1.350	**108.060**	54.930	3.090	1.800	**59.820**	4.860	2.790	1.080	**8.730**
August	107.760	30.510	1.560	**139.830**	86.550	33.510	2.070	**122.130**	103.830	19.320	1.440	**124.590**	51.930	8.130	1.680	**61.740**	7.080	0.090	0.750	**7.920**
September	111.960	40.410	1.830	**154.200**	85.950	28.680	1.560	**116.190**	99.300	5.790	1.170	**106.260**	53.400	12.120	1.530	**67.050**	4.380	0.660	0.600	**5.640**
October	56.580	43.650	1.290	**101.520**	35.700	23.610	1.470	**60.780**	76.890	23.400	1.080	**101.370**	34.830	14.220	1.170	**50.220**	4.530	0.540	0.540	**5.610**
November	48.420	47.520	1.140	**97.080**	34.620	30.180	1.230	**66.030**	71.850	23.520	0.930	**96.300**	33.720	14.280	0.840	**48.840**	4.530	1.230	0.420	**6.180**
December	81.840	13.650	1.260	**96.750**	72.240	7.020	1.470	**80.730**	72.210	7.020	1.350	**80.580**	60.690	9.540	0.750	**70.980**	10.980	0.600	0.930	**12.510**
January	67.650	11.730	1.560	**80.940**	36.780	10.020	1.440	**48.240**	67.440	7.710	1.380	**76.530**	31.230	5.400	0.870	**37.500**	8.550	0.900	1.170	**10.620**
February	46.860	7.890	1.440	**56.190**	38.370	7.380	1.230	**46.980**	32.430	8.760	1.140	**42.330**	23.430	4.650	0.600	**28.680**	7.500	1.050	0.930	**9.480**
March	35.640	8.610	0.960	**45.210**	29.820	5.250	1.200	**36.270**	26.850	6.930	0.570	**34.350**	24.720	2.760	0.450	**27.930**	8.790	0.960	0.750	**10.500**
April	75.510	6.240	1.380	**83.130**	60.900	4.110	0.870	**65.880**	73.140	7.110	1.740	**81.990**	60.480	5.790	0.750	**67.020**	17.910	0.450	1.140	**19.500**
May	99.690	5.160	1.260	**106.110**	96.390	2.940	0.780	**100.110**	68.310	4.620	1.530	**74.460**	59.790	3.810	0.570	**64.170**	15.510	0.570	1.080	**17.160**
Total	1090.860	283.530	16.83	**1391.22**	864.450	209.220	15.93	**1089.60**	886.170	128.100	15.180	**1029.45**	565.110	89.610	11.46	**666.180**	120.600	10.140	10.440	**141.180**
Total per month	90.905	23.628	1.403	**41736.6**	72.038	17.435	1.328	**32688.0**	73.848	10.675	1.265	**30883.5**	47.093	7.468	0.955	**19985.4**	10.050	0.845	0.870	**4235.40**
Per Month/ capita	22.726	5.907	0.351	**10434.150**	18.009	4.359	0.332	**8172.00**	14.770	2.135	0.253	**6176.70**	11.773	1.867	0.239	**4996.35**	3.350	0.282	0.290	**1411.80**
Total per day	3.030	0.788	0.047	**347.805**	2.401	0.581	0.044	**272.400**	2.462	0.356	0.042	**205.890**	1.570	0.249	0.032	**166.545**	0.335	0.028	0.029	**47.060**
Per day/ capita	0.758	0.197	0.012	**3478.05**	0.600	0.145	0.011	**2724.00**	0.492	0.071	0.008	**2573.62**	0.392	0.062	0.008	**1665.45**	0.112	0.009	0.010	**352.950**
Average	90.905	23.628	1.403	**55.605**	72.038	17.435	1.328	**47.263**	73.848	10.675	1.265	**26.710**	47.093	7.468	0.955	**17.132**	10.050	0.845	0.870	**6.540**
Std. Dev.	48.359	20.031	0.285	**68.675**	41.055	16.227	0.407	**57.689**	24.595	7.031	0.311	**31.938**	16.854	4.165	0.477	**21.496**	6.643	0.693	0.253	**7.588**

Table 5:- Showing Total Average Solid Waste (Kg/Capita/Month) Generation and Composition in 5 Houses each from Zone I- Zone IV From June, 2007- May, 2008

S.No.	Solid Waste	Zone-I H.1-H.5		Zone-II H.1-H.5		Zone-III H.1-H.5		Zone-IV H.1-H.5		Total H.1-H.5		Total	%age
		A.V.	S.D.	A.V.	S.D.	A.V.	S.D.	A.V.	S.D.	A.V.	S.D.	A.V.*12	
1	Bio Degradable Solid Waste	25.370	7.368	15.115	3.841	14.818	2.687	58.787	27.501	28.523	10.349	342.276	82.003
2	Non-Degradable Solid Waste	2.601	1.151	3.253	1.371	3.611	1.727	12.01	9.629	5.368	3.469	64.416	15.433
3	Inert Solid Waste	0.764	0.347	0.671	0.152	0.967	0.363	1.164	0.346	0.892	0.302	10.704	2.564
4	Total Solid Waste	28.735	8.866	19.039	5.364	19.396	4.777	71.961	37.476	34.783	14.120	417.396	100.00

A.V. -Average

S.D.- Standard Deviation

3. Current waste disposal practices as followed by the municipality are unsatisfactory and may cause various environmental problems in the area of present investigations.
4. The improper solid waste disposal in open drains, vacant spaces and nallahs near the bank of river Chenab, may have an adverse impact on ground water as well as surface water quality.
5. In order to reduce the harmful impacts of solid waste on environment, proper scientific solid waste management practice is needed in the area so as to protect the living population from this menace of environmental concern.

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References

Gupta, Subash C. and P. Manhas 2008. Percentage generation and estimated energy content of municipal solid waste at commercial area of Janipur, Jammu. ***Env. Conserv. J.*****, 9** (1&2): 27-31.

Gupta, Subash C. and S. Sambyal 2007. Solid Waste Management: A case study of Samba town of Jammu division of J&K. ***Indian J. Conserv. and Ecoplan*****, 14**(3): 571-574.

Jaswal, S. 2008. *Generation, composition, management and impact of Municipal Solid Waste on ground water quality at Muthi, Jammu.* M.Phil. Dissertation submitted to the University of Jammu, Jammu.

Kour, J. 2004. Generation, disposal and management of solid waste in Jammu city. Ph. D. Thesis, University of Jammu, Jammu.

Krishan, K. 2010. *Qualitative and quantitave analysis of commercial solid waste, estimated energy content and its management- A case study of Udhampur Town.* M.Phil. Dissertation submitted to the Department of Environmental Sciences, University of Jammu, Jammu.

Rampal, R.K. and D. Sharma 2002. Generation and disposal of solid waste at Bagh-e-Bahu complex of Jammu. ***Indian J. Environ. And Ecoplan***, **7**(1): 51-54.

Rampal, R.K. and J. Kour 2005. Solid waste generation in the residential area of Jammu city (J&k). ***Poll. Res.***; **24** (2): 1-5.