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Study of composition & charactersitic of municipal solid waste in Gwalior city

Deepak Sharma[1], Deepak Rastogi[2]
[1] PG Scholar, Department of Civil Engineering, MITS, Gwalior, Madhya Pradesh India
[2] Associate Professor, Department of Civil Engineering, MITS, Gwalior, Madhya Pradesh, India

Abstract
Waste generation is increasing very rapidly due to fast moving modernization, globalization and rapid growth of economic and population growth. Solid waste are generated from residential building, institutional buildings, commercial building etc. these generated solid waste adversely affecting our environment, human beings and animals. As we know solid waste nature i.e. composition and characteristics changes from place to place through out the world. Solid waste generation rate depend on economic standard also like - solid waste from higher income group (HIG) is more and lower in low income group (LIG) and characteristics of waste is also different between them. Seasonal variation & living standard of people affect the quantity and quality of solid waste. msw characteristics and composition study is more impotant to account the issue generated by solid waste throughout the city. Only by knowing these solid waste perameter we can deal with suitable use of it. Gwalior region include- morar zone, lakshar gwl, maharaja bada, bhool bagh, and thatipur. City population growth rate is about 2.28% per annum. now city population reach beyond 14 lakh in numbers. City has 66 wards. Waste collection quantity is range between 400 to 450 tonnes in a day by municipal corporation of Gwalior. For handling and management of this huge generated solid waste we require proper analysis and study of solid waste parameter, There is a need for proper Planning and effective implementation of proper solid waste management system is being felt for the Gwalior city, which covers the aspect of wide awareness, cost-effective collection & transportation, correct waste characterization, proper segregation, recycling and recovery from the solid waste to make it a valuable market product. The aim or main objective of this study is find out the characterstics and composition of generated solid waste from various ward of Gwalior city.

Keywords: municipal solid waste (MSW), moisture conetnt (m/c), Gwalior municipal corporation (GMC), high income group (HIG), low income group (LIG).

Introduction
Solid Waste is the waste material that is discarded after the use. As the modernization going on, solid waste generation also increasing. Today consumption of packaging materials is increasing significantly which ultimately results in generation of solid waste. these waste generated from residential building, commerical building, institutional etc. There fore we need proper characteristics and composition study to deal with this generated solid waste so we can utilize these waste in suitable and effective manner. Generation rate of solid waste depends on culture, living standard of people, geographic location of that area, season of year and frequecy of collection of solid waste etc.
During collection and handling of solid waste, segregation of waste plays an important role. Due to segregation of waste, load on landfills and hetero genious nature of solid waste gets reduced upto some extent. Segregation should be done at source level.
Composition and characteristics study helps in finding out the nature of solid waste so that it can be further utilized in best suitable manner.

Case study - Gwalior city
Gwalior city is a major city of Madhya Pradesh state located in center of country India. Gwalior location, in the state of Madhya Pradesh, is at the geographical coordinates of 26.22° North Latitude and 78.18° East Longitude. Situated 197 meters above sea level, Gwalior is 121 km from Agra and 321 km from The national capital of New Delhi. The city of Gwalior coves a geographical area of 5214.00 sq km and is situated by the banks of Chambal River. City is divided into 66 ward region in which 6 wards are selected for analysis. city population is around 10,69,276 as per census 2011. management of all generated solid waste is comes under Gwalior municipal corporation (GMC) who look all the services like collection, transporation, treatment and dumping of solid waste of city.

Present Scenario
Now a days as population increasing, generation of solid waste is also increasing respectively. These generated waste causing various environmental issue and also effect to human beings and animals so to handle these waste, state and cental government has launched various programmes and inititative like door to door collection, awareness to people etc. are not much effecative as we need. segregation and waste collection is not proper throughout the city that resulting in poor asthetic appearance at many places. Its also leads to polluting the water by leaking leachate, spreading of various diseases. Quantity of generated waste is not equal to quantity of collected waste, this implies that still there is need to be more focus on technique of collection of waste so that we can improve solid waste collection effiency. For proper handling and

treatment of solid waste, we need to be focus more on segregation of waste & in determination of composition and characteristics to counter all these issue. The above loopholes leads to serious health problems to the people of city and resident nearby dumpsites. So these problems could be mitigated through detailed study of solid waste characteristics and its composition wardwise. By knowing these parameters we can categorized the waste in different types, Hence the accurate and precise knowledge of segregation composition and characteristics of waste is needed for maximum utilization of Solid waste from different wards of Gwalior city.

Therefore my studies is mainly focus on proper analysis and determination of characteristics and composition of municipal solid waste (msw) wardwise in Gwalior city.

Methodology

For doing proper study and analysis we have collected different ward wise waste sample at KEDARPUR MSWM (municipal solid waste management) site to determine the waste composition and to analyze & test the waste sample. gwalior city has 66 wards in whuch 6 wards are selected for study i.e. ward no. 19, 22 29 55 58 and 65. we have classified the solid waste sample in different catagories like, paper, plastic organic matter, inert material, textile etc. and then its fraction value is calculated out. on analyzing we found that solid waste mainly contain 57.16% organic matter i.e of biodegradable nature. In labortary we have calculated out the various solid waste parameters i.e. pH, moisture content (m/c). on analysis of solid waste characteristics and composition of municipal solid waste, we have suggested best suitable technique for better utilization of solid waste by treatment technique.

Result and Discussion

Ward wise solid Waste composition of Gwalior city

Table 1: Various calculated solid waste parameters in Laboratory

S. No.	Ward no.	Moisture content (%)	pH
01	19	60	5.38
02	22	73.13	5.67
03	29	68	4.99
04	55	82.49	5.2
05	58	59	6.57
06	65	68	6.52

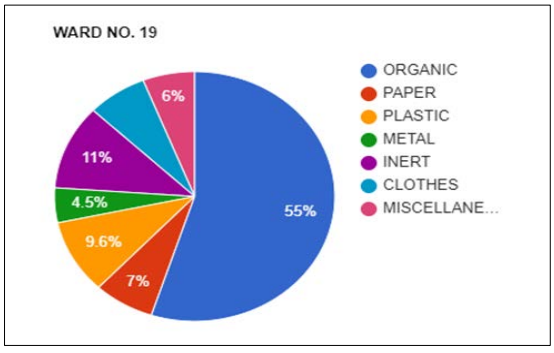

Fig 1: Pie-chart of MSW composition for ward no.19

Table 2: MSW composition of ward no.19

S. No.	Perameter	Percentage (%)
1	Organic	55
2	Paper	7
3	Plastic	9.6
4	Metal	4.5
5	Inert	11
6	Moisture content	60
7	Volatile matter	54

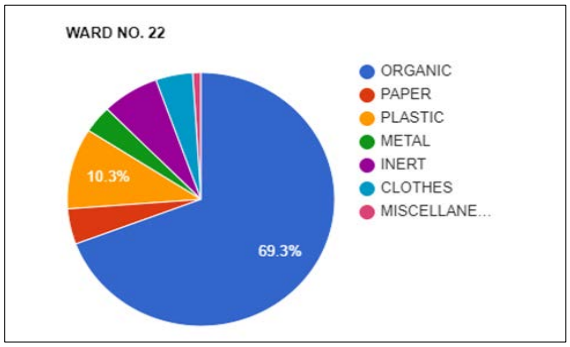

Fig 2: Pie-chart of MSW composition for ward no.22

Table 3: Composition of Ward No.22

S. No.	Perameter	Percentage (%)
1	Organic	69.28
2	Paper	4.52
3	Plastic	10.32
4	Metal	3.48
5	Inert	6.92
6	Moisture content	73.13
7	Volatile matter	59

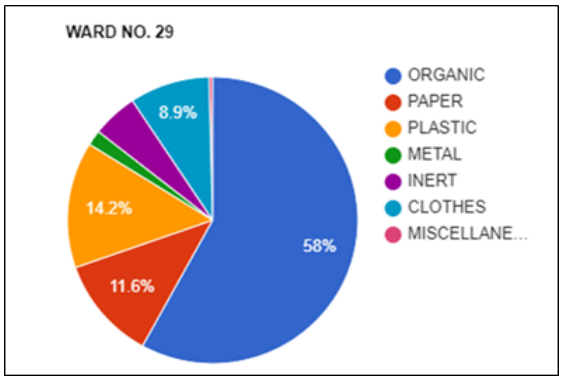

Fig 3: Pie-chart of MSW composition for ward no.29

Table 4: MSW Composition of ward NO.29

S. No.	Perameter	Percentage (%)
1	Organic	58
2	Paper	11.64
3	Plastic	14.24
4	Metal	1.72
5	Inert	5.08
6	Moisture content	68
7	Volatile matter	62

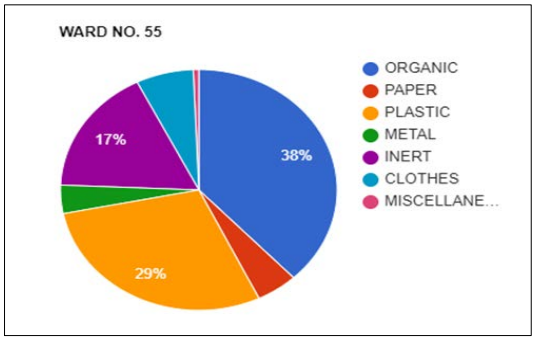

Fig 5: Pie-chart of MSW composition for ward no.55

Table 5: MSW Composition of ward NO.55

S. No.	Perameter	Percentage (%)
1	Organic	38
2	Paper	4.84
3	Plastic	29
4	Metal	3.8
5	Inert	17
6	Moisture content	82.49
7	Volatile matter	63

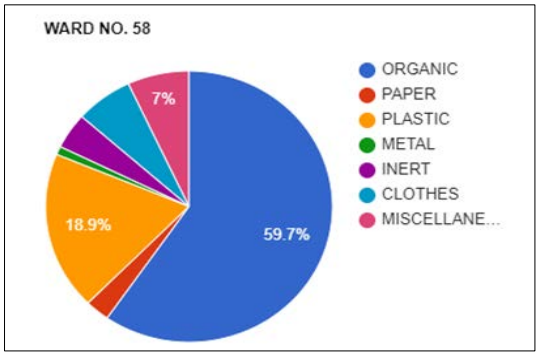

Fig 6: Pie-chart of MSW composition for ward no.58

Table 6: MSW composition of ward No.58

S. No.	Perameter	Percentage (%)
1	Organic	59.66
2	Paper	2.76
3	Plastic	18.86
4	Metal	1
5	Inert	4.26
6	Moisture content	59
7	Volatile matter	61.4

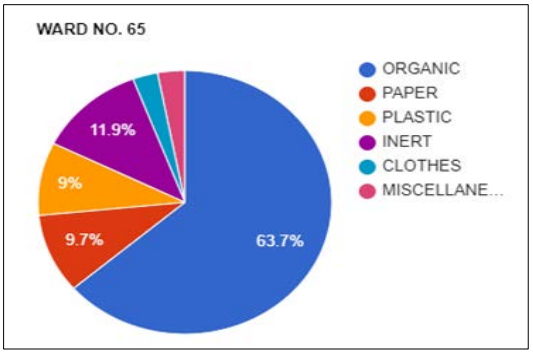

Table 7: Pie-chart of MSW composition for ward no.65

Table 7: MSW Composition of ward no.65

S. No.	Perameter	Percentage (%)
1	organic	63.68
2	paper	9.72
3	plastic	8.96
4	metal	-
5	inert	11
6	Moisture content	60

Conclusion

On the basis of analyzing the municipal solid waste collected of different 6 ward sample taken from segregation point following average composition was found as follow-

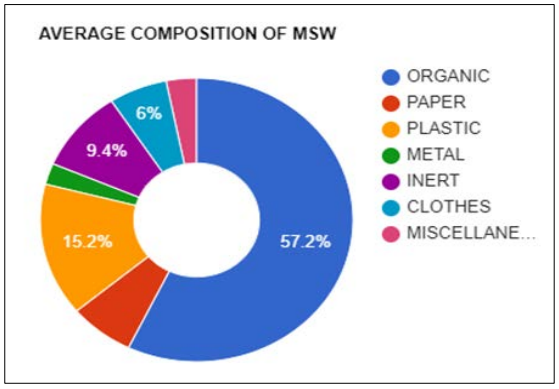

Fig 8: Pie-chart of average MSW composition

Table 8: Average MSW composition of Gwalior city

S. No.	parameter	Percentage (%)
1	organic	57.16
2	paper	6.74
3	plastic	15.16
4	metal	2.41
5	inert	9.35
6	Moisture content	68.43

- On analyzing the municipal solid waste, it is observed that average value of organic matter in MSW of 6 ward of Gwalior city is about 57.16%. so after study we have concluded this biodegradable matter avg. value is best suitable for anaerobic digestion technique.

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