

# Review of Biodegradable Waste Characterization in Biomethanation Plant

Vaishali.S<sup>1</sup>, Senthamilkumar.S<sup>2</sup><sup>1</sup>M.Tech Environmental Engineering, Periyar Maniammai University, Vallam, Thanjavur, Tamilnadu, India<sup>2</sup>Professor, Dept. of Civil Engineering, Periyar Maniammai University, Vallam, Thanjavur, Tamilnadu, India

**ABSTRACT:** Solid waste is the most important factor in the environment pollutant. These wastes having materials like glasses, plastics, paper and food waste etc. The solid waste or degradable waste polluting the environment continuously by the process of open dumping. This wastes are producing the CH<sub>4</sub>, CO<sub>2</sub>, N<sub>2</sub> gases and it will affect the lands by the way of leachate. So the characterization of this waste is essential while transporting and disposing. Characterization of wastes having a part of physical, chemical, biological characteristics. This study carried out the results and discussion of past experimental investigation and characterisation from the literature reviews. Finally this report shows the past, present and future characterization analysis of solid waste.

**KEY WORDS:** Solid waste, Degradable waste, Physical characteristics, Chemical characteristics

## I. INTRODUCTION

Wastes are the common factor in the world wide. From that waste, producing of solid wastes increasing day by day in each and every country. In India generated 48 million tonnes of solid waste are disposed in unsafe ways. For example burning, dumped into oceans and other water bodies and lands. While burning or open dumping of solid waste occur the environment and it will creates a toxic gases and harmful effects. So that the characterization process is most important role in solid waste management. These wastes are physical characterized by segregation of waste. This paper shows the process and types of characterized in chemically by means of pH, volatile matters, CO<sub>2</sub>, CH<sub>4</sub> contents etc.

## II. LITERATURE REVIEW

From the literature study Benjamin Ternenge Abur, Emmanuel Enomena Oguche said that the solid wastes are having a major component of food, glass, metals, paper, plastics and rubber etc and 56.2% of solid wastes are biodegradable waste. They suggest need to establish a formal composting 56.2% and recycling facility for 37.8% and 21% of the waste of this characterization study.

M.B.Oumarou and M.Dauda are suggested the physical characterization is carried out the wastes of wood, glass, metal, plastic and paper in varying proportions. The value of moisture is 32.593, volatile was 25.25, fixed carbon 10 and ash content 32.150 for kano. The average daily municipal solid waste is generated per person was 1.23kg. Energy production is possible with the addition of supplementary fuel such as biogases, weeds or water hyacinth.

Habib Fathi, Abdolhossinpari Zangani are suggested Due to high organic and its high moisture content, MSW must be collected daily and transferred to disposal site substantially increasing the cost of the solid waste. 184.2 tones of waste are produced in Zanjan. Average pH value for MSW is 5.4 and humidity was high in the range of 69.2% and may be reduced by aeration during the process of composting.

Manohara B., Belagali S.L. are described the composting process of municipal solid waste and it's characterized by the nitrogen, phosphorus, potassium, secondary macronutrients calcium, magnesium and micronutrients/trace minerals like chlorine, manganese, iron, zinc, copper, molybdenum, nickel were analyzed.

P.B.Vyas suggested the pH value of MSW in alkaline side with the average value of 7.24 and the value is ranging from 6.89 to 7.79 and metal value is 47.05 to 184.54mg/kg, Ni between 30.98 to 62.59mg/kg and Cd between 1.5 to 6.49mg/kg. The Hg content is very low and ranged from 0.01 to 0.23mg/kg.

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 12, December 2015

## III. EXPERIMENTAL STUDY

### 1. Physical characterization:

#### a) Specific weight:

Weight of the solid waste per unit volume is to be calculating by from the various sources and the standard specific weight of some wastes is tabulated below.

COMPONENTS	RANGE IN Kg/m <sup>3</sup>
Paper	40 – 130
Food waste	130 - 480
Plastics	40 – 130
Glass	160 - 480

#### b) Moisture Content:

Percentage of wet weight of the municipal solid waste. The waste shall be kept in oven at 105°C and the value of moisture content can be calculating by the below formula,

$$M = (w - d / w) \times 100$$

Where,

w = Wet weight of solid waste

d = Dry weight of solid waste

### 2. Chemical characterization

#### a) Proximate analysis:

This analysis is the components of MSW and it includes the following test values. These are

- i. Moisture
- ii. Volatile combustible matter
- iii. Fixed carbon
- iv. Ash

#### b) Fusing point of ash:

The temperature at which the ash resulting from the burning of waste will form a solid by fusion. The fusion temperature was 1100° to 1200°C.

#### c) Ultimate analysis:

Ultimate analysis involves the determination of presents of Carbon, Hydrogen, Oxygen, Sulphur and ash.

## IV. RESULTS AND CONCLUSION

The physical and chemical characterization of municipal solid waste is to be determining from the various sources and various types of waste.

## REFERENCES

1. Benjamin Ternenge Abur, Emmanuel Enomena Oguche “Characterization of Municipal Solid Waste in the Federal Capital Abuja, Nigeria” Global journals, vol 14, issue 2, year 2014.
2. M. B. Oumarou, M. Dauda, “Characterization and Generation of Municipal Solid Waste in North Central Nigeria” International journal of modern engineering research, vol 2, issue 5, sep-oct 2012.
3. Adjei, S.M., Municipal solid waste minimization through household waste segregation in Bantama, Kumasi. A thesis submitted to the Department of Environmental Science, Kwame Nkrumah University of Science and Technology, Kumasi, in partial fulfilment of the requirement for the award of Master degree in Environmental Science. 2013

## International Journal of Innovative Research in Science, Engineering and Technology

*(An ISO 3297: 2007 Certified Organization)*

**Vol. 4, Issue 12, December 2015**

4. American Society for Testing and Materials, 2008. Standard test method for determination of the composition of unprocessed municipal solid waste, In: ASTM D5231-92-2008, US.
5. Habib Fathi, Abdolhossinpari Zangane, Hamed Fathi, hossein moradi “Municipal solid waste characterization and it is assessment for potential compost production: A case study in Zanjan city, Iran” American journal of agriculture and forestry, 2014, 2(2), 39-44.
6. Manohara B, Belagali S.L. “Characterization of Essential Nutrients and Heavy Metals during Municipal Solid Waste Composting” International journal of innovative research in science, engineering and technology, vol 3, issue 2, Feb 2014.
7. P. B. Vyas “Assessment of municipal solid waste compost Characterization and compliance” Jr. of Industrial Pollution Control 27(1)(2011) pp 87-91.
8. Rajesh Babu Katiyar<sup>1</sup>, S. Suresh<sup>1</sup>, A. K. Sharma “Characterisation of Municipal Solid Waste Generated by the City of Bhopal, India” International journal of chem. Tech research, vol 5, No.2, pg 623-628.