

# Odour Neutralizer – A Solution to Minimize the Odour from Municipal Solid Waste

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## Abstract

With growing population, industrialization and urbanization, the odour problem has been assuming objectionable proportion. Urbanization without proper sanitation facilities is a major cause of odour problem. Odour affects human beings in a number of ways. Strong, unpleasant or offensive smells can interfere with a person's enjoyment of life especially if they are frequent. Most commonly reported odour-producing compounds are hydrogen sulfide, volatile organic compounds, which is generated from landfill site or dumping ground. The objective of this study is to treat solid waste in economical way to reduce the odour nuisance. This research will be carried out at Kanjur site with specific experimentation using garbage gas collector on municipal solid waste. Presently, India does not have any defined odour policy to measure and control this nuisance. To maintain the aesthetic value of the environment there is requirement of new products which are to be adopted to minimize the odour. These products are natural and non-toxic which are used to enhance degradation rate of organic waste.

**Keyword-** Odour neutralizer, Municipal solid waste, Odour nuisance

## I. INTRODUCTION

Odour can be defined as the "perception of smell" or in scientific terms as "a sensation resulting from the reception of stimulus by the olfactory sensory system". Whether pleasant or unpleasant, odour is induced by inhaling air-borne volatile organics or inorganics. There are many kinds of air pollutants in the ambient air, but the most harmful & annoying pollutants would be odorous pollutants. Landfill gas creates odour nuisance as well as potential to health hazard therefore some measures should be taken to control odour. Therefore, the use of odour neutralizer is done to minimize odour nuisance.

Municipal solid waste (MSW) landfills were experiencing the consequences of conventional landfill techniques, whereby the landfill leachate and gases that are generated from these units have been determined, in many cases, to be risks to human health and the environment. Undesirable odour contributes to air quality concerns and affect human lifestyles. Odour is undoubtedly the most complex of all the air pollution problems. Unlike conventional air pollutants, odour has distinctly different characteristics, which, to an extent, can be comparable with noise pollution.

## II. AVAILABLE TECHNIQUES TO REDUCE ODOUR NUISANCE

There are various techniques which are adopted to minimize the odour. They depend on the type of sources.

### A. Odour Control from Area Sources

#### 1) Excluding Development Close to the Site

Development close to the site is to be excluded. A reasonable "buffer zone" around the area sources has to be determined. The actual size of the zone depends upon a number of factors, including the size of the area from which odour emanates, the intensity of the odour being emitted, the duration and frequency of the odour emissions, the actual process being undertaken, the topography of the site, the weather conditions that prevails at the site. Green belt development in the buffer zone may help at least partially to mitigate / obfuscate the odour.

#### 2) Ensuring that the Operation Is Carried Out Under the Best Management Practices

Best management practices (BMP) vary depending upon the industry producing the odour. For all new developments, BMPs starts with the site selection and the building of the facilities.

3) *Nozzles, Sprayers and Atomizers That Spray Ultra-Fine Particles of Water or Chemicals Can Be Used Along the Boundary Lines of Area Sources to Suppress Odours*

Rotary atomizer is one such technique widely recommended for effective control of odour in case of area sources. The Atomizer uses centrifugal action by a spinning inner mesh to force droplets on to an outer mesh which "cuts" the water into atoms. There are a large number of chemicals and proprietary products that claim to reduce odour when they are applied to area sources.

*B. Odour Control from Point Source*

In case of point sources such as that of industries, the odour-causing gas stream can be collected through piping and ventilation system and made available for treatment. The choice of the technology is often influenced by the following factors:

- The volume of gas (or vapor) being produced and its flow rate
- The chemical composition of the mixture causing the odour
- The temperature
- The water content of the stream

1) *Mist filtration*

While gases cause most odour problem may also result from aerosols in the fumes. Odorous air streams frequently contain high concentration of moisture. If the vapour discharge can be cooled below 40°C, a substantial quantity of the water vapour will condense thereby reducing the volume of gases to be incinerated. Mist filters can be used for this purpose. Mist filters can also remove solids and liquids from gas stream. If the odour is caused by these particles, then it will result in odour reduction also.

2) *Bio-filtration*

This method is becoming an acceptable and successful way of reducing odours from biological process. Bio-filtration is a natural process that occurs in the soil that has been adopted for commercial use. Bio-filters contain micro-organisms that break down VOC's and oxidize inorganic gases and vapours into non-malodorous compounds such as water and CO<sub>2</sub>. Bio-filters can be constructed using various materials such as compost, straw, wood chips, peat, soil, and other inexpensive biologically active materials.

3) *Green Belt Development*

Green belts are used to form a surface capable of sorbing and forming sinks for odorous gases. Leaves with their vast area in a tree crown, sorbs pollutants on their surface, thus effectively reduce their concentrations in the ambient air and source emissions.

4) *Adsorption*

There are systems that use activated alumina impregnated with potassium permanganate for adsorption. The alumina absorbs the odorous substances so that the permanganate can oxidize them, usually to carbon dioxide, water, nitrogen and sulfur dioxide, depending on their composition. The alumina bed is replaced progressively as the permanganate is exhausted. This has an advantage over carbon because no further treatment is needed; and may offset the cost of alumina.

### III. ODOUR PROBLEMS AT KANJUR SITE

Kanjur landfill site has total area of 141.77 Ha where the area available for developing the projects is nearby 66 Ha. The disposal of municipal solid waste is done by bio-reactor landfill which has gas and leachate collection system.

Gases are produced in landfill due to anaerobic digestion by microbes. At Kanjur, the collected gas is used for flaring. Also the other gases which are responsible for odour nuisance are generated and they are treated with odour neutralizer of higher cost.

### IV. SOLUTION MATERIAL

Treatment to reduce odour with an enzyme based product should be economical. Use of Biowizard Odor may decrease the cost and also may reduce the odour more effectively.

Biowizard Odor is an excellent material that can be used. Biowizard Odor is revolutionary combination of beneficial enzymes, super catalysing co-enzymes and co-factors, essential oils and plant extracts and specially formulated nutrients. It is 100% natural organic compound without harsh chemicals. Biowizard Odor activates the beneficial microbes present in the waste to rapidly digest the waste product. Biowizard Odor digests the compounds that cause noxious smells which include ammonia, hydrogen sulphide, amines and marchpanes. Biowizard Odor has been tested by independent laboratories and confirmed to be non-toxic, non-irritating, non-flammable, non-pathogenic and non-hazardous. Biowizard Odor treatments can be applied at any stage of waste cycle including newly added waste or even to capped landfills where a permanent reduction in odour emissions can be achieved economically.

## V. CONCLUSION

- For effective odour control Biowizard Odor is economical solution.
- It is natural organic compound which is harmless to human and environment.
- It is useful to reduce volume of municipal solid waste thereby increasing capacity of landfill.
- Improves the quality of leachate by reducing BOD, COD, TDS, oil grease and nutrient level.

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