2011 International Conference on Environmental and Agriculture Engineering
IPCBEE vol.15(2011) © (2011) IACSIT Press, Singapore

The Study on the Reduction of the State of Odor Pollution in the Odor Generation Facilities (II)

Park Chan Jin

School of Urban & Environmental Engineering, University of Incheon, Incheon, Korea

Abstract. The method of odor reduction was investigated in the typical odor generating facilities using the liquid absorbent spraying. And the lab-scale odor reduction analysis were conducted to get accurate effect of reducing major odor-components to explain the odor reduction phenomena. The major scope of industry was the excretion processing of raising livestock which generates odor in the neighborhood of the residential regions. The spraying of liquid absorbents in the fields of livestock facility showed good effects reducing the odor in the suburban regions.

Keywords: reduction, odor, absorbent

1. Introduction

There are many kinds of air pollutants in the ambient air, but the most harmful & annoying pollutants would be odorous pollutants. There are many kinds of odorous pollutants generated in the fields such as industrial, landfill sites and household affairs and as the state of life style is being developed in the metropolitan cities the odor has become most painful air pollution to be managed for better life[1]. And as the population of metropolitan cities increases, the distance between the residential districts and sources for the odorous materials has become small. Many industries such as chemical, food production & livestock excretion can be the origin of odor production and become the source of civil odor appeals. In this study the reduction of odors by using liquid absorbents were investigated & concentration of odors & intensity were monitored to suggest the methods of improvement conditions of odor pollutions.

2. Experimental

Major odor emission sources were investigated in the odor producing sources in our previous study[2]. And our major focusing fields in this study is the livestock excretion facilities near the cities causing many civil appeals of odor & major odor reducing methods were the spraying liquid absorbents. In this study, the odor intensities were measured using odor diluting ratio methods & odor components were analyzed with instrumental analysis The standard analysis methods of odor components were illustrated in Table 1 as follows[3].

Table 1: Standard instrumental methods of major odor components

Species	Name of compound	Method
Ammonia	Ammonia	UV-SpectroPhotometry
Sulfur compounds	Hydrogen Sulfides Methyl mercaptan Dimethyl sulfides Dimethyl disulfides	GC/FPD

Carbonyl compound	Acetaldehydes Propionaldehydes Butyraldehydes n-valeraldehydes iso-valeraldehydes	HPLC/UV
Amines	Trimethyl amines	GC/NPD

3. Results & Discussions

As expressed earlier, there are many kinds of odor-generating facilities which can be the main sources of many civil appeals. From our study as explained above, odor concentration of livestock excretion facilities with the spraying of liquid absorbent before and after in the fields were measured and expressed in the Fig.1. In most places the removal of odors were very effective and especially in the site-3 showed the highest removal efficiency with the spraying of absorbents which are produced in the form of odor reducing agents.

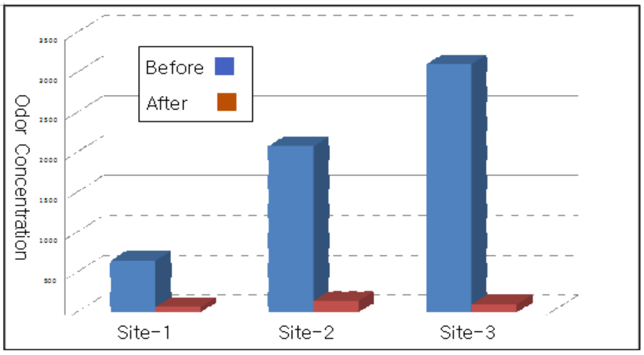

Fig. 1: Effect of spraying liqiuid absorbents on odor con-centration in livestock facilities.

To estimate the odor removal efficiencies of liquid absorbents, the concentration of inlet concentration & the outlet concentration of standard odor gases with the addition of liquid absorbent. Ammonia was estimated to have the removal efficiency of low, medium and high concentration ranges in the order of their ranges, but the characteristics of removal was comparatively not good compared to other components.

Removal effciency of TMA (Tri Methyl Amine) with the liquid spraying was estimated as higher in the case of low concentration, medium & high concentration. And sulfur compounds was nearly the same as TMA. In our experiment, the odor generating components are separated with the combination of liquid absorbents[4].

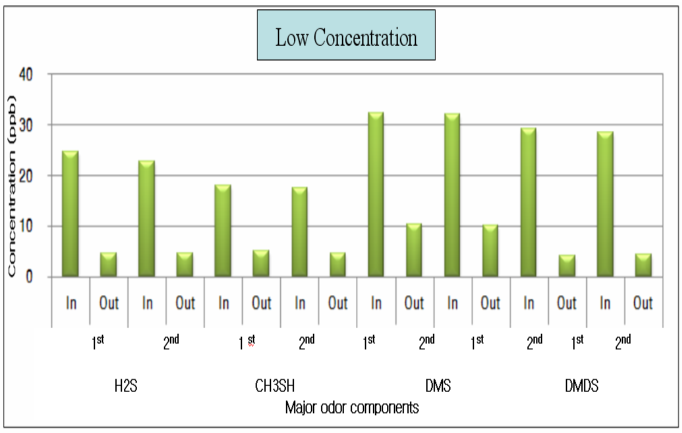

Fig. 2. Tendency of odor removal with liquid spraying in low concentration

Odors are emitted in every diffusive sources including emission stacks such as warehouse windows, open storage yards including stacks. Therefore, the odor-control technology should be covered over-all odor sources including boundary regions. This characteristics are uniquely different from the general air pollution control. The methods of spraying liquid deodorants we have selected have proved that this methods are efficient in odor control technology.

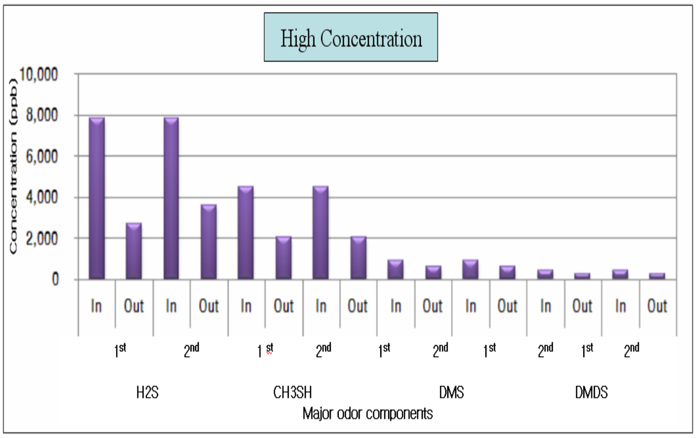

Fig .3. Tendency of odor removal with liquid spraying in high con-centration

Removal effciency of TMA with the liquid spraying was estimated as higher in the case of low concentration, medium & high concentration. And sulfur compounds was nearly the same as TMA. Odor component regulation should be kept in terms of odor emission stacks & the boundary line conditions. In our experiment ammonia and i-valer aldehydes concentration has exceeded before spraying liquid absorbents & only the concentration of ammonia was exceeded slightly after spraying the absorbents. The most effective odor component removed by our liquid absorbents were sulfur compounds, especially hydrogen sulfides & dimethyl sulfides showed the best conditions.

4. Conclusions

Civil appeals of odor are closely related to the effective management of air quality in terms of control policy with the odor sources. In this study the spraying method of liquid absorbents on the odor sources was investigated which was livestock excretion utilizing facility. From the experiment, odor concentration in view of odor dilution methods was diminished considerably but the odor components were not removed completely. Therefore the more study will be continued in view of the most efficient control of odor components which are related.

5. Acknowledgement

The author thanks the University of Incheon for supporting this research.

6. References

[1] C-J, Park, The Study on the Management Method of the Odor Controlled Regions for the Industrial Complex in Incheon Area, Korean J. of Odor Research and Engineering, 2009, 2(8): 71-77.

[2] C-J, Park, The Study on the odor emission sources & the state of air pollution in Incheon area (I), ICEAE, 2010.

[3] J.H. Song & S.O. Baek, Theory and application of odor analysis, SinKwang Publishing Co.

[4] Kirk & Othmer, Seperation Technology, 2nd ed., John Wiley & Sons, 2008.