PB11) Evaluation of Odor Emission from Ocheun Fishery Industrial Complex

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1. Introduction

In recent years, a large-scale of food industries have increased such as fishery and these operations usually generate numerous types of odors. Residents around these industries complain for odor nuisance whenever odor leaks to the outside. In case of Ocheun Fishery Industrial Complex, Korea, unpleasant odors from these plants are the major cause of complaints from the public which appeared 2 times in 2005. These composition and concentration of emission odor are different in each type of business. For fishery, the main odor compounds are microbial spoilage odors such as TMA(trimethylamine) and ammonia. In this study, we investigated the odor composition in the boundary and complaints sites of Ocheun Fishery Industrial Complex and confirmed the major cause of complaints from the public.

2. Materials and Methods

In this study, samples are collected from 6 boundary sites(O-1 to O-6) and 2 complaints sites (O-7, O-8), the sampling has been continued from May to November, twice in each season, a total of six times, and all of the data appeared from the study are the average results during this period. Sample items are the total of 22 compounds which will be designated as odor compounds by Korean Ministry of Environment until 2010. We use the Tedlar sample bags and Tenax-TA columns for gathering the sulfur compounds and aromatic compounds, respectively, the other samples such as aldehydes, ammonia, patty acids and trimethylamine are collected by the methods of solution absorption, 2,4-DNPH cartridge and impregnated filter with KOH or H_2SO_4. The specific location of sampling sites are shown in Fig. 1.

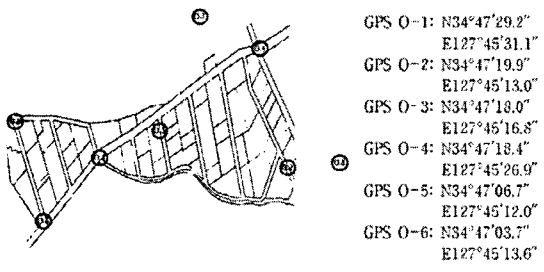

Fig. 1. The specific location of sampling sites.

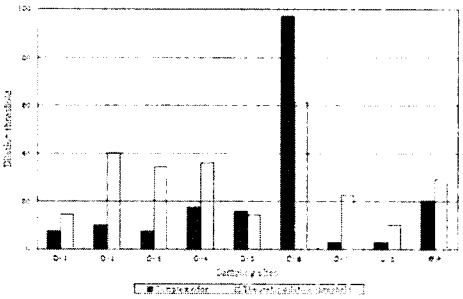

Fig. 2. The complex odor and theoretic dilution threshold at the sampling sites.

3. Results and Discussion

Fig. 2 shows the complex odor and theoretic dilution threshold at the sampling sites. The permission level of complex odor in boundaries of companies is less than 20 degree regulated by Odor Prevention Law. The average results at boundary of Ocheun Fishery Industrial Complex is 26 which is over than the limit of Odor Prevention Law. In case of site O-6, the data is even higher than the standard of 5 times. For the theoretic dilution threshold, the result is similar to the complex odor and the data of site O-6 is the most highest as 61 in all of the sampling sites. Actually, the value of complex odor should be higher than the theoretic dilution threshold at the same site. However, in this study, we only select 22 odor compounds as typical substance. Compared to many odor compounds, there will be deviations of the experimental results.

The odor concentrations and the theoretic dilution threshold in the boundary and complaints sites of Ocheun Fishery Industrial Complex are shown in Fig. 3. From the data we can find that ammonia concentration of 83% is higher than any other odor compounds. In case of the theoretic dilution threshold, the order of the proportion of odor compounds can be described as trimethylamine(60%)>butylaldehyde(10%) and acetaldehyde(10%)>methyl mercaptane(6%)>n-valeric aldehyde (4%)>ammonia(3%). This result just conformed with references that ammonia and TMA are the major odor compounds in fishery. Although many of instrument are use for odor monitoring in the fish industry such as electronic nose, the governments, especially the manager of industrial complex should find more ways to reduce the odor impact on the residents.

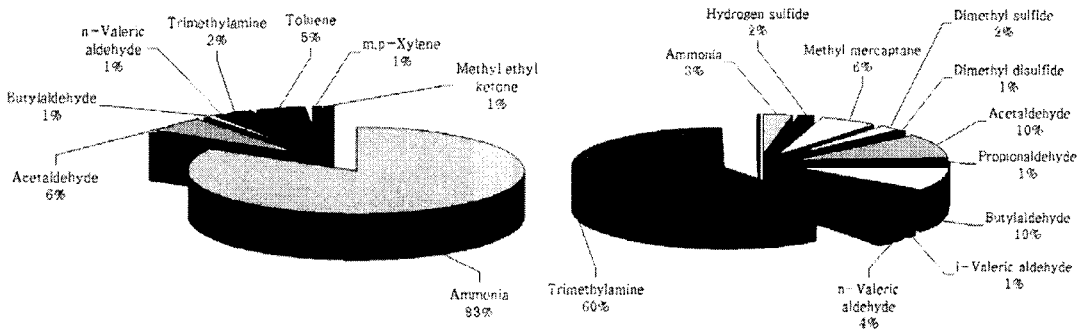

Fig. 3. The odor concentrations and the theoretic dilution threshold at the sampling sites.

Acknowledgement

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