



PolyU Technology & Consultancy

Company Limited

理大科技及顧問有限公司

CONSULTANCY SERVICE

FOR

[SANSON PICO BIOTECHNOLOGY COMPANY LIMITED]

[Testing of Biocatalysts - P13-0361(CEE)]

Prepared by:
[Prof. S.C. Lee]



Signed by:
Date: 12/Sep./2014



1. Introduction

A service was requested by Mr. Andy Chan from Sanson Pico Biotechnology Company Limited on 20 December 2013, to conduct testing on Biocatalysts.

2. Scope of works

- To conduct testing on Biocatalysts provided by Mr. Andy Chan at selected sampling location;
- To collect odour samples at identified sampling sites such as refuse collection point and public toilet;
- To determine the removal efficiency of using that Biocatalysts;
- To analyze the results and prepare a technical report.



3. Methodology

● Odour sampling

Odour gaseous sample is collected by using an odour sampling system, which includes a battery-operated air pump, a sampling vessel, and an odour bag as shown below. During air sampling, an empty sample bag is placed in the vessel, a rigid plastic container, and the container is then evacuated at a controlled rate and the bag is filled with foul gas.

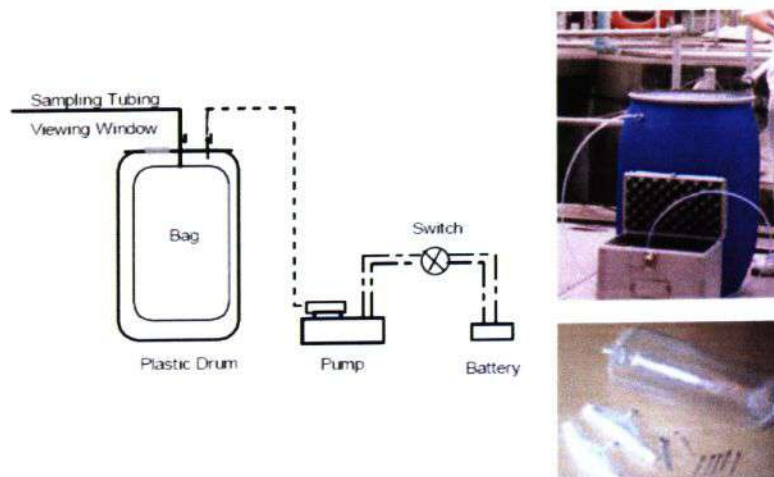


Figure 1 - Sampling equipment of odour sampling

In this technique, all “wetted” parts exposed to the odorous gas are to be composed of stainless steel and Teflon tubing. It is necessary to pre-conditioning the sampling bag, that is the bag is to be partly filled with the odorous sample and then emptied prior to filling the bag for odour testing. The only materials, which the odorous air should contact, are stainless steel, borosilicate glass or one of polytetrafluoroethylenes (PTFE). The sample bags are to be manufactured from PTFE, Tedlar if the bags to be reused or from nalophane NATM if the sample bags are to be discarded after use. About 60 L of foul gas is collected for each sample. About 60 L of foul gas is collected for each sample.

The QA/QC samples will be collected by sucking the ambient air through a portable gas purifier (Drierite 27068) on the site. It could be also collected by using a “hood” method whereby either a dynamic flux hood or a wind tunnel is placed on the odour emission surface of selected locations, and odour-free air either from a gas cylinder or by passing through an activated carbon filter is blown through it.



● **Olfactometry analysis**

The odour concentration of a gaseous sample is determined by presentation to a panel of observers, with known acuity to odour, in varying dilutions. The odour concentration is then expressed in multiples of Odour concentration is determined by a Forced-choice Dynamic Olfactometer (Olfacton-n2) in full accordance with the European Standard Method (EN13725). This European Standard is applicable to the measurement of odour concentration of pure substances, defined mixtures and undefined mixtures of gaseous odorants in air or nitrogen, using dynamic olfactometry with a panel of human assessors being the sensor. The range of measurement including pre-dilution prior to the olfactometry analysis is typically from 10^1 ou/m³ to 10^7 ou/m³. This analysis technique provides directly comparable data for different odour types, and used for input into dispersion models to determine odour impact in terms of annoyance and abatement efficiency assessments.

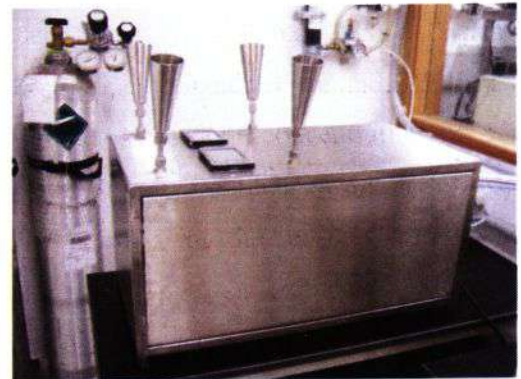
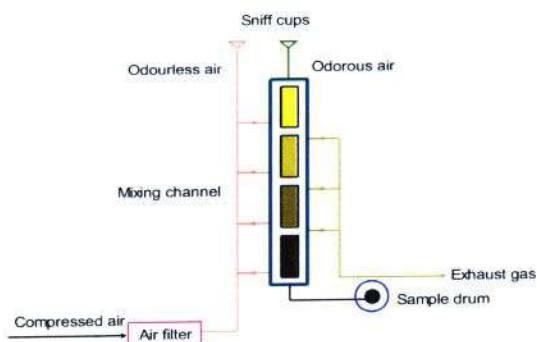


Figure 2 - Olfactometer (Oldacton-n2) at Odour Lab



4. On-site Sampling

- For each sampling site, a baseline sample was collected before the spray of the client's Odour Naturalization Product ("PICO") to the sampling area. After the spray, one consecutive sample was then collected in shortest time possible (normally around 5 to 10 min each). Collected samples are then transported back to the Odour Research Laboratory of The Hong Kong Polytechnic University for analysis. Temperature and Humidity data were also collected on site along with each sample.
- 4 Samples were collected in two different sites selected by the client with relevant description are summarized in Table 1.

Date	Location	Sampling ID	Description
7/7/2014	香港區住宅物地下大垃圾站	1	Before spray
		2	After spray
8/7/2014	九龍區商場公用男洗手間	3	Before spray
		4	After spray

Table 1 - Samples locations with description in two different sites selected by the client



- Some photos about the on-site sampling activities are presented below.

香港區住宅物地下大垃圾站, 7/7/2014



Before spray



After spray

九龍區商場公用男洗手間, 8/7/2014



Before spray



After spray



5. Analytical Results

ID	Type	Sampling Date	Description	Time	Weather Condition	Site Temperature, (°C)	Site Relative Humidity, (%)	OC, (ou/m ³)	Odour Removal Efficiency (%)
1	A	7-7-2014	Before spray	09:28	Rainy	30.2	99.6	949	n/a
2	A	7-7-2014	After spray	09:35	Rainy	31.0	97.5	176	81
3	A	8-7-2014	Before spray	16:00	Sunny	26.5	72.4	88	n/a
4	A	8-7-2014	After spray	16:10	Sunny	26.5	84.4	34	61

Table 2 - summaries of analysed result

Remark: A: Ambient sampling; AT: Air Temperature; RH: Relative Humidity; OC: odour concentration;