



## Italian Society for Applied Microbiology

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### APPLICATION NOTE

### PATHOGENIC FUNGAL MONITORING IN WASTE WATER & SOLID TREATMENT PLANTS AEROSOL

#### INTRODUCTION

The presence of pathogenic – toxigenic fungi like *Aspergillus fumigatus*, *Aspergillus flavus*, *Stachybotrys chartarum* may have potential adverse health effects on the worker of the wastewater and solid treatment plants. There also is the risk for the inhabitant of the surrounding area.

The monitoring of the bio-aerosol can be made using an active microbial air sampler. The liquid samples are then tested by rapid methods like PCR or MVOC.

The collections of microorganisms and virus on culture agar requests a long time of incubation before to highlight their presence. Their collection in liquid gives the possibility to apply the rapid methods (e.g.: PCR) and have the results in minutes or few hours.

The new “TRIO.BAS BIO VIRUS” air sampler has been developed with the purpose to collect pathogens bacteria, fungi, yeast, virus in a liquid for the subsequent rapid analytical steps.

This method is important in the industrial fields (pharma, food, beverage, etc.) to obtain the result in short time for a quick reaction to possible contamination; in the army field to recognize a possible biological attack for an immediate reaction; in the hospital to give the correct pharmacological product to the patients in short time; in the public sector (school, restaurant, bar, underground, train, municipality buildings, etc.) for disease/pandemic surveillance in public and transportation; in disinfection activity (to confirm the efficiency of sanitisation / disinfection after the sanitisation treatment).

The new AIRBIO-VIRUS active microbial air sampler is the new instrument to test the bio-aerosol. The AIRBIO-VIRUS can also be used with the traditional culture Petri dish.



## **SOP – STANDARD OPERATING PROCEDURE**

### **GLOSSARY**

Aerosol, Bio-aerosol, Collection liquid, Fungi, MVOC, Pathogenic, PCR, Treatment plants

### **OBJECTIVE**

Monitoring the presence of pathogenic fungi in the aerosol that is produced by the treatment plant and can be inhaled by the operators / workers / inhabitant of the close environment.

### **RESPONSIBILITY**

Waste Treatment plant Mng

### **BIO-SAFETY**

All the operators must be trained about the bio-aerosol risk and dressed with the correct safety devices according the safety officer instructions.

### **MATERIAL**

- Active Microbial Air Sampler with the connected device to collect micro-organisms in liquid (e.g.: AIRBIO DUO VIRUS).
- Autoclavable container to collect the micro-organisms present in the aerosol.
- Phosphate-buffered saline with 0.005% TritonX100.

### **PROTOCOL**

The container with the sterile phosphate buffered saline is connected to the active air sampler that was programmed to collect 1.000 litres of air (this volume may be reduced if a high concentration of micro-organisms is expected).

The sampler is positioned at least in 3 different parts of the plant, close where the aerosol is produced. The purpose of the 3 tests is to obtain a representative sample.

The container with the liquid (50-100-250 ml) is then unscrew from the sampler and delivered to the analytical laboratory for the real time PCR Test or MVOC Test (Microbial Volatile Organic Compound).

<b>SAMPLING LOCATION</b>		
<b>330 lts/air</b>	<b>330 lts/air</b>	<b>330 lts/a</b>
<b>Total 1.000 lts/air</b>		

**CONCLUSIONS**

The combination of the bioaerosol sampling in liquid and the subsequent application of rapid methods like PCR / MVOC gives the possibility to highlight the presence of pathogenic fungi in short time to apply rapid strategy for the protection of workers and city inhabitants.