

**Biodet**

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Our Ref: GBEDS/16/Q4

Date: 20<sup>th</sup> October 2016

**BIOAEROSOL MONITORING REPORT**

Log No. 1956

**BIOAEROSOL MONITORING REPORT FROM GROWING BEDS, RAVENS DEN**  
Sampling performed 5<sup>th</sup> October 2016

The composing site at **Growing Beds, Ravensden** was visited on 5<sup>th</sup> October 2016.

Sampling for the enumeration of airborne micro-organisms was undertaken by Richard Smith of Biodet following so far as reasonably practicable, the Standardised Protocol for the Monitoring of Bioaerosols at Open Composting Facilities (Association for Organic Recycling (AfOR), 2009).

All sampling was carried out on a normal working day whilst operational activities were taking place, which are detailed in Appendix 1: Site data during sampling. The prevailing weather conditions (wind direction, wind speed, temperature and humidity) were recorded at the time of sampling.

On-site activity (turning, screening etc.) was recorded.

**Sampling Points**

Sampling points were chosen to correspond with the criteria of the AfOR Protocol (see page 3: Plan of Site, for further details on the positions):

1. Upwind of the composting activities at approximately 39 metres from the operational boundary, north-east (56° from north) of the centre of the site operations.
2. Downwind of composting activities at approximately 291 metres from the operational boundary, south-west (236° from north) of the site operations.

3. Nearest Receptor\* at approximately 287 metres from the operational boundary, south-south-west (190° from north) of the shredding operation.

\* *A sensitive receptor is defined as 'any building, structure or installation in which at least one person normally lives or works, other than a building, structure or installation within the same ownership or control as the operator / owner of the composting facility.'* - Standardised Protocol for the Sampling and Enumeration of Airborne Microorganisms at Composting Facilities: [The Composting Association]

In the case of Growing Beds, the nearest sensitive receptor was determined to be the cottages and farm to the south-west of the site.

The sample points are indicated on the site map (page 3).

Samples were taken at a height of 1.5 metre, using SKC IOM bioaerosol sampling heads at 2.0 litres per minute.

The recovered membranes were tested for mesophilic bacteria and for *Aspergillus fumigatus*. Nutrient agar (NA) was used to culture mesophilic bacteria and the plates were incubated for 2 days at 37 C.

Malt extract agar (MEA) was used to culture *Aspergillus fumigatus* and the plates were incubated for 2 days at 41 C.

Tests were performed in triplicate at each sampling point.

Identification of *Aspergillus fumigatus* was performed by microscopy.

## Results:

Site	Growing Beds, Ravensden
Date of visit:	5 <sup>th</sup> October 2016
Operator:	R. Smith
Wind Direction:	North-easterly
Wind Speed:	7-12 mph
Operation:	Shredding & material movement

## Weather:

- Dry and mild.
- Temperature ranged from 14.5 C to 18.8 C, the average was 16.9 C.
- Relative humidity ranged from 40.3% to 51.6%, the average was 44.4%.
- Wind speed ranged from 7 mph to 12 mph, the average was 9.5 mph.
- Wind direction was on average from the west (56° from north).

**Growing Beds Plan: 5 October 2016**



**Microbiological Results:**

<b>Site: Growing Beds, Ravensden</b> <b>Date: 5 October 2016</b>			<b>Site Operator: Mark Evans</b> <b>Commissioning Lab: Biodet, University of Hertfordshire</b> <b>Materials processed on site: Green waste</b>					
Location	Sample ref no.	Distance from site operation (m)	Sampling times (hh:min:ss)	Sampling volume (litres)	Microbial type	Calculated concentration of airborne micro organisms (CFU/m <sup>3</sup> )	Arithmetic mean of parallel samples (CFU/m <sup>3</sup> )	Comments relating to activities
Upwind	U1	120	12:20-13:05	90	MB	110	74	Shredding & screening
Upwind	U2	120	12:20-13:05	90	MB	<100		
Upwind	U3	120	12:20-13:05	90	MB	110		
Upwind	U1	120	12:20-13:05	90	AF	<100	0	Shredding & screening
Upwind	U2	120	12:20-13:05	90	AF	<100		
Upwind	U3	120	12:20-13:05	90	AF	<100		
Downwind	D1	383	11:30-12:15	90	MB	2330	2037	Shredding & screening
Downwind	D2	383	11:30-12:15	90	MB	1220		
Downwind	D3	383	11:30-12:15	90	MB	2550		

Downwind	D1	383	11:30-12:15	90	AF	<100	0	Shredding & screening
Downwind	D2	383	11:30-12:15	90	AF	<100		
Downwind	D3	383	11:30-12:15	90	AF	<100		
S. receptor	S1	340	11:30-12:15	90	MB	330	259	Shredding & screening
S. receptor	S2	367	11:30-12:15	90	MB	220		
S. receptor	S3	367	11:30-12:15	90	MB	220		
S. receptor	S1	367	11:30-12:15	90	AF	<100	0	Shredding & screening
S. receptor	S2	367	11:30-12:15	90	AF	<100		
S. receptor	S3	367	11:30-12:15	90	AF	<100		

**MB = Mesophilic bacteria, AF = *Aspergillus fumigatus***

**Controls:**

<b>Site: Growing Beds, Ravensden</b> <b>Date: 5 October 2016</b>				<b>Site Operator: Mark Evans</b> <b>Commissioning Lab: Biodet, University of Hertfordshire</b> <b>Materials processed on site: Green waste</b>			
Location	Sample ref no.	Distance from shredding operation (m)	Sampling times (hh:min:ss)	Sampling volume (litres)	Microbial type	Calculated concentration of airborne micro organisms (CFU/membrane)	Comments relating to activities
Control 1	C1	n/a	n/a	n/a	MB	<10	Membrane loaded on-site but no air passed through
Control 1	C1	n/a	n/a	n/a	AF	<10	Membrane loaded on-site but no air passed through

**Environmental conditions:**

<b>Site: Growing Beds, Ravensden</b> <b>Date: 5 October 2016</b>		<b>Site Operator: Mark Evans</b> <b>Commissioning Lab: Biodet, University of Hertfordshire</b> <b>Materials processed on site: Green waste</b>	
<b>Time</b>	<b>Temperature C</b>	<b>Relative humidity %</b>	<b>Wind speed mph</b>
11:30	18.0	42.2	7-12
11:35	17.8	41.4	7-12
11:40	18.2	42.2	7-12
11:45	17.2	42.5	7-12
11:50	17.2	44.7	7-12
11:55	17.9	42.6	7-12
12:00	18.1	41.0	7-12
12:05	18.6	40.5	7-12
12:10	18.8	40.3	7-12
12:15	18.4	40.3	7-12
12:20	17.9	41.5	7-12
12:25	17.4	40.9	7-12
12:30	16.3	42.8	7-12
12:35	15.1	48.2	7-12
12:40	14.8	49.5	7-12
12:45	14.5	49.2	7-12
12:50	14.9	51.1	7-12
12:55	14.8	51.6	7-12
13:00	15.0	51.1	7-12

**Comments:**

Bacteria and fungi occur naturally and are commonly present in the air. Concentrations are highly variable, but background levels of micro-organisms do not normally exceed 1000 cfu/m<sup>3</sup> (colony forming units per cubic metre). Environment Agency guidance levels of 1000 cfu/m<sup>3</sup> for bacteria and 500 cfu/m<sup>3</sup> for fungi have been used within this report, when assessing the concentrations of bioaerosols.

**Upwind position**

*A. fumigatus* spp was not detected at the upwind position. Mesophilic bacteria were isolated in satisfactory numbers from the upwind position during the sampling period (74 cfu/m<sup>3</sup>); and concentrations were therefore below the 1000 cfu/m<sup>3</sup> EA reference level.

**Downwind**

*A. fumigatus* spp was not detected at the downwind position. Mesophilic bacteria were isolated in high numbers from the downwind position (2037 cfu/m<sup>3</sup>) and were above the 1,000 cfu/m<sup>3</sup> EA reference level. This result may be attributable to the windy conditions across the ploughed field downwind of the site.

**Nearest Receptor**

*A. fumigatus* spp was not detected at the sensitive receptor position. Mesophilic bacteria results were low at the nearest receptor position (259 cfu/m<sup>3</sup>) and were therefore below the 1,000 cfu/m<sup>3</sup> EA reference level.



20<sup>th</sup> October 2016

R. SMITH

DATE

DIRECTOR OF BIODET