

Biodet

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Our Ref: GBEDS/14/Q3

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BIOAEROSOL MONITORING REPORT

Log No. 1624

BIOAEROSOL MONITORING REPORT FROM GROWING BEDS, RAVENS DEN
Sampling performed 21 Aug 2014

The composing site at **Growing Beds, Ravensden** was visited on 21 August 2014.

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 50 metres from the operational boundary, south-south-west (212° from north) of the centre of the site operations.
2. Downwind of composting activities at approximately 290 metres from the operational boundary, north-north-east (32° from north) of the site operations.

3. Nearest Receptor* at approximately 300 metres from the operational boundary, south-south-west (193° from north) of the screening 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 7 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:	21-Aug-2014
Operator:	R. Smith
Wind Direction:	South-south-westerly
Wind Speed:	13-18 mph
Operation:	Shredding, screening & site operations

Weather:

- Dry and sunny.
- Temperature ranged from 18.4 C to 21.4 C, the average was 19.1°C.
- Relative humidity ranged from 34.7 % to 55.2 %, the average was 45.9%.
- Wind speed ranged from 13 m/s to 18 m/s, the average was 15.5 m/s.
- Wind direction was on average from the south-south-west (212° from north).

Growing Beds Plan: 21 August 2014



Microbiological Results:

Site: Growing Beds, Ravensden Date: 21 Aug 2014			Site Operator: Mark Evans Commissioning Lab: Biodet, University of Hertfordshire Materials processed on site: Green waste					
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 ³)	Arithmetic mean of parallel samples (CFU/m ³)	Comments relating to activities
Upwind	U1	170	11:00-11:45	90	MB	1000	2666	Screening, shredding & site operations.
Upwind	U2	170	11:00-11:45	90	MB	2330		
Upwind	U3	170	11:00-11:45	90	MB	4670		
Upwind	U1	170	11:00-11:45	90	AF	<200	0	Screening, shredding & site operations.
Upwind	U2	170	11:00-11:45	90	AF	<200		
Upwind	U3	170	11:00-11:45	90	AF	<200		
Downwind	D1	290	11:50-12:35	90	MB	170	389	Screening, shredding & site operations.
Downwind	D2	290	11:50-12:35	90	MB	830		
Downwind	D3	290	11:50-12:35	90	MB	170		

Downwind	D1	290	11:50-12:35	90	AF	<200	0	Screening, shredding & site operations.
Downwind	D2	290	11:50-12:35	90	AF	<200		
Downwind	D3	290	11:50-12:35	90	AF	<200		
S. receptor	S1	390	12:45-13:30	90	MB	2170	1444	Screening, shredding & site operations.
S. receptor	S2	390	12:45-13:30	90	MB	1170		
S. receptor	S3	390	12:45-13:30	90	MB	1000		
S. receptor	S1	390	12:45-13:30	90	AF	<200	0	Screening, shredding & site operations.
S. receptor	S2	390	12:45-13:30	90	AF	<200		
S. receptor	S3	390	12:45-13:30	90	AF	<200		

MB = Mesophilic bacteria, AF = *Aspergillus fumigatus*

Controls:

Site: Growing Beds, Ravensden Date: 21 Aug 2014				Site Operator: Mark Evans Commissioning Lab: Biodet, University of Hertfordshire Materials processed on site: Green waste			
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	<15	Membrane loaded on-site but no air passed through
Control 1	C1	n/a	n/a	n/a	AF	<15	Membrane loaded on-site but no air passed through

Environmental conditions:

Site: Growing Beds, Ravensden		Site Operator: Mark Evans	
Date: 21 Aug 2014		Commissioning Lab: Biodet, University of Hertfordshire	
Materials processed on site: Green waste			
Time	Temperature C	Relative humidity %	Wind speed mph
11:00	20.8	34.7	13-18
11:05	20.4	35.9	13-18
11:10	19.4	35.3	13-18
11:15	19.2	38.0	13-18
11:20	19.8	37.9	13-18
11:25	18.7	38.2	13-18
11:30	18.4	38.7	13-18
11:35	18.6	40.8	13-18
11:40	19.0	40.2	13-18
11:45	18.5	41.6	13-18
11:50	18.1	42.0	13-18
11:55	19.2	39.7	13-18
12:15	18.7	40.3	13-18
12:20	19.6	45.5	13-18
12:25	20.1	49.9	13-18
12:30	20.4	47.7	13-18
12:35	19.3	55.2	13-18
12:40	20.5	56.9	13-18
12:45	21.4	43.7	13-18
12:50	20.6	46.5	13-18
12:55	18.4	47.2	13-18
13:00	18.9	47.4	13-18
13:05	18.4	51.2	13-18
13:10	18.1	53.7	13-18

13:15	18.4	51.3	13-18
13:20	18.2	53.3	13-18
13:25	18.0	55.6	13-18
13:30	18.5	51.1	13-18
13:35	18.3	53.1	13-18
13:40	18.6	53.0	13-18
13:45	18.5	56.4	13-18

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/m³ (colony forming units per cubic metre).

Environment Agency guidance levels of 1000 cfu/m³ for bacteria and 500 cfu/m³ for fungi have been used within this report, when assessing the concentrations of bioaerosols.

Upwind position

A. fumigatus spp were not detected at the upwind position.

Mesophilic bacteria were isolated in elevated numbers from the upwind position during the sampling period (2670 cfu/m³); and concentrations were therefore above the 1000 cfu/m³ EA reference level. Results may well have been influenced by the movement of harvesting vehicles in the field (photograph appended).

Downwind

A. fumigatus spp were not detected at the downwind position.

Mesophilic bacteria were isolated from the downwind position (389 cfu/m³) and results are low in comparison to levels measured at the upwind sampling position. Concentrations were also below the 1,000 cfu/m³ EA reference level.

Nearest Receptor

A. fumigatus spp were not detected at the sensitive receptor position.

Mesophilic bacteria results were elevated at the nearest receptor position (1444 cfu/m³) and were above the 1,000 cfu/m³ EA reference level. These results are also likely to have been impacted by traffic movements and the adjacent farm operations.



29th August 2014

R. SMITH

DATE

DIRECTOR OF BIODET

Plate 1. Dust created by harvesting vehicles close to upwind sampling point

