

Biodet

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Our Ref: GBEDS/15/Q3

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BIOAEROSOL MONITORING REPORT

Log No. 1641

BIOAEROSOL MONITORING REPORT FROM GROWING BEDS, RAVENS DEN
Sampling performed 2nd September 2015

The composing site at **Growing Beds, Ravensden** was visited on 2nd September 2015.

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, west (260° from north) of the centre of the site operations.
2. Downwind of composting activities at approximately 130 metres from the operational boundary, east (80° from north) of the site operations.

3. Nearest Receptor* at approximately 280 metres from the operational boundary, south-south-west (193° 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 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.

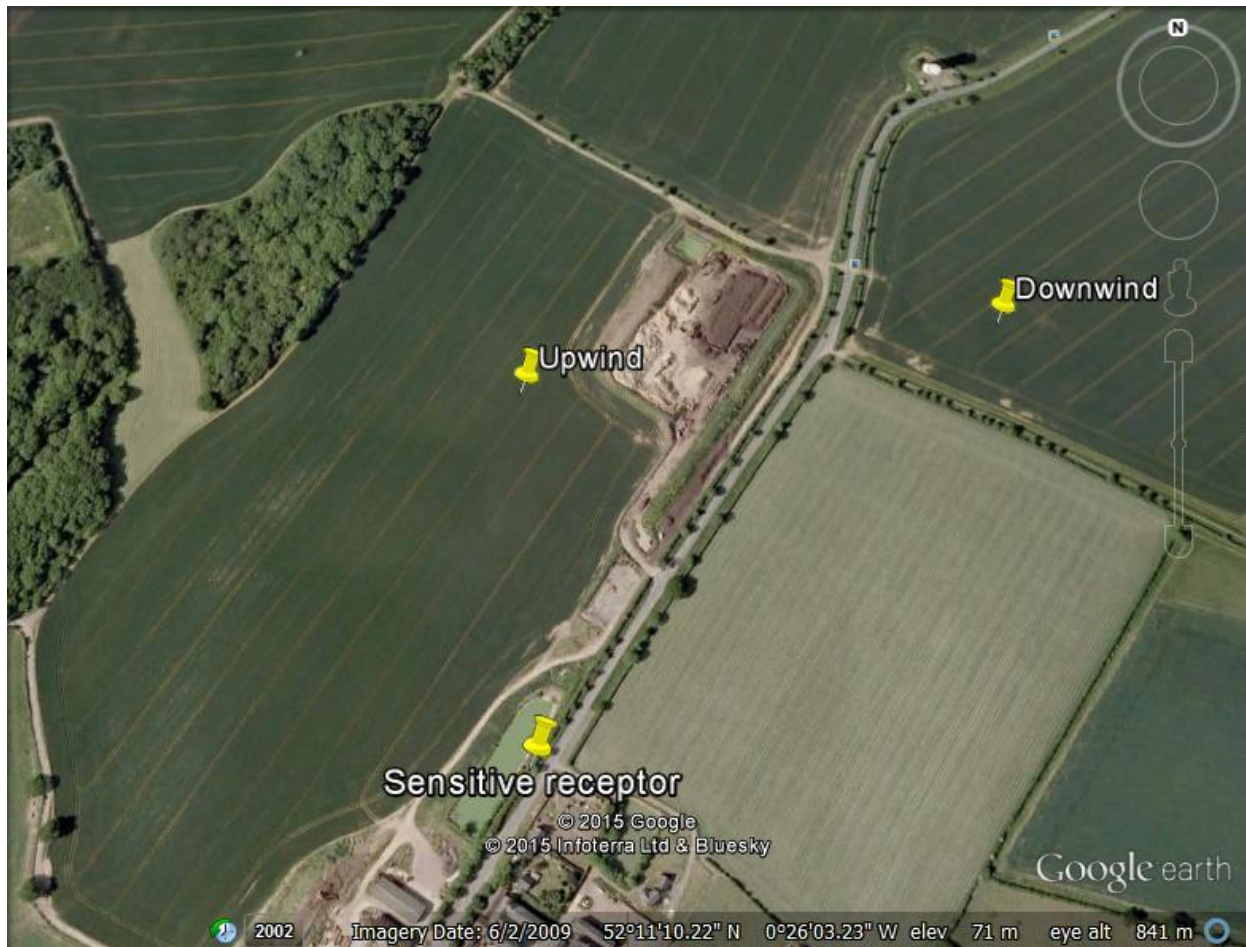
Results:

Site	Growing Beds, Ravensden
Date of visit:	2-September-2015
Operator:	R. Smith
Wind Direction:	Westerly
Wind Speed:	3-5 mph
Operation:	Shredding & material movement

Weather:

- Dry and warm.
- Temperature ranged from 15.9 C to 20 C, the average was 17.6 C.
- Relative humidity ranged from 62.7 % to 74.6%, the average was 68.5%.
- Wind speed ranged from 3 mph to 5 mph, the average was 4 mph.
- Wind direction was on average from the west (260° from north).

Growing Beds Plan: 2 September 2015



Microbiological Results:

Site: Growing Beds, Ravensden Date: 2 September 2015			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	135	10:45-11:30	90	MB	670	667	Shredding & material movement.
Upwind	U2	135	10:45-11:30	90	MB	670		
Upwind	U3	135	10:45-11:30	90	MB	670		
Upwind	U1	135	10:45-11:30	90	AF	170	56	Shredding & material movement.
Upwind	U2	135	10:45-11:30	90	AF	<200		
Upwind	U3	135	10:45-11:30	90	AF	<200		
Downwind	D1	186	11:35-12:20	90	MB	670	833	Shredding & material movement.
Downwind	D2	186	11:35-12:20	90	MB	1000		
Downwind	D3	186	11:35-12:20	90	MB	830		

Downwind	D1	186	11:35-12:20	90	AF	<200	111	Shredding & material movement.
Downwind	D2	186	11:35-12:20	90	AF	170		
Downwind	D3	186	11:35-12:20	90	AF	170		
S. receptor	S1	340	10:45-11:30	90	MB	330	555	Shredding & material movement.
S. receptor	S2	340	10:45-11:30	90	MB	830		
S. receptor	S3	340	10:45-11:30	90	MB	500		
S. receptor	S1	340	10:45-11:30	90	AF	<200	111	Shredding & material movement.
S. receptor	S2	340	10:45-11:30	90	AF	330		
S. receptor	S3	340	10:45-11:30	90	AF	<200		

MB = Mesophilic bacteria, AF = *Aspergillus fumigatus*

Controls:

Site: Growing Beds, Ravensden Date: 2 September 2015				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: 2 September 2015		Commissioning Lab: Biodet, University of Hertfordshire	
Materials processed on site: Green waste			
Time	Temperature C	Relative humidity %	Wind speed mph
10:45	17.9	63.7	3-5
10:50	17.7	67.9	3-5
10:55	17.0	69.3	3-5
11:00	16.9	68.0	3-5
11:05	15.9	71.9	3-5
11:10	16.2	74.6	3-5
11:15	16.6	73.7	3-5
11:20	16.9	72.4	3-5
11:25	17.3	74.6	3-5
11:30	17.2	71.0	3-5
11:35	18.0	69.4	3-5
11:40	17.5	67.2	3-5
11:45	17.5	72.3	3-5
11:50	18.3	63.3	3-5
11:55	19.6	62.7	3-5
12:00	20.0	63.0	3-5
12:05	18.7	65.2	3-5
12:10	17.6	65.6	3-5
12:15	18.0	66.3	3-5

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 was detected in low numbers at the upwind position.

Mesophilic bacteria were isolated in satisfactory numbers from the upwind position during the sampling period (667 cfu/m³); and concentrations were therefore below the 1000 cfu/m³ EA reference level.

Downwind

A. fumigatus spp was detected in low numbers at the downwind position.

Mesophilic bacteria were isolated in low numbers from the downwind position (833 cfu/m³) and were below the 1,000 cfu/m³ EA reference level.

Nearest Receptor

A. fumigatus spp was also detected in low numbers at the sensitive receptor position.

Mesophilic bacteria results were low at the nearest receptor position (555 cfu/m³) and were therefore below the 1,000 cfu/m³ EA reference level.



R. SMITH

DIRECTOR OF BIODET

10 September 2015

DATE