GLP STANDARD OPERATING PROCEDURE

User Ref:	**Title** Composting of Plant Material infected with *Phytophthora* species, including *P. ramorum* and *P. kernoviae*	
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INTRODUCTION

The aim is to develop a facility and system of composting plant material that will achieve sufficiently high and uniform temperatures to control *Phytophthora* species in pathogen- infected plant wastes, and to produce compost in accordance with the Environment Agency Quality Protocol for Compost. Of particular importance is *Phytophthora ramorum* and *P. kernoviae* in infected waste of *Rhododendron ponticum* and other species of shrubs. A composting temperature of 45˚C for at least 5 days or 35˚C for at least 10 days, on 4 occasions with a moisture content of ca. 55% w/w at the start of each period of heating, is required for sanitisation of infected material. Wastes need to achieve these time/temperature and moisture requirements throughout the entire mass before they can be safely disposed of as mulch material.

SAFETY

Animal manures and plant waste/animal manure blends should be handled with protective gloves. Normal protective equipment (safety visor or goggles, gloves, boots) should be worn during shredding of plant wastes and filling of the composting bays.

MATERIALS

Composting Facility

The composting facility consists of two or more adjacent bays, each constructed of breeze blocks or wooden panels on three sides mounted on a concrete base. Each bay should measure 2 to 3 m × 2 to 3 m with a fill height of 1.5 to 2.5 m. The open front end is closed with horizontal wooden planks which slide into vertical grooves mounted on the open ends of the side walls. The walls of the bay are lined with a double layer of waste wool/Hessian carpet. After filling, the bays are covered with a double layer of thick polythene or plastic tarpaulin with a double layer of waste carpet in between.

PROCEDURE

(a) Rhododendron and other woody plant wastes (stems, roots and leaves) are shredded to pieces with a length of about 5 cm. Large batches of shredded waste should be prepared and

stored dry before composting (i.e. covered with a tarpaulin sheet), rather than filling the bays with small quantities of waste over several weeks.

(b) Shredded woody wastes are mixed with an organic nitrogen source (10% by volume horse manure or cow manure or 5% by volume of dry poultry broiler manure) which acts as a compost activator. The manure should be brought on site as required to avoid storage. If there is sufficient leaf material in the waste, addition of other activator materials may not be required. However, if the blended materials are too dry (50% w/w or less moisture), the moisture content should be increased to about 55% w/w by addition of water or other wet plant wastes (leaf waste, lawn clippings, vegetable waste). Moisture content should be measured at the start of the composting process and at the beginning of each subsequent heating cycle (see (d)) using a moisture meter.

(c) The blended materials are filled into a bay to a height of at least 1.5 m. The surface of the materials is covered with a double layer of thick polythene or plastic tarpaulin with a double layer of wool/Hessian carpet in between.

(d) Compost temperatures should be monitored at a depth of 20 cm (in the centre of the bay, 10 cm from the side walls, and 10cm from the corners) with a data logger, at least every two days. As soon as the material being composted reaches a temperature of at least 45˚C for 5 days or 35˚C for 10 days, the material can be removed and used to fill a second insulated bay. This transfer (=turning) should not be delayed beyond 14 days after filling, otherwise the waste will continue to lose its re-heating potential.

(e) The procedure in (d) is repeated three times so there are four heating phases of the composting process. The material in the upper and lower corners of the bay should be emptied into a bulk bin and refilled into the centre of the next bay at the start of each heating process (d).

(f) Additional organic manure (up to 50% of the quantities stated in b) and/or water (to achieve 55% w/w compost moisture) may be added at the start of each turning of the material. Fresh plant wastes should not be added to the material being composted, unless the entire procedure is to be repeated, as in (g) below.

(g) If sufficiently high composting temperatures are not achieved 10 cm from the side walls (45˚C for at least 5 days or 35˚C for at least 10 days), the material should be blended with the next batch of waste and the composting procedure will have to be started again.

(h) After composting, the material should either be disposed of immediately as a mulch within the boundary of the site or kept under a tarpaulin onsite until used.

Record keeping

Records should be kept of:

1. Start date of composting process, dates of turning (transferring) batches, and position of composting batches within bays.
2. Volumes of waste ingredients used in each batch, and whether water was added.
3. Temperatures and location measured (centre, side, corner) in the material being composted as well as the moisture content.

Pass/fail criteria

The compost will be safe for disposal as a mulch if:

1. Sufficient composting temperatures/times measured 10 cm from the side wall of the bay are achieved during each of the four heating phases (45˚C for 5 days or 35˚C for 10 days) as well as ca. 55% w/w moisture content at the start of each heating phase.

And

2. There is no green leaf material at the end of composting.

If these criteria are not met, the waste material must either be re-composted with the next batch of waste as described in section (g) of the above procedure, or disposed of by deep burial.

DISTRIBUTION

DOCUMENTS REFERRED TO

Environment Agency Quality Protocol for Compost (2009)
http://www.ea-transactions.com/static/documents/Business/Quality_protocol_for_compost.pdf

FORMS REFERRED TO