HL0172: Producing high quality horticultural growing media through the retention of plant structure in composted food-processing waste

Abstract

The aim of this proposal is to assess the feasibility of producing high-quality horticultural growing media from the controlled composting of traceable, sustainable and locally-produced plant-based food processing waste. This will involve replicating plant-structure-dependent physicochemical characteristics found in high-quality growing media. The research will translate into the development of improved composting technologies for growing media production via a Core Research LINK project.

The requirement for horticultural growing media has increased rapidly since the 1950's as a result of the growth of the Professional Growers industry including nursery stock, pot plants/herbs, bedding plants etc., and amateur gardening. Sphagnum peat has been used as the main constituent of growing media, and the demand has been met principally by UK peat sources, but also by increased import (30%). UK professional growers utilise approximately 1.2m^3 peat annually. Sphagnum peat satisfies a range of generic grower requirements. These include air porosity (10% at 1kPa), water holding capacity (WHC; 30%-65%), low nutrient and nitrogen status (that can be regulated), good rehydration and drainage characteristics and structural stability. All of these underpin modern water and nutrient management practices.

The current supply of peat is under threat as a result of various EU directives, particularly the Wetland Habitats Directive. In addition, targets to reduce biowaste (e.g. landfill directive) has encouraged National Government to set aspirational targets for reducing peat use in Horticulture (40% reduction by 2005; 90% by 2010), the hope being that the reduction will be addressed by the use of the composted materials.

Objectives

1. Examine and define the molecular and structural basis for the key physicochemical characteristics of peat-based growing media; (assessment of peat structure at different length scales, molecular through to cellular and tissue);
2. Elucidate the microbial and biochemical nature, and changes in structure of a range of defined plant materials during closely-monitored composting with particular reference to properties identified in (1) and horticultural suitability; this will involve close collaboration with compost producers, major growers, representative bodies and food processors.
3. Exploit data from 1&2 to identify criteria for monitoring, controlling and enhancing growing-media quali***y*** from composted food process waste with a view to commercial application and dissemination via a Core Research LINK project