New Project Summary Report for M 056: Understanding Mushroom Nutrition

Project Number	44056000
Title	Understanding Mushroom Nutrition: project aimed at improving yield, substrate efficiency and utilisation and flavour
Short Title	M 056
Lead Contractor	East Malling Research
Other Contractors	Campden BRI
Start & End Dates	31 August 2012 - 30 August 2015
Industry Representative	Dr Jude Wilson (Monaghan Mushrooms) and Mark Irwin (Greeba Farm Ltd)
Project Budget	£94,994
AHDB Contribution	£64,994

Aims and Objectives

Project summary

The current use of supplements in phase 3 compost in the UK and other mushroom industries will be established. The effects of supplementing different phase 3 composts with different types of commercial supplements on crop yield, flushing pattern and quality (including a taste panel evaluation) will be determined. This project will develop our understanding on mushroom nutrition using the mushroom to report on its own biology in response to different supplements by employing microarray technology. The project will provide knowledge of how supplements can stimulate higher yields and how further improvements can made.

Benefits to industry

The potential benefits to the industry of the proposed work are:

- Increased general production yields from substrates

- Improved quality (whiteness, and firmness) and increased production yield over consecutive flushes, potentially reducing waste generation.

- Generate opportunities in: Efficiency in substrate use, Supplement formulation and composting, New directions for biomarkers for compost quality, Factors determining mushroom flavour

The mushroom industry will be benefit from this work as nutrition from compost is a key factor for the industry. At the state of the art, there is a clear knowledge gap on optimal nutritional conditions for the cultivation of the mushroom. There is a lack of knowledge on how supplements might work, and a deficit on relevant and precise tests for assessing the quality of compost for mushroom cultivation.

Project aims

(a) To improve the reliability of the beneficial effects of different compost supplement(s) on mushroom yield, flushing pattern and quality

(b) To assess whether compost supplementation can improve mushroom flavour

(c) To gain an understanding of how supplements benefit nutrition and identify opportunities from this work

Project objectives

01. To review the usage of supplements in phase 3 compost within the UK and other mushroom industries

02. Supplements on cropping performance
    a. Establish the yield, flushing pattern and quality effects of supplementing phase 3 composts with different types of commercial supplement
    b. Determine the effect supplementation on the cropping performance of different phase 3 composts
    c. Compare cropping performance with analysis of compost (pre-supplementation)

03. Determine how nutrient supplements give benefit to yield, growth and quality using gene expression technology which is a good proxy for enzyme level, and so enables a complete understanding of the biology of the mycelium
    a. Sample compost with mycelium from the trays of Objective 02 and freeze
    b. Conduct gene expression studies on compost samples showing significant differences in yield, size or grade
        i. Extraction of RNA from compost
        ii. Microarray experiments
        iii. Data analysis
        iv. Identify gene changes and link with supplements use
        v. Develop opportunities from new information e.g. new compost/ supplement formulations, improved knowledge of mushroom nutrition and quality that could lead to improved indicators for compost quality