



Agriculture & Horticulture  
DEVELOPMENT BOARD



# Grower Summary

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## **FV 395**

Strategies for broccoli management to  
improve quality and extend storage life

Annual 2012

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Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

## **Further information**

If you would like a copy of the full report, please email the HDC office ([hdc@hdc.ahdb.org.uk](mailto:hdc@hdc.ahdb.org.uk)), quoting your HDC number, alternatively contact the HDC at the address below.

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HDC is a division of the Agriculture and Horticulture Development Board.

**Project Number:** FV 395

**Project Title:** Strategies for broccoli management to improve quality and extend storage life

**Project Leader:** Dr Richard J Colgan

**Contractor:** University of Greenwich

**Industry Representative:** Gavin Willerton, Marshalls

**Report:** Annual, Year 1

**Publication Date:** 12/06/2012

**Previous report/(s):** None

**Start Date:** 1<sup>st</sup> April 2011

**End Date:** 31<sup>st</sup> March 2014

**Project Cost:** £95,274

## **Headline**

This project is helping to reduce waste and crop losses by developing strategies to improve quality and storage life of broccoli.

## **Background and expected deliverables**

The aim of this project is to define strategies for pre and post-harvest management of broccoli to improve quality and extend storage life. The outputs of the project will enable the industry to reduce waste and crop losses both in the field and post-harvest. The strategies tested include technologies to reduce the concentrations of ethylene in packhouses and store rooms, the use of the ethylene antagonist SmartFresh™ (1-MCP) and the use of pre-harvest chemical treatments to manipulate ethylene production and response by broccoli heads. In addition the project is investigating the use of chlorophyll fluorescence to assess maturity and shelf-life of broccoli at harvest and thereby to improve the consistency of the harvested crop.

## **Summary of the project and main conclusions**

Background ethylene concentrations were sampled at four broccoli handling facilities. Within store rooms the concentrations ranged from 4 to 400 ppb. Trials to determine the effect of ethylene concentration on broccoli shelf-life indicated that at the higher concentrations this is sufficient to accelerate the rate of broccoli senescence during shelf-life.

The first year of trials indicate that SmartFresh™ can ameliorate the loss of visual quality during shelf life of cv. Ironman; applied as a single dose (625 ppb) at harvest or as a split application (321 ppb) applied at harvest. After 8 days of storage at 1°C (100 % RH) SmartFresh™ reduced loss of green colour during shelf-life (18°C) and improved the visual appearance of florets. The effectiveness of SmartFresh™ in maintaining the harvest quality is dependent on the quality of fresh produce at the point of treatment.

Trials were also carried out to determine the impact of pre-harvest sprays of Permasect C and Amistar used as part of standard crop protection programmes on broccoli quality. Results from trials in year one indicates that in some cases they can have secondary beneficial effects on shelf-life quality of broccoli.

Chlorophyll fluorescence has been used as a tool to study the process of photosynthesis for many decades. Models of the functioning of the photosynthetic system have been used to relate the fluorescence characteristics to specific physiological aspects of chloroplasts. The

characteristic that appeared to be most sensitive to broccoli senescence was RC/CS (reaction centres/cross-section), which relates to the concentration of functional photosynthetic reaction centres. This will be studied in more detail in the second year of the project to see if it can be used as a practical tool to predict broccoli shelf-life.

### **Financial benefits**

No financial benefits have been determined so far

### **Action points for growers**

The use of electric powered fork-lifts may be preferential in confined spaces to prevent the buildup of ethylene that can impact on the shelf-life potential of broccoli