

Full details

All details held on the selected case study are shown below.

Went live on	Title	Reference
8 Apr 2011	Plastic fantastic in RELU drive for clever polytunnels	SID0245

Synopsis

Crops grown under polytunnel plastic are less nutritious due to lack of UV light. A project led by the University of Reading has been finding out how to use smart plastics to improve light penetration and grow healthier crops.

Description

The RELU project "Implications of a Nutrition Driven Food Policy for the Countryside" has been investigating the potential for enhancing the nutritional content of foods. This work examines the potential developing sustainable food chains capable of delivering healthy foods at prices consumers are willing to pay, and assesses the impact on land use and the rural environment and economy.

One area of investigation has been polytunnels. These are widely used to protect crops, offering many advantages to the grower and consumer, including better and more consistent products, longer growing seasons and lower pesticide use. They are being used increasingly in the UK for an ever-wider variety of salad and soft fruit crops.

However, the film traditionally used in polytunnels generally excludes ultraviolet (UV) light, and there is some concern that this may affect the nutritional qualities and taste of some plants. Scientists think that plants respond to UV light by accumulating flavonoids, because they help to protect plant cells from UV damage. Flavonoids do not only contribute to the taste of food, but have also been found to benefit human health.

Recently growers working with scientists have developed and experimented with novel films that selectively block or transmit light from across the spectrum to enhance not only the quantity but also the quality of crop production. One potentially important development has been novel film that is transparent to UV light, and researchers based at the University of Reading have worked closely with both the chemists who develop these novel films and the commercial growers who are interested in experimenting with their application.

"In the current project we discovered that a red variety of lettuce, grown under commercial conditions, responded dramatically to cultivation under the UV transparent film," says project member Professor Paul Hadley.

"The enhanced levels of UV that the plants experienced during growth caused the leaves to redden, and increased concentrations of the main flavonoids, quercetin and cyanidin, as well as luteolin and phenolic acids. The total phenol content and antioxidant activity doubled for lettuce grown under UV transparent film, compared with that grown under UV block film."

There is increasing evidence that these phytochemicals have health benefits, which could contribute to reducing the risk of chronic diseases such as heart disease, stroke, atherosclerosis and cancer, as well as helping avoid cognitive decline.

The present finding adds another application to those already established for specialised spectral filters in polytunnel films. Other possible applications of spectral filters include reducing pest infestation and controlling plant growth and development.

The research was carried out as part of NERC's Rural Economy and Land Use (RELU) programme.

References and links

Hyperlinks	1. RELU - Research projects
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Impacts

Actual impacts	Industry, Practice
Impact evidence	The present finding adds another application to those already established for specialised spectral filters in polytunnel films. These other applications of spectral filters include reducing pest infestation and controlling plant growth and development.

Research and funding

Funding type	Research Programme
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Classification	
Science themes	Sustainable use of natural resources, Technologies
Policy areas	Agriculture, food and fisheries, Environmental technology, Land use, Health
Keywords	Agriculture, Food, Health