Improving the prospects for mild onion production

Mild onion imports account for 20% of British bulb onion consumption. With no standardisation on flavour and no home produced alternative, it's a £30m market lost to British growers

Problems and opportunities

Despite being climatically towards the northern limits for onion production, the British onion industry is highly organised and has been very successful in meeting the challenge of imports. Over the last ten years, imports have been pegged back from half of total British consumption to around 40%.

This has been achieved through the adoption of higher quality standards and considerable investment in improved technologies for production and storage.

Over the same period, the onion market has become increasingly segmented, with some segments dominated by imports. Half of current onion imports, for example, are designated 'mild' – a total of around 100,000 tonnes imported mainly from Spain and Chile.

It's a segment of the market that British onion producers have found it hard to break into, partly because the designation 'mild' is defined more by the source of the onions than their actual flavour characteristics. Many imported so-called mild onions are not mild at all.

There is a clear need to establish a standard which could be adopted by both the production industry and retailers and which is based on analysis of the relevant flavour components that contribute to pungency.

"This information is vital for the British onion industry to develop standardised flavour as an added value aspect for sales"

Paul Cripsey
F B Parrish & Sons

Research objectives

To provide information and technologies that will underpin the production and marketing of high quality, low pungency onions in Britain. This will be achieved through a combination of:

- The development of a routine and rapid method of profiling the flavour of onions and the components that contribute to pungency.
- The identification of environmental factors that have an impact on pungency, with a particular emphasis on known factors such as soil sulphur and long term storage.
- An assessment of the genetic variability in the flavour

Project participants learn about biochemical techniques on a fact-finding visit to USA

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characteristics of varieties grown in Britain and breeding material being trialled for British conditions.

Research methods

In onions, flavour is dependent on the concentration and type of a limited number of flavour precursors in the bulb. When tissue is cut, the flavour precursors mix with, and are broken down by, the enzyme alliinase releasing the familiar volatiles associated with cut onions. Previous research has shown that a test for the level of pyruvate, which is released during this biochemical process, can provide an indicator of the degree of pungency.

A test for pyruvate has become the standard in the USA, but most onions grown there are classified as sweet, and pungency levels are generally low. As pungency increases, this complicates the chemical reactions and the pyruvate test may be less appropriate as a standard for all types of onion.

University of Liverpool is undertaking biochemical work to define the relationships between flavour precursors, alliinase activity and pungency. High-performance liquid chromatography (HPLC) will be the main laboratory technique used to measure directly the levels of the flavour precursors in onions. These results will be compared with the indirect method using the pyruvate test.

HRI Wellesbourne is responsible for investigating the influence of environmental factors and variety on pungency. In particular, they will be looking at the effect on flavour of soil type and sulphur content, climate, water availability and variety on trial sites around the main onion production areas. Trial sites are provided by the industrial partners in the project.

The Allium and Brassica Centre is looking in detail at the additional factor of storage and the effect this has on flavour. For this work, onions will be drawn from the field trial sites.

Biochemical tests enable flavour characteristics to be identified and classified on a standardised scale

Expected achievements

- A reliable standard scale for the classification of onions according to flavour characteristics based on a routine and rapid test which can replace the variability of taste panel results.
- Information on the performance of existing varieties and new breeding material in relation to environmental factors – the fundamental information necessary to progress British production of mild onions.

Benefits to the industry

- Replacement of an increasing proportion of the current imports of mild onions, valued at £30m, by British production.
- A boost to the sales of British and imported onions because of increased customer confidence in a classification based on sound, reliable principles. Similar benefits were experienced in the USA where fresh onion consumption increased 17% following the promotion and sale of mild sweet onions.

"A robust biochemical method of classifying onion pungency is a real possibility"

Hamish Collin
University of Liverpool

What is HortLink?

LINK is the UK Government's principal mechanism for supporting collaborative research partnership between UK industry and the research base.

The HortLink programme was launched in 1996 and has recently been extended. The aims of the extended programme are:

- To improve the sustainability of the horticultural industry.
- To improve knowledge and understanding of processes and factors which determine the performance of the horticultural industry.
- To enable access by the horticultural industry to innovative ideas and technology by involving a wide range of research institutes and university departments.
- To promote wider awareness of the benefits of advanced horticultural techniques/ methods, especially to SMEs.

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LINK COLLABORATIVE RESEARCH

Project details
UK fundamentals for mild onion production

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