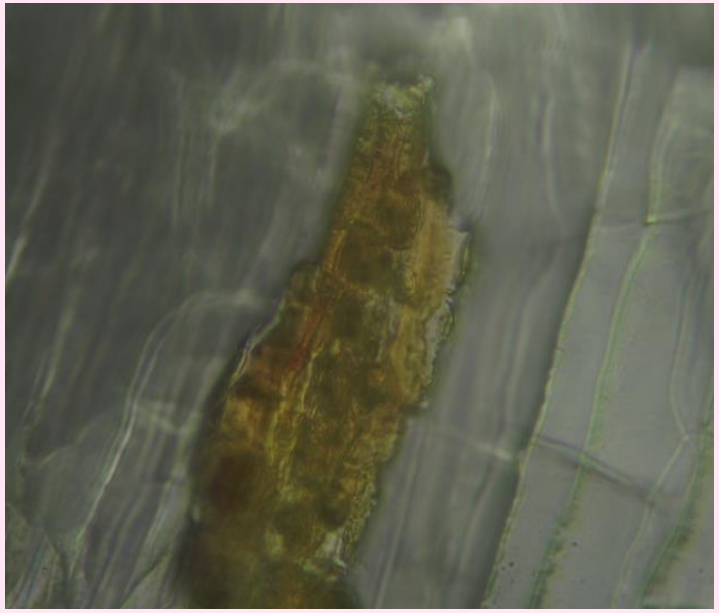
Prepackaged cut salads account for a growing share of how we consume salads. However the added convenience comes with a trade off of shorter shelflife, as the cut edges lead to loss of nutrients, weaken the leaf to infection, and create undesirable colour changes. Iceberg lettuce in particular is limited by conditions of ‘pink rib’ and ‘pinking’ at the cut edge.

This typically occurs before any changes that affect safety, taste or texture, and so is the main limiting factor in how long you can store cut lettuce. This leads to unnecessary waste, which could be stopped if the condition can be halted.

The exact mechanisms have never been proven, but understanding this could lead to waste reducing innovations.

We were able to gather information which indicates that the pink pigment is likely not caffeic acid quinones as has ben the main existing theory.
Evidence suggests a polymerisation product, which is deep red, refracted through translucent cells. Tetra-terpenes are a candidate for this, known for orange-red colours, while terpenoids are abundant in the phloem and latex.



100x microscopy of cut lettuce vein, showing orange/red phloem pigmentation

Evidence from solubility experiments and from broad NMR peaks suggests polymerisation products, rather than o-quinones. HPLC results targeting expected quinones and polyphenols did not show difference between clear and pink samples.

Follow on projects include a short partnership with Agrial supporting an undergraduate project and a PhD project with a broader focus on lettuce shelflife, but which will include further experiments looking at polymerisation products.

University of Reading

IN THE PINK: IDENTIFING PINK DISCOLOURATION IN LETTUCE

NMR, HPLC, and microscopy techniques were used to identify the pink compounds

Pinking in lettuce may be more accurately described as red pigment refracting through translucent white leaf

Evidence suggests polyterpenes and polymeric glycosides in the phloem are the most likely cause of pinking