Enhancing raspberry fruit quality

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Introduction

- Successful fruit packaging relies upon the use of high quality produce.
- SCRI hopes to optimise raspberry fruit quality via focused research.
- We report on the physiology and molecular biology of raspberry fruit quality.

Ethylene and fruit firmness

Ethylene plays a causal role in raspberry fruit ripening. Immature fruits exposed to 21 ppm ethylene for 24 h reddened and softened.

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Ripeness class</th>
<th>Ethylene exposure</th>
<th>% CO₂</th>
<th>Firmness (mN)</th>
<th>Optical density (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glen Prosen</td>
<td>2</td>
<td>Yes</td>
<td>2.1</td>
<td>564</td>
<td>1.0±0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>1.9</td>
<td>806</td>
<td>0.2±0.0</td>
</tr>
<tr>
<td>Glen Clova</td>
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<td>Yes</td>
<td>1.8</td>
<td>228</td>
<td>1.0±0.3</td>
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<tr>
<td></td>
<td></td>
<td>No</td>
<td>1.1</td>
<td>714</td>
<td>0.2±0.0</td>
</tr>
</tbody>
</table>

Antioxidant capacity

Data indicates that the antioxidant capacity of ripe raspberry juice is high. The majority of the antioxidant capacity is not derived from vitamin C.

Molecular biology

A method to extract high-quality RNA from ripe raspberry fruit was developed.

This has allowed the cloning of genes which are differentially expressed during ripening.

Raspberry packaging

Ripe raspberry fruit shelf-life can be extended to 4 days if stored at 4°C and sealed into punnets using film types 1 or 2.

Analysis of fruit cell-wall material using GC, FT-IR and NMR showed that pectic acid/anion, methylated ester and cellulose contents declined as fruit softened.

Cell-wall modifying enzyme activities increase as fruit mature. This increase correlates with a rapid decline in fruit firmness.

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The future

At SCRI we now hope to research the underlying physiology and biochemistry of successful packaging strategies.

Acknowledgements

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