

# Establishment of an Australian mild onion industry – the sensory component.

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# Onions

- QLD onion industry worth \$11 million in 2003
- Well known that onion cultivars differ in flavour intensity
- QLD onions in competition with onions from southern States
- QLD produces a sweet, mild onion

# Sweet, mild onion market

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- Positive selling point
- Export opportunities
- USA and UK markets

# Onions and pungency

- Lower pungency associated with sweet, mild onions
- Genetic and environmental factors will influence onion flavour
- Enzyme alliinase cleaves cysteine sulphoxides to yield pyruvate, ammonia and sulfur containing volatiles
- Measure pyruvate produced

# Certification scheme

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- A sweet, mild onion certification scheme is essential to establish the market
- Critical factor is the availability of a suitable pungency test

# Consumer acceptance testing

- Consumer acceptability of 5 onion varieties
- QLD sweet, mild onions (Cavalier and Aussie Mild 2) liked significantly more ( $P < 0.05$ ) than the brown onion for:
  - » Odour
  - » Appearance
  - » Flavour
  - » Texture
  - » Overall

# Consumer acceptance testing

- Cavalier mild was significantly lower ( $P < 0.05$ ) in pungency and aftertaste than the brown onion
- 93% of consumers in favour of mild less pungent onion for eating raw
- Pay the same (21%) or more than (66%) price of standard brown onions

# Sensory descriptive analysis

## AIM:

- To use sensory descriptive analysis to profile the odour and flavour attributes of 12 selected onion samples



# Panel screening and training

- 9 panellists
- 9 training sessions of approx 2.5hrs each
  - Product familiarisation
  - Vocabulary development
  - Attribute derivation
  - Attribute and scale definition
  - Practice
  - Panel evaluation sessions
- Samples assessed raw

# Panel assessment

- 5g samples finely diced raw onion
- 3 samples per session
- Samples assessed in duplicate
- Individual booths (ISO 8589-1988)
- Standard rating test (AS 2542.2.3)
- Statistical analysis

# Descriptive analysis attributes

Strength of onion odour

Clean green odour

Dusty odour

Sweetness

Bitterness

Strength of onion flavour

Sourness

Astringency

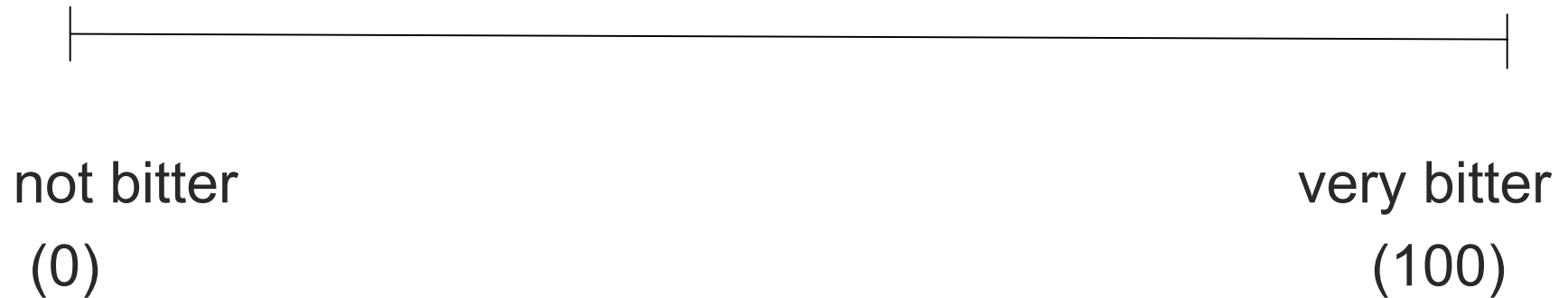
Other flavour intensity

Bitter aftertaste

Other aftertaste

# Descriptive analysis scales

Rate the bitterness intensity of sample 487



# Results

- Significant differences ( $P < 0.05$ ) found between the 12 samples for:
  - Sweetness
  - Bitterness
  - Sourness
  - Astringency
  - Bitter aftertaste
  - Other aftertaste

# Results

- However, no significant differences ( $P > 0.05$ ) for the attributes:
  - Strength of onion odour
  - Clean green odour
  - Dusty odour
  - Strength of onion flavour ( $P = 0.072$ )
  - Other flavour

# Results

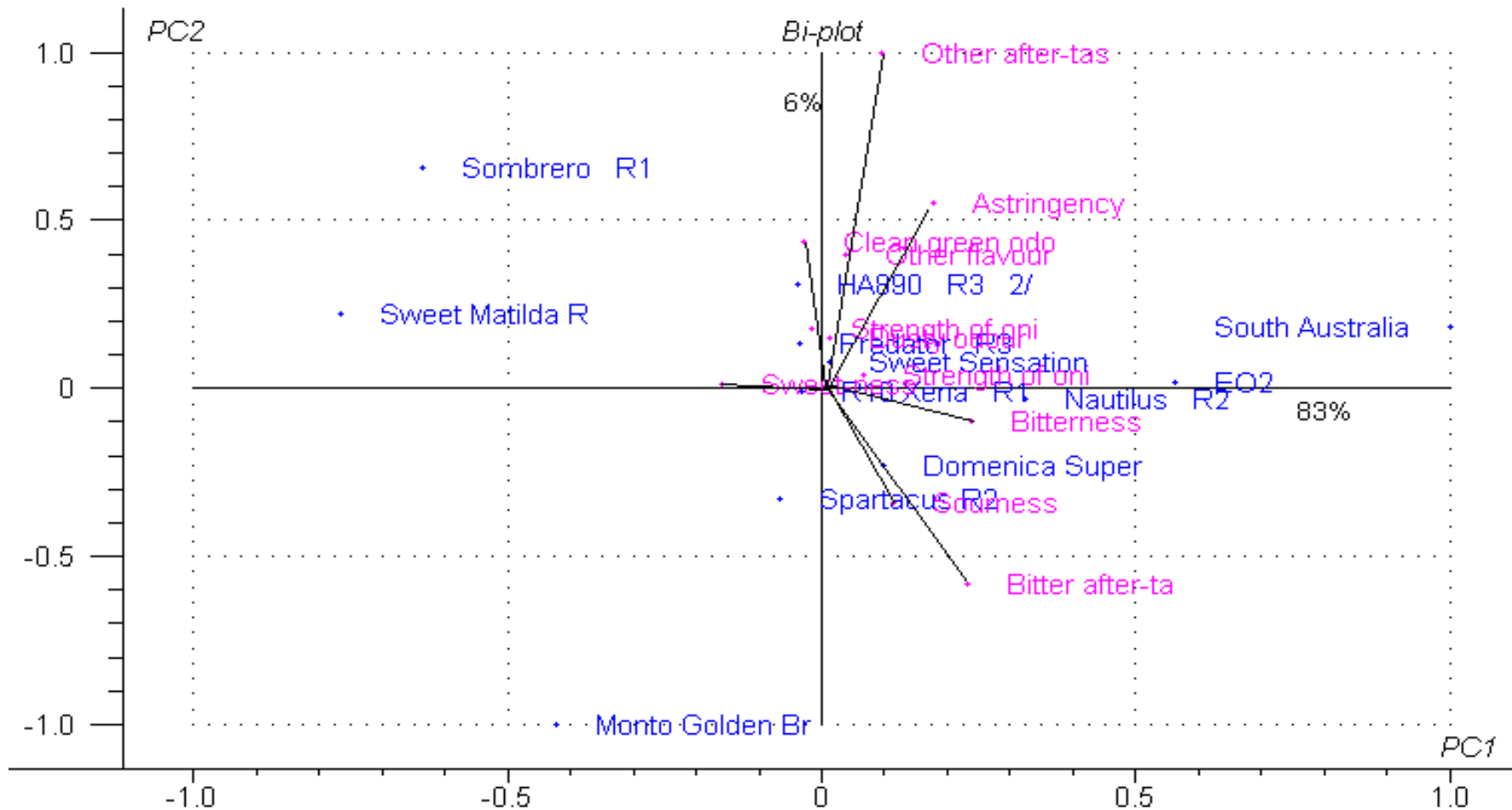
- Three samples that “stood out” from a sensory perspective as potential sweet, mild cultivars:  
***Sweet Matilda***   ***Sombrero***  
***Monto Golden Brown***
  - Highest in intensity for sweetness
  - Lowest for bitterness, sourness, astringency, bitter aftertaste and other aftertaste
  - Lowest in intensity for strength of onion flavour (although no significant difference ( $P > 0.05$ ) between samples)

# Results

- South Australia brown sample, out of the 12 samples assessed:
  - Lowest intensity in sweetness
  - Highest intensity in bitterness, sourness, astringency, bitter aftertaste, other aftertaste
  - Highest intensity for strength of onion flavour and other flavour (although no significant difference ( $P > 0.05$ ) between samples for these attributes)



# Principal components analysis



# Results

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- Sensory and chemical analysis relationship

# Conclusion

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- Sensory descriptive analysis able to profile and differentiate 12 onion varieties

# Further work

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- Storage trials planned for Oct-Dec 2004
- Investigate ways to increase sugars levels in onions – genetic basis

# Acknowledgements

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