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

CE Reid, SM Nottingham, GE Bell, AA Duff
Department of Primary Industries and Fisheries
Queensland
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

- 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

• 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

not bitter (0) very bitter (100)
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

• Sensory and chemical analysis relationship
Conclusion

• Sensory descriptive analysis able to profile and differentiate 12 onion varieties
Further work

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