The effect of DPA on internal browning of 'Cripp's Pink' apples

Anél Botes

CA meeting – 6 November 2018

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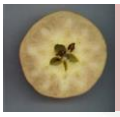
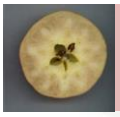


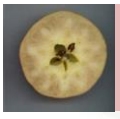
Introduction

- DPA is an antioxidant – suppress superficial scald and reduces internal browning (IB)
- DPA prevents the development of CO_2 injury during storage of 'Fuji' (Argenta *et al*., 2002) and 'Honeycrisp' apples (Cantreras, 2014)
- Fruit that was treated with 1-MCP and stored in CA, without DPA, developed internal browning and cavities (Mattheis and Rudell, 2008)
- Since 2015 higher incidence of IB on SA fruit (Fuji) which might be linked to the fact that DPA is not used



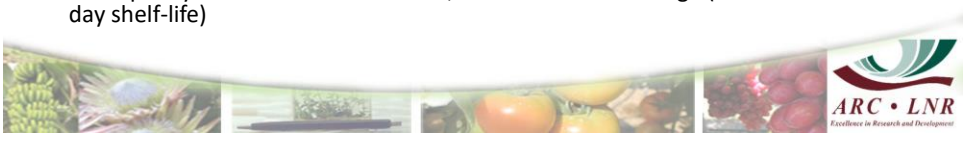
Aim and Objectives

- Aim:
  - to determine if other quality benefits can be attributed to DPA application
- From these results the current recommended gas regimes for South African pome fruit might need to be re-evaluated



Materials and Methods

- Optimum harvested Cripp's Pink (2017)
- Production areas: Grabouw and Ceres
- Three sites from each production area
- Treatments:
  - DPA + RA
  - DPA + CA (recommended – 1.5% O_2 + 0.5% CO_2)
  - DPA + HCA (1.5% O_2 + 2.5% CO_2)
  - CA (1.5% O_2 + 0.5% CO_2)
  - RA
- Storage temperature: -0.5^{o}C
- Fruit quality evaluations done after 3, 6 and 9 months storage (+ 6wk RA + 7 and 14 day shelf-life)



Results and Discussion

Grabouw

Maturity index	Site 1	Site 2	Site 3
Skin background colour (scale 1-5)	2.94 ± 0.15	2.86 ± 0.02	2.73 ± 0.09
Firmness (kg)	8.33 ± 0.37	8.52 ± 0.18	8.26 ± 0.25
TSS (°Brix)	14.62 ± 0.24	14.10 ± 0.25	13.68 ± 0.30
TA (g/100mL)	0.84 ± 0.07	0.82 ± 0.04	0.92 ± 0.01
Starch conversion (%)	48.6 ± 7.1	52.4 ± 14.6	44.0 ± 6.82

Ceres

Maturity index	Site 1	Site 2	Site 3
Skin background colour (scale 1-5)	3.01 ± 0.14	2.99 ± 0.02	2.87 ± 0.11
Firmness (kg)	8.54 ± 0.27	8.18 ± 0.23	8.61 ± 0.23
TSS (°Brix)	13.93 ± 0.44	14.45 ± 0.40	14.03 ± 0.17
TA (g/100mL)	0.96 ± 0.04	1.09 ± 0.04	1.07 ± 0.08
Starch conversion (%)	37.6 ± 8.7	49.8 ± 17.0	42.4 ± 6.2

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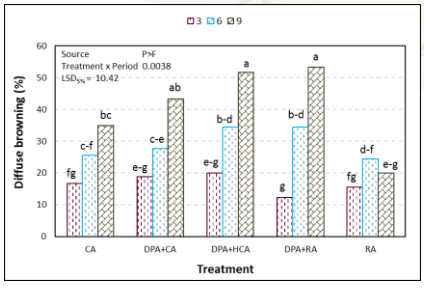
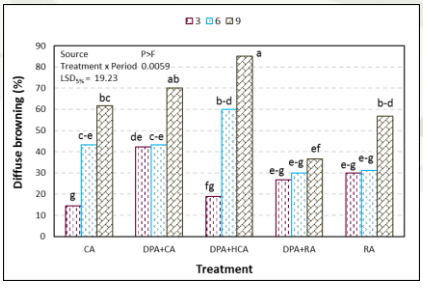
Results and Discussion

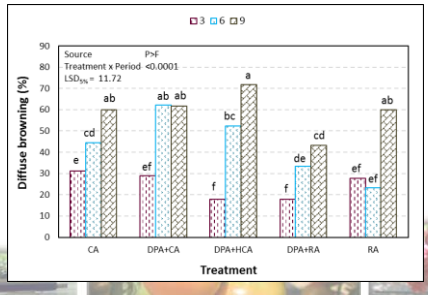
IB from Site 1 in Grabouw



IB from Site 2 in Grabouw



IB from Site 3 in Grabouw



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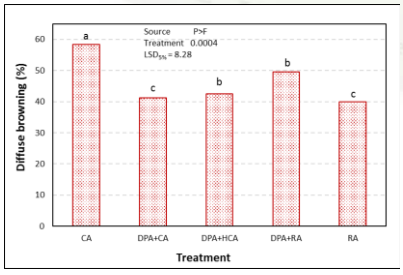
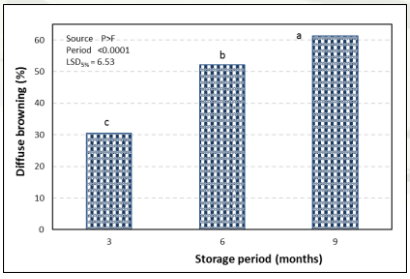
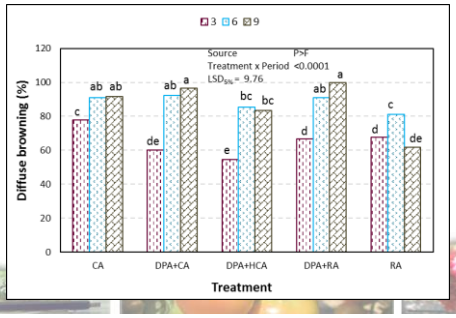
Results and Discussion

IB from Site 1 in Ceres



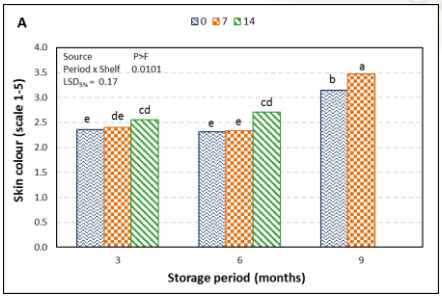


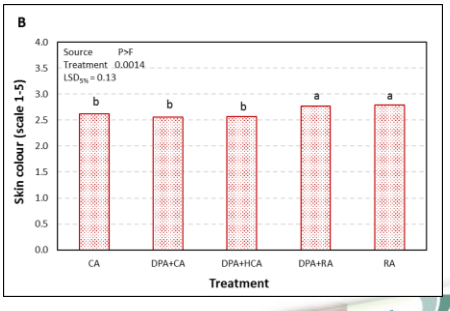
IB from Site 2 in Ceres



Results and Discussion

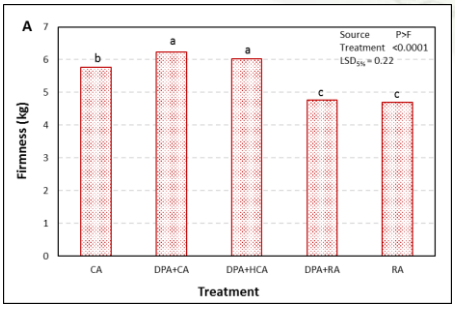
Skin background colour for Site 1, Grabouw

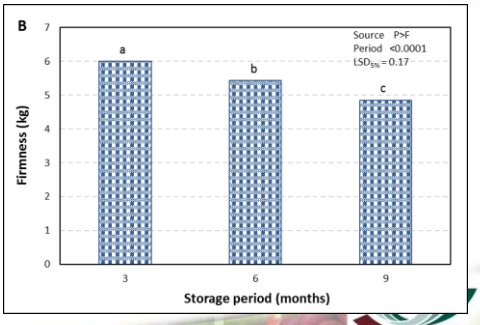




Results and Discussion

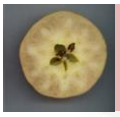
Firmness for Site 1, Grabouw





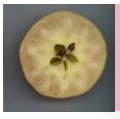
Results and Discussion

- Soft scald
  - all sites DPA+RA and RA – 6 months + 6wk RA + 14 d
  - at two sites all treatments - 9 months + 6wk RA + 7 d
  - also found DPA+HCA after various periods



Conclusions

- Application of DPA did not prohibit IB development – diffuse browning
- High CO_2 levels did not cause IB related to CO_2 damage
- Variables were included that would induce IB
  - sites with a historic browning problem
  - store fruit at -0.5°C instead of the recommended 1°C
- This season included a standard recommended treatment
  - 1-MCP + CA at 1°C (CA - 1.5% O_2 + 0.5% CO_2)



Acknowledgements

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