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Influence of 1-MCP on quality of ‘Conference’ and ‘Williams’ pears

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CAMA2017

Disclosure

- This research project was done with the financial support of AgroFresh

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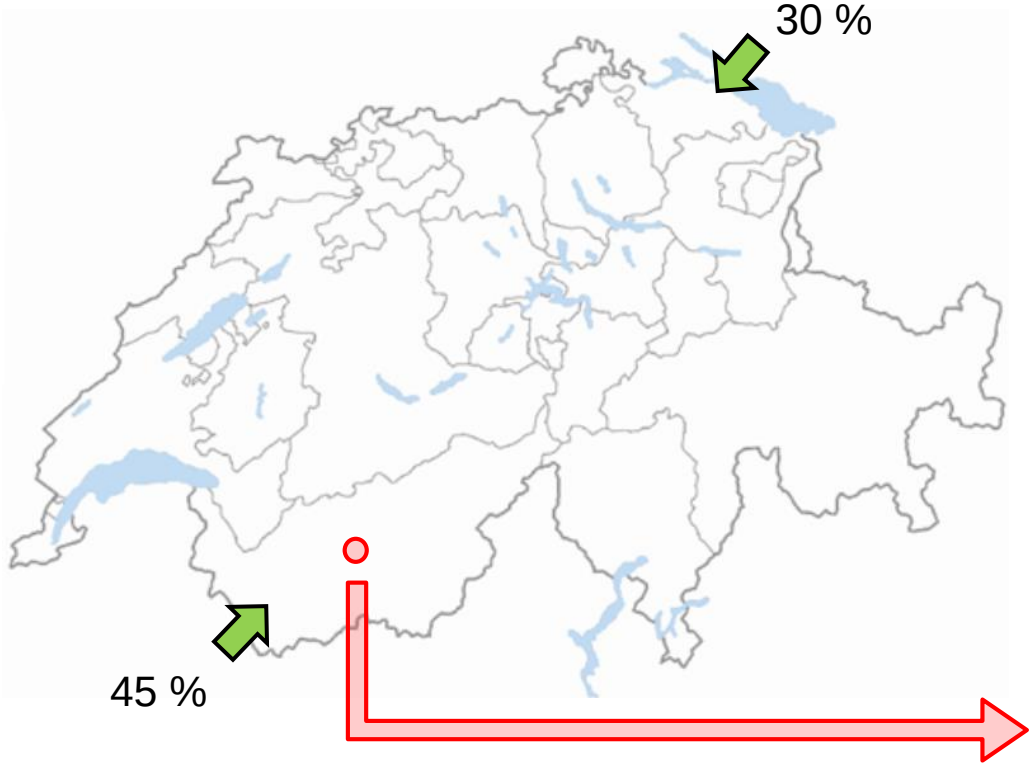
Pears are the second most produced fruit in Switzerland

- 75% of swiss pears are cultivated in 2 regions



Agroscope Research Center, Wallis

‘Conference’ and ‘Williams pears

- Represent 40% of total swiss pear production
- Different in terms of quality traits, taste and storage life

- ‘Conference’:
  - Typical autumn pear
  - Good storage potential
  - Susceptibility to internal cavities

- ‘Williams’
  - Summer pear
  - Short storage life
  - Well-suited for processing (pear brandy, juices, …)

1-MCP treatment on pears

- SmartFresh™ approved for use on swiss pears in 2013
- 1-MCP binds ethylene receptors which delays ripening and softening of pears
- 2/3 of swiss consumers appreciate melting pears

- **Key questions**
  - Can 1-MCP **improve storage life** of 'Conference' and Williams' pears and **reduce fruit losses** in the supply chain?
  - How 1-MCP influences fruit quality, in particular **softening**?
  - How 1-MCP influences **physiological disorders** happening during storage and/or shelf life?

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Study protocol
2015-16

HARVEST

- **M1** :

1 week before commercial harvest

- **M2**:

At commercial harvest

1-MCP TREATMENT

- **1-MCP 0.3 µL L^{-1}**
- **1-MCP 0.6 µL L^{-1}**
- **Control**

CA STORAGE AT 0.5 °C

- **'Conference':**

1% CO_2, 3% O_2

- **'Williams':**

2% CO_2, 2% O_2

3 REMOVALS / SHELF LIFE

- **Firmness**
- **Skin color**
- TSS
- Acidity
- **Ethylene production**
- **Physiological disorders**

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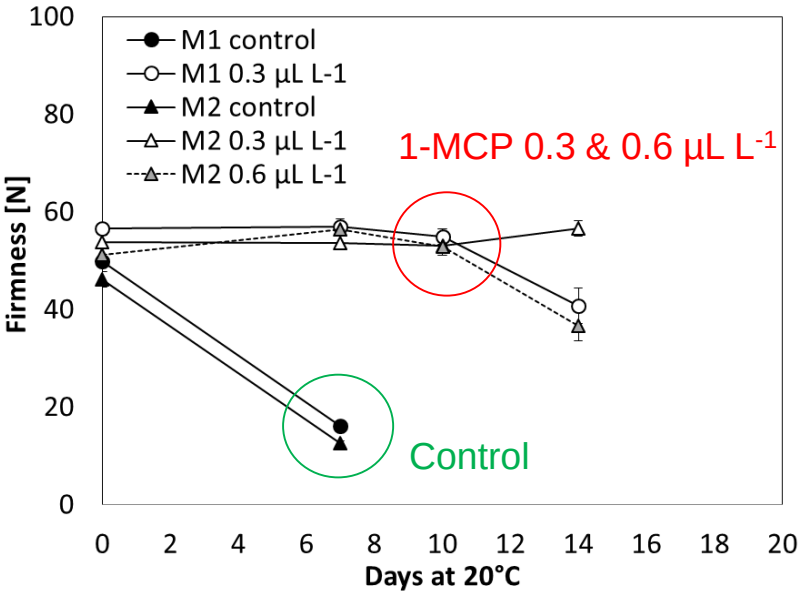
Influence of 1-MCP on firmness was highly cultivar-dependant

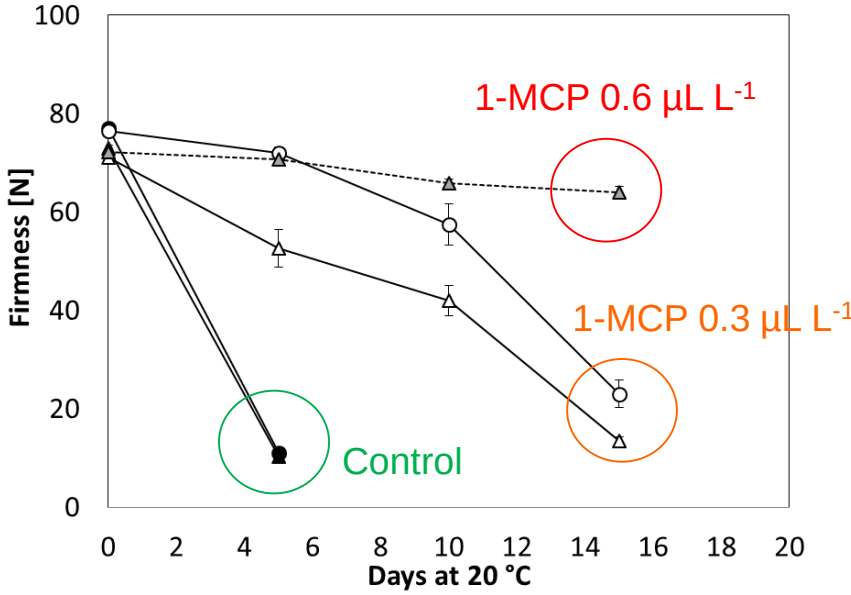
‘Conference’

Evaluation after 8 months of storage



‘Williams’

Evaluation after 3 months of storage



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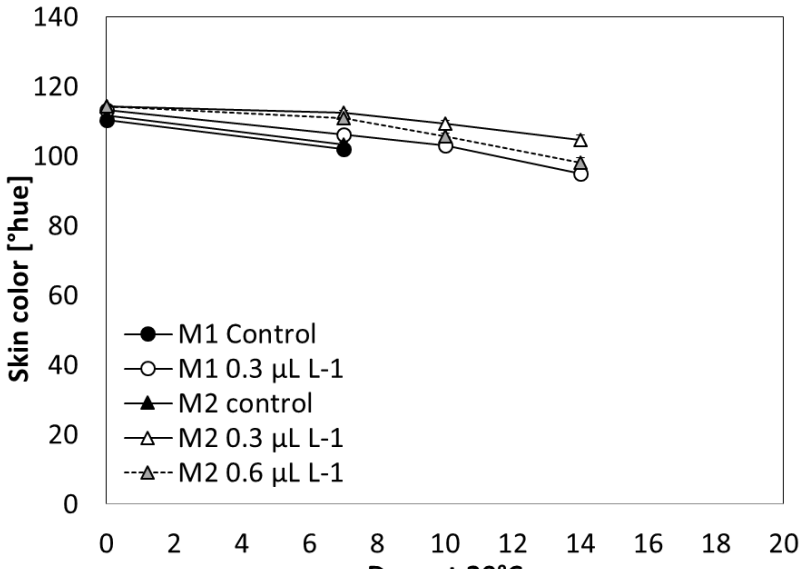
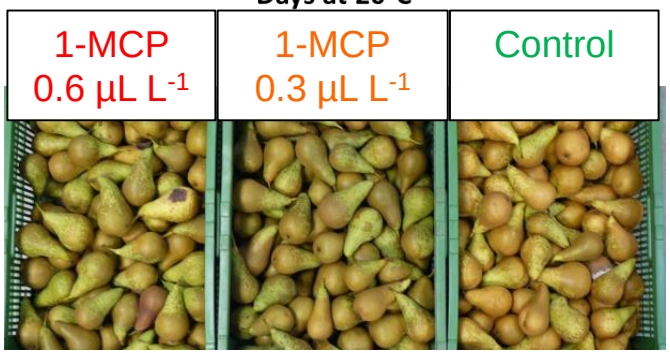
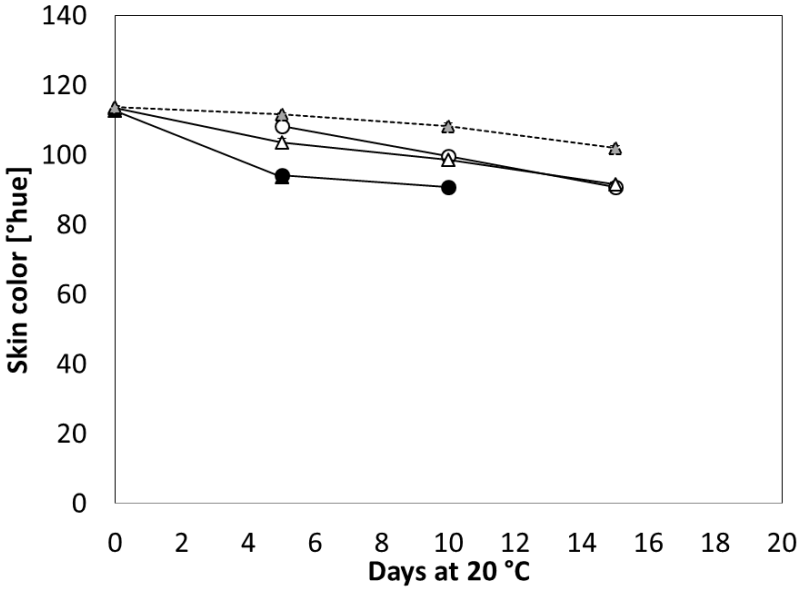
1-MCP delayed yellowing of pears

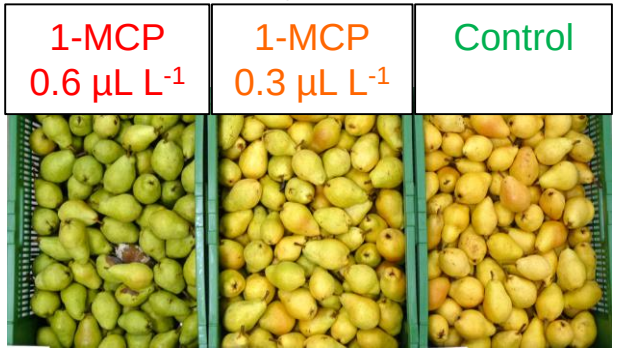
‘Conference’





‘Williams’





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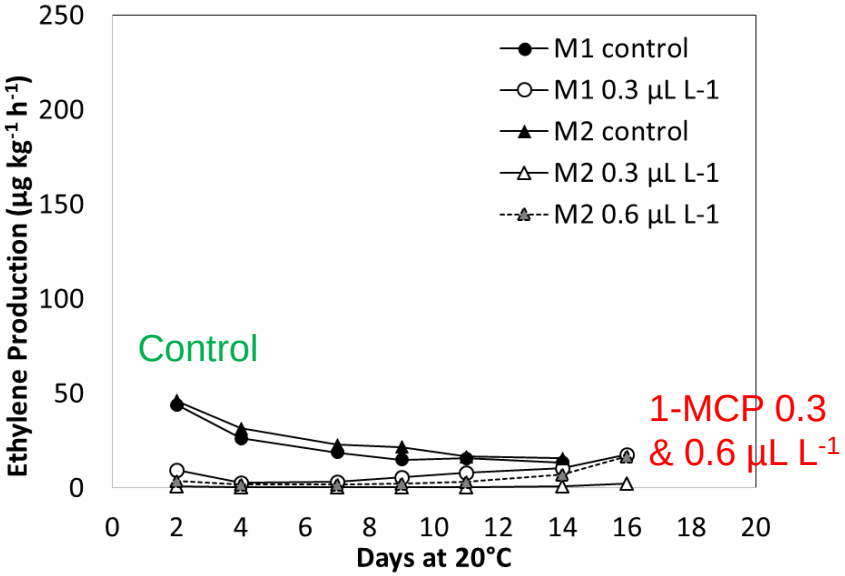
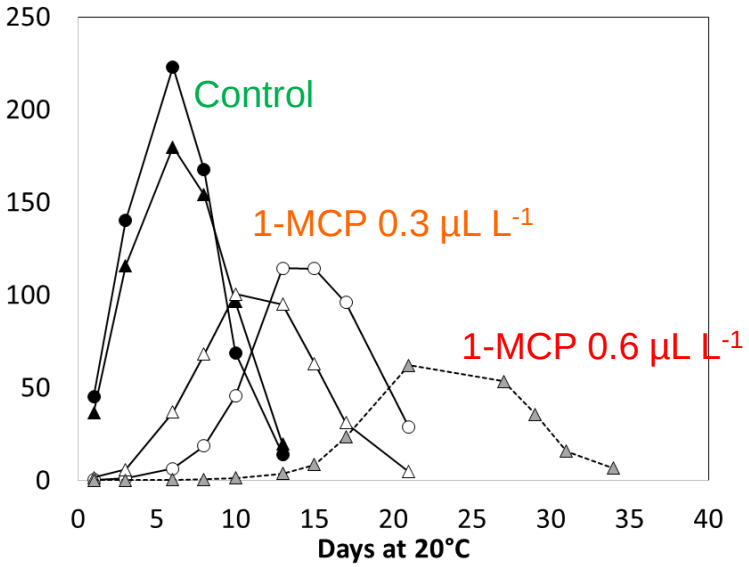
Softening / yellowing of pears was correlated to ethylene production

‘Conference’



‘Williams’



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Influence of 1-MCP on physiological disorders was cultivar-specific

‘Conference’

1-MCP treated pears developed

- **Black spots**

after a long period of storage under CA and a long shelf life

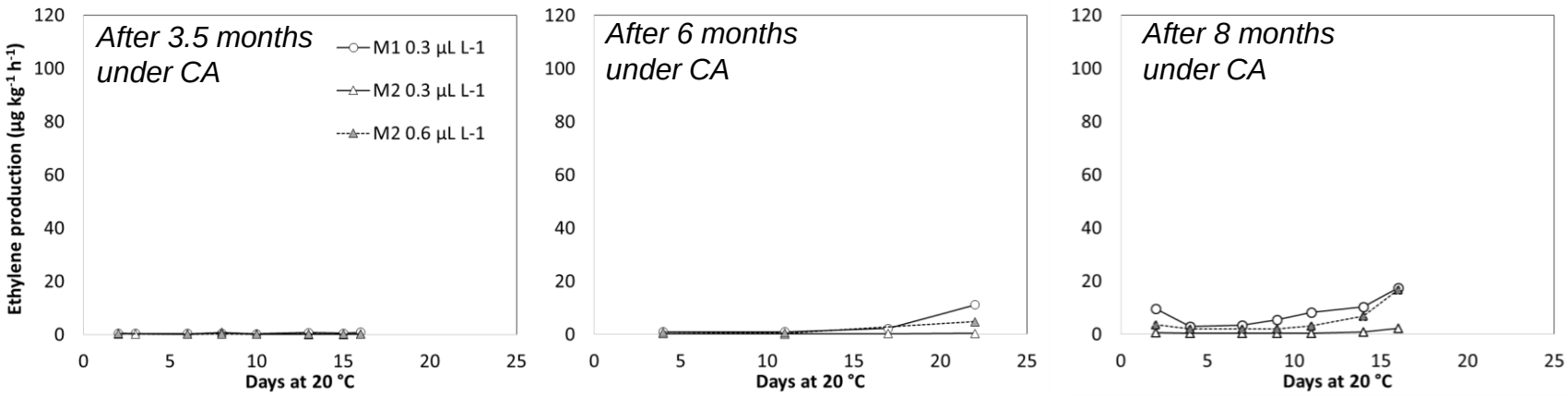
‘Williams’

1-MCP limited the apparition of

- **skin bruising** and
- **brown core**

(which are related to fruit senescence)

Would the occurrence of black spots coincides with a late onset of ethylene rise?



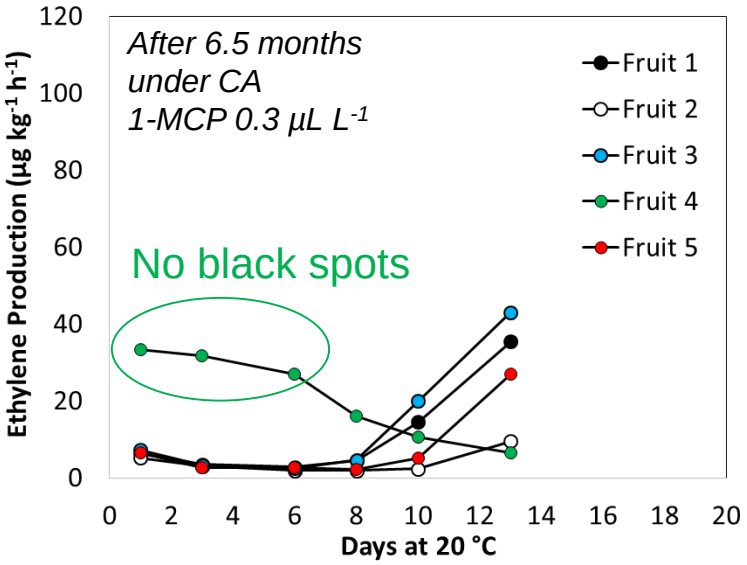
No black spots

Black spots after 22 days at 20°C

Black spots after 14 days at 20°C

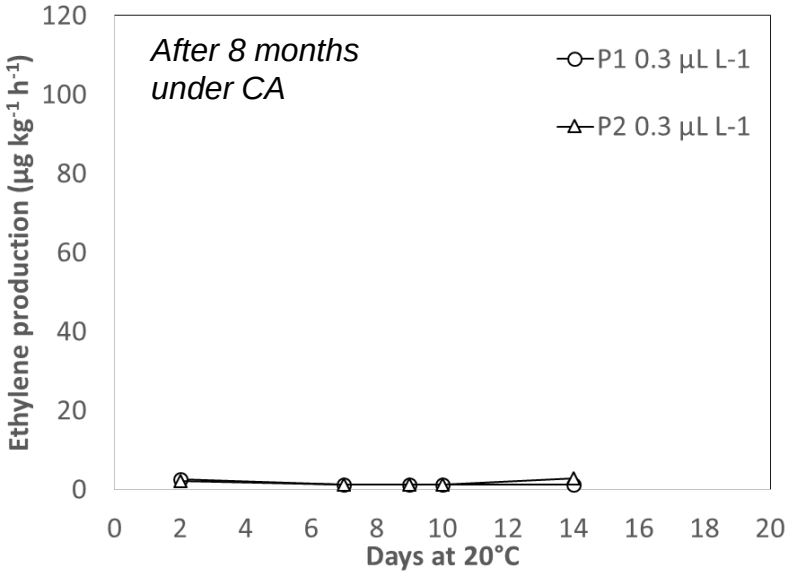
Supporting evidences

2014-15



Black spots after
10 days at 20°C

2016-17



No black spots

Conclusions

- ‘Conference’
  - 1-MCP treatment strongly inhibited ripening of pears, even after a long period of storage under CA and a long shelf life.
  - While 1-MCP improves pears storability, the non recovery of softening can be a drawback for consumers.
  - Preliminary results suggest a correlation between a late onset of ethylene rise and the apparition of blackspots.

- ‘Williams’
  - The effect of 1-MCP on delay of pears ripening was dosis-dependent.
  - Well-controlled 1-MCP treatment is beneficial for both supply chain and consumers.

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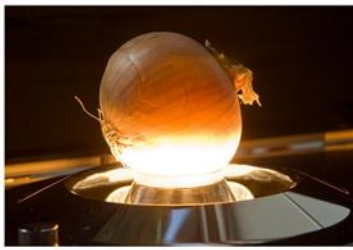

Thank you for your attention

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