Nutrición de cultivos Frutales en la EEAD – CSIC

Fisiopatías en manzana y melocotón

Estación Experimental de Aula Dei (EEAD)

Lleida, 16 de mayo de 2013

Ca

Ca in the plant

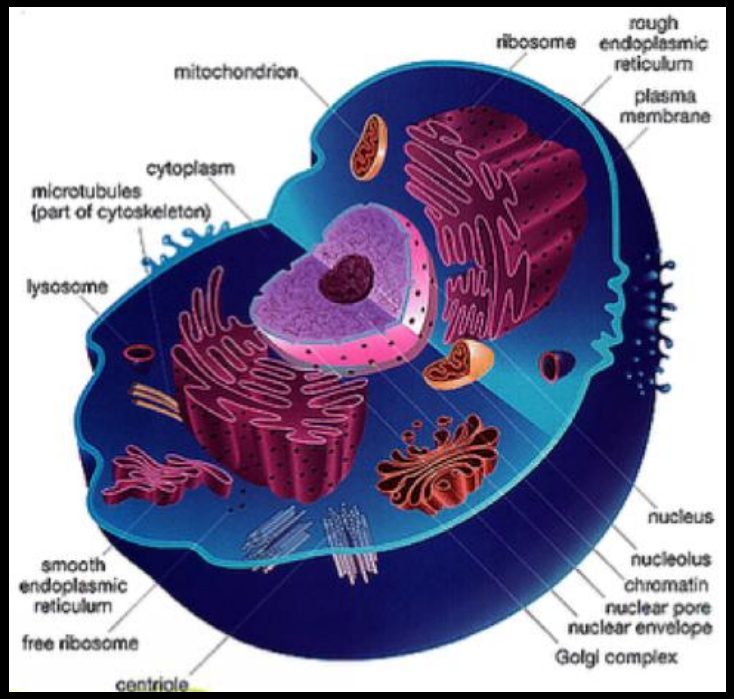
Papel del Ca en plantas

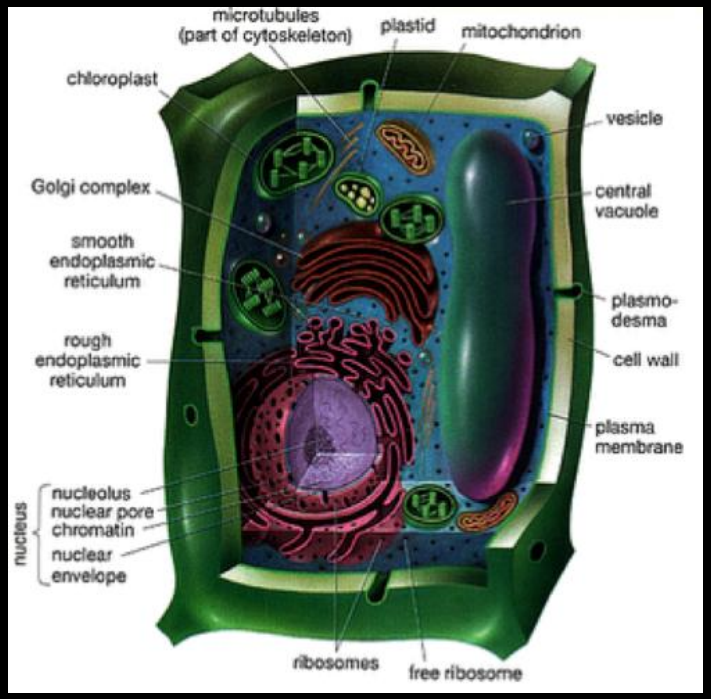
- Active role in cell growth and integrity of cell wall and plasma membrane
- Cell division and new cell structures
- Cofactor and modulator in a large number of enzymes
- Alleviates stress and protects against ROS
- Makes easier uptake of other nutrients and regulates sugar and protein movement within the plant
- Regulates water flow
- Corrects soil acidity, improves soil properties, corrects soil salinity in saline-sodic soils
- Gives consistency and quality to fruits for conservation during storage
- Important in human nutrition by fruit consumption

Ca

Ca in the plant

La pared celular: animal vs. vegetal

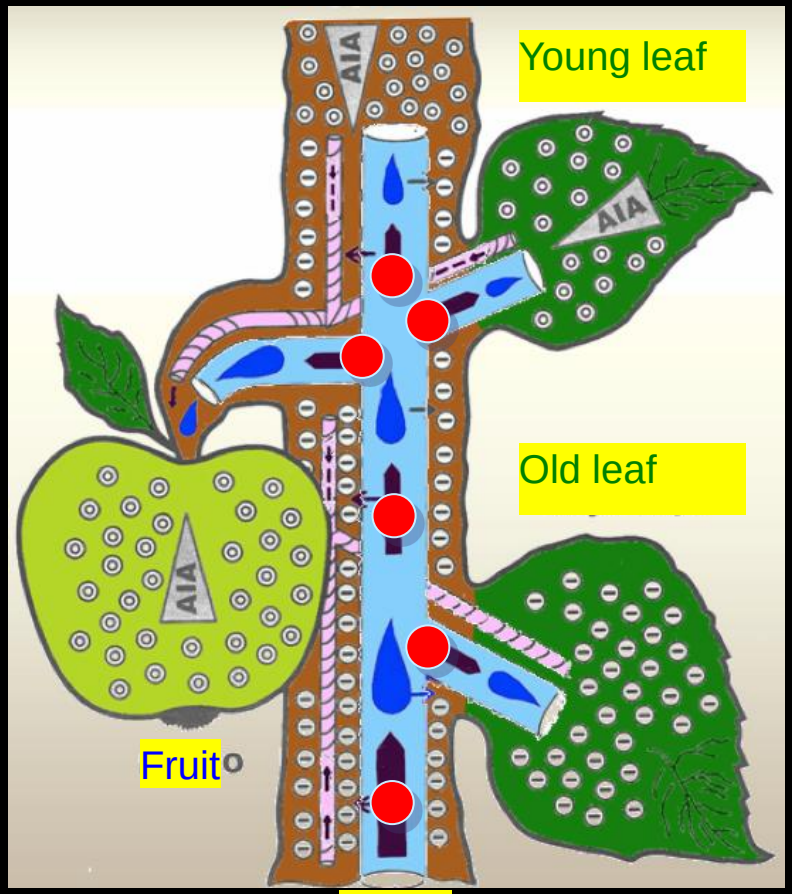




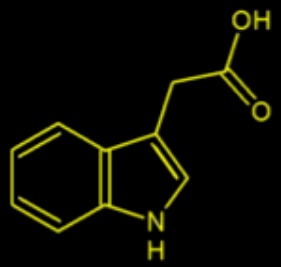
Ca

Ca in the plant

Transporte de Ca en plantas



Ca: acropetal



Auxin: basipetal

Other hormones..

de Freitas, Mitcham (2012)
Hortic Reviews

Alteraciones relacionadas con Ca más comunes

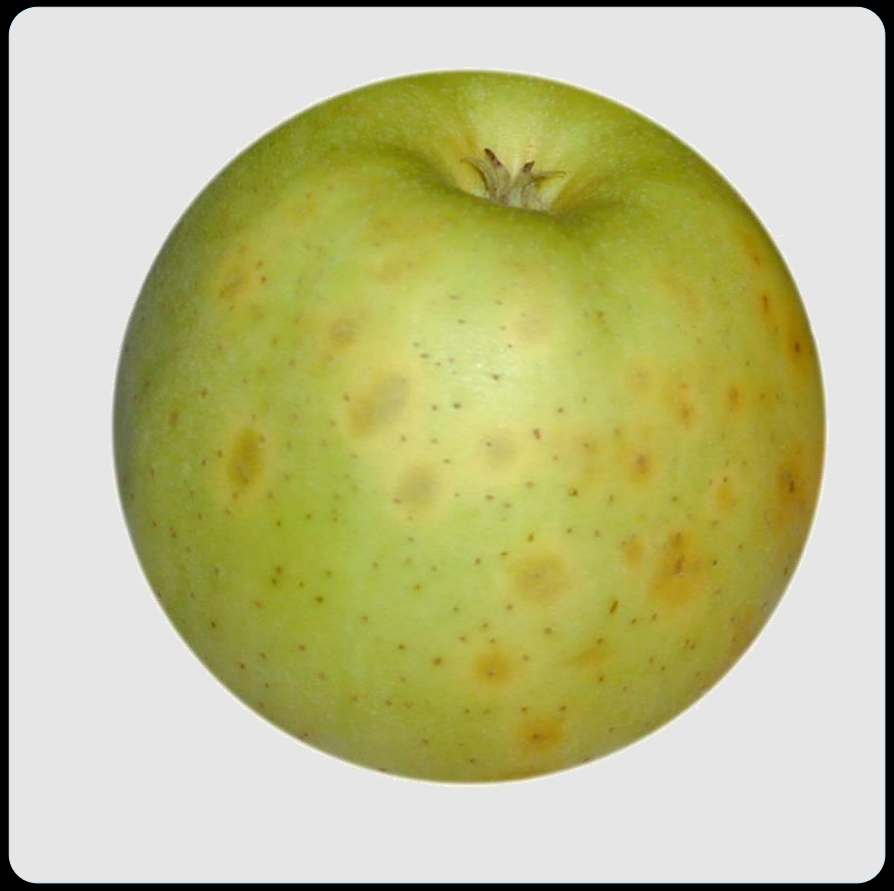
- Bitter pit (apple)
- Tip burn (lettuce, Brassica)
- Blossom end rot (tomato, pepper, melon, etc.)
- Corky brown spot (pear)
- Lenticel blotch spot (apple)
- Jonathan spot (apple)
- Vitrescent dark spot (peach)
- Translucent flesh and gamboges (mangosteen)
- Senescence in flowers

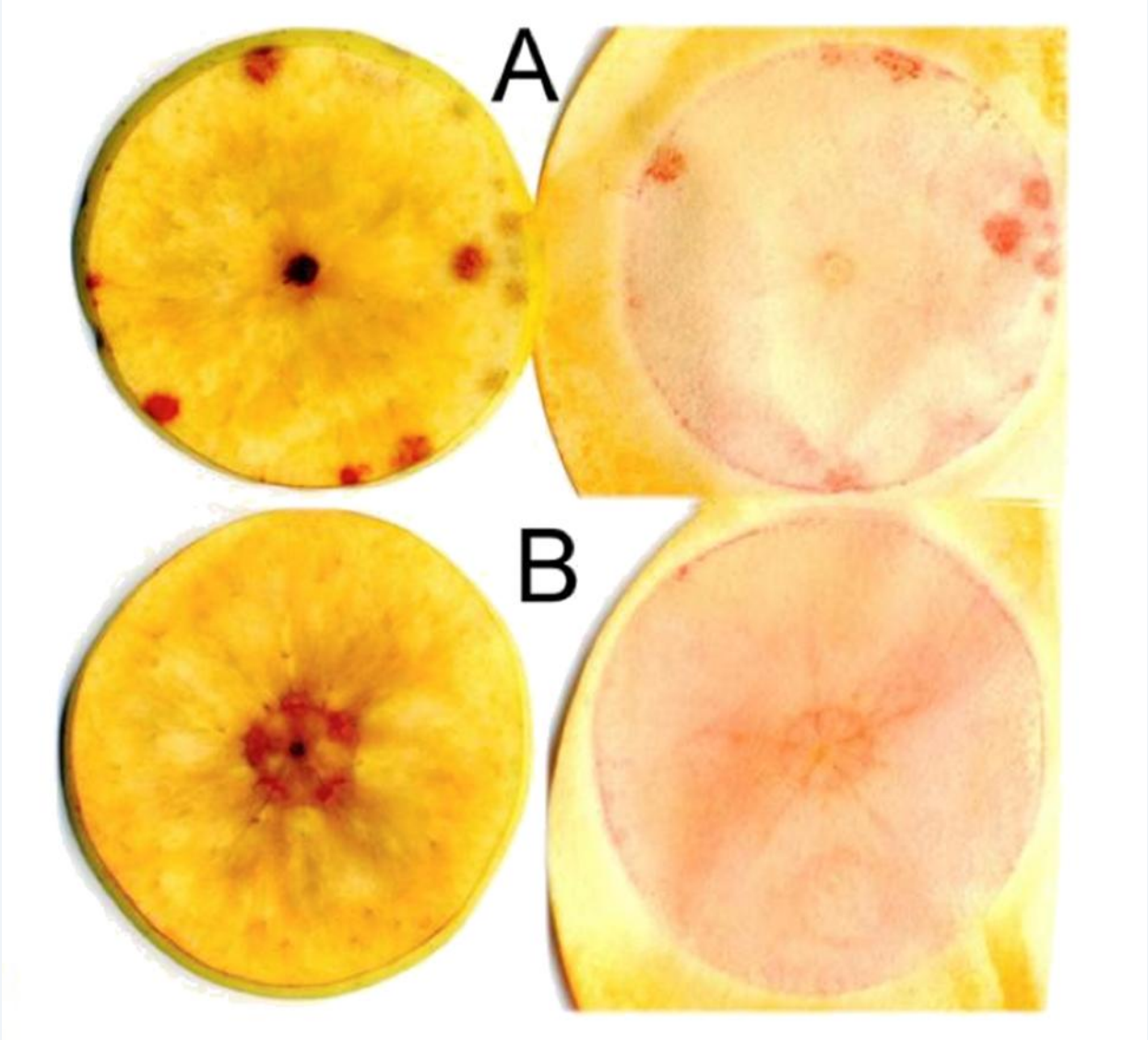
Ca

Ca disorders

Physiological alterations due to Ca

Bitter pit




A
B

Ca

Ca work EEAD-CSIC

Trabajo desarrolado en la EEAD-CSIC

Summary

- Procedures for modelling bitter pit development (i.e. Mg infiltration, oxalate injection)
- Methods for the prognosis of bitter pit in apple: Mg infiltration
- Method for localization of Ca in the fruit (patent) Val et al. (2008) Food Sci Technol Int
- Proteomics of bitter pit tissues Val et al. (2006) Food Sci Technol Int
- Image analysis
- In-season Ca treatments to prevent bitter pit in apple Val et al. (2008) J Plant Nutr
  Blanco et al. (2010) Sci Hortic
- In-season Ca treatments to prevent vitriscent spot in peach
  Fernández et al. (2009) J Food Sci Agric
  Val and Fernández (2011) J Plant Nutr Soil Sci

Ca

Procedures for causing bitter pit development

Ca work EEAD-CSIC

Mg (II) infiltration (0.12%)

Vacuum 1 min

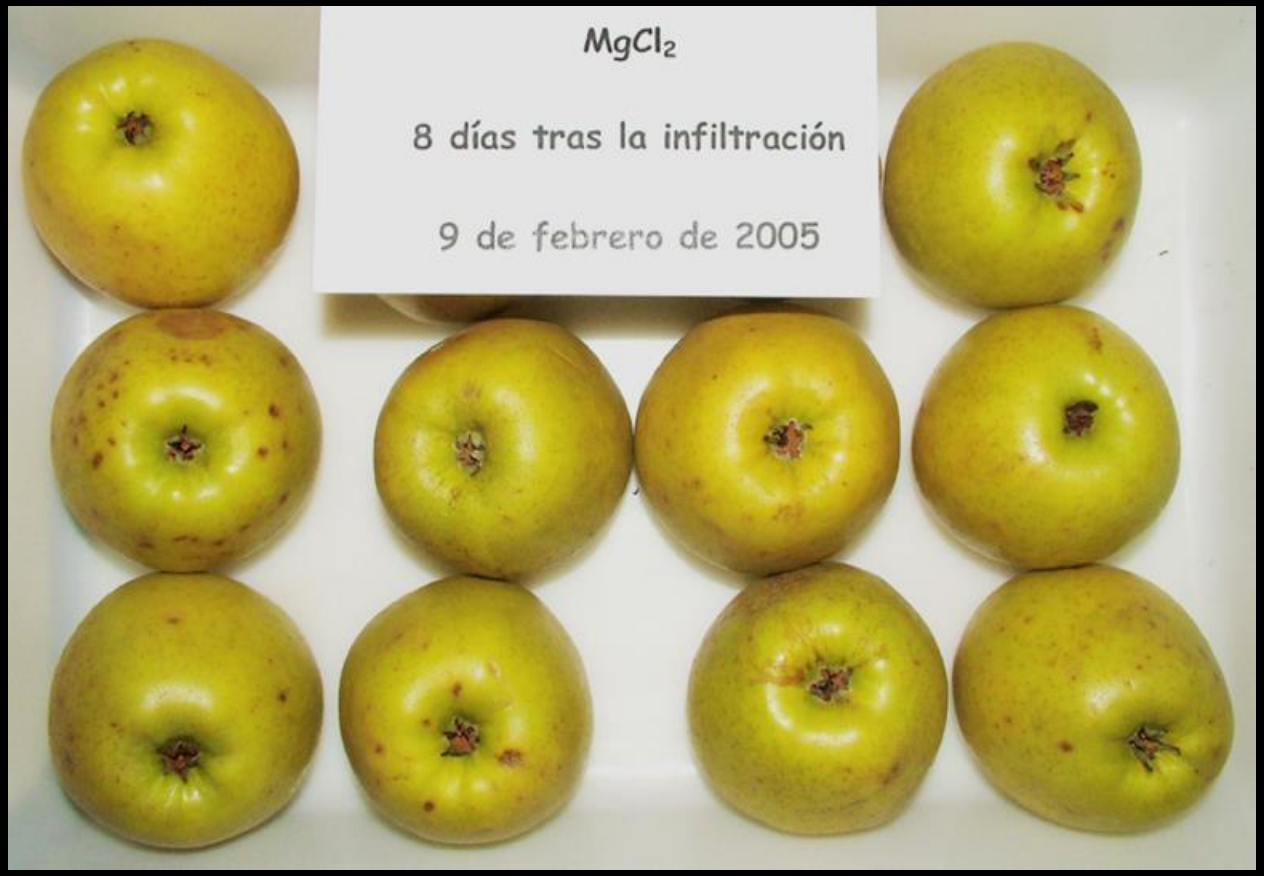
Immersion 24 h

Ca

Procedures for causing bitter pit development

Ca work EEAD-CSIC

Mg (II) infiltration



Ca

Ca work EEAD-CSIC

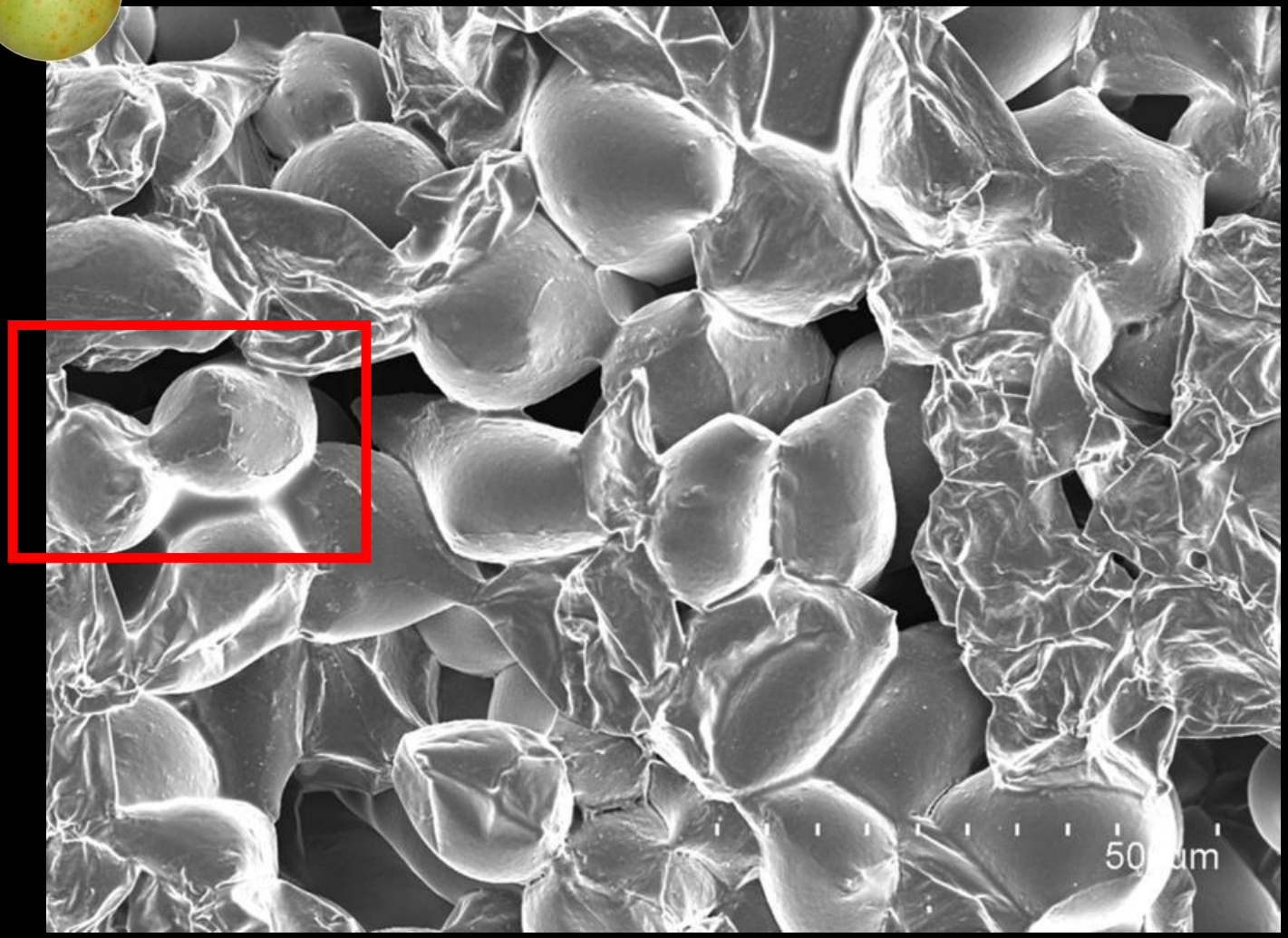
Procedures for causing bitter pit development

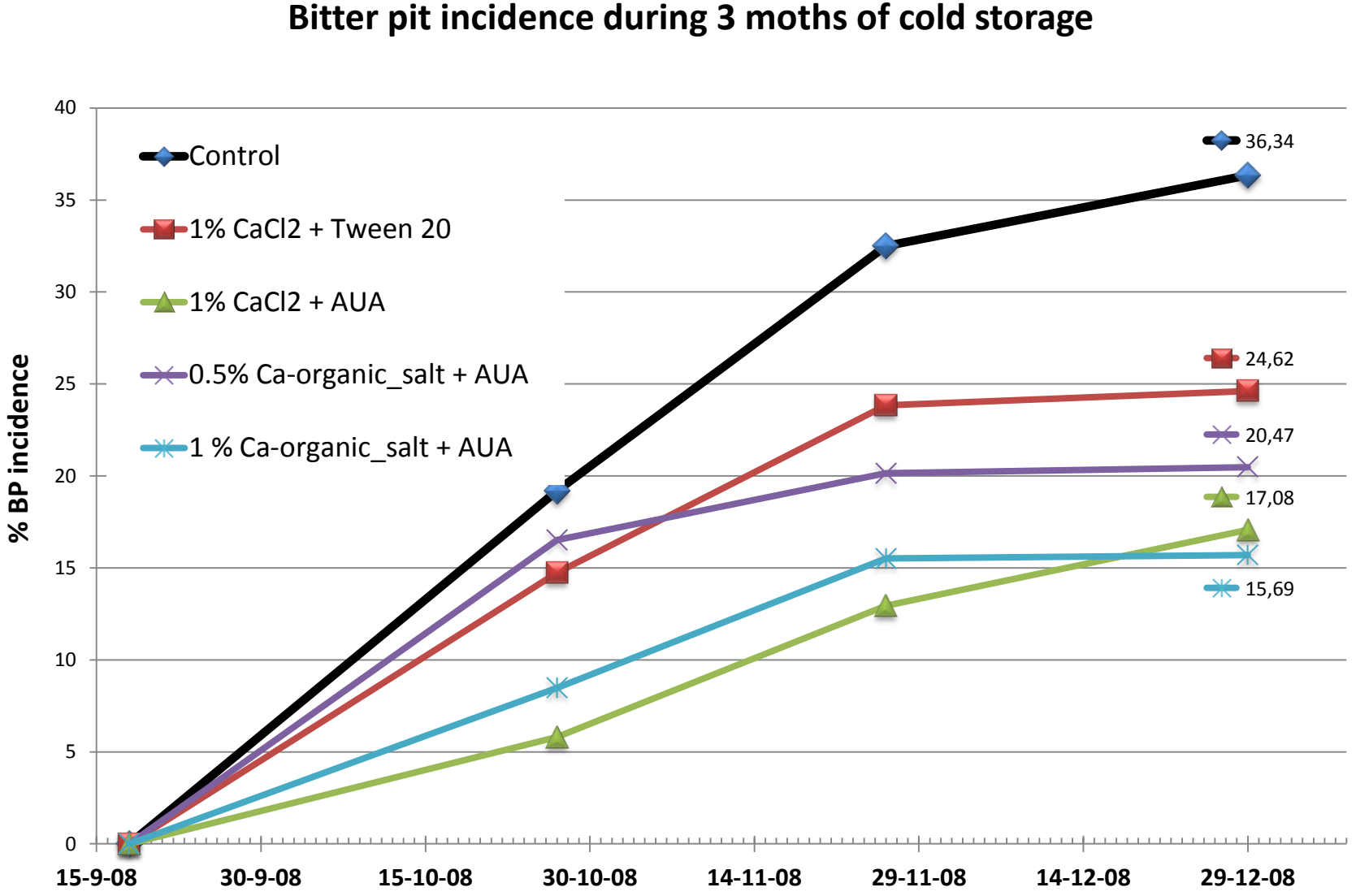
Injections of Ammonium oxalate

Ca

Image analysis

Ca work EEAD-CSIC




Bitter pit incidence during 3 moths of cold storage
% BP incidence
40
35
30
25
20
15
10
5
0
15-9-08
30-9-08
15-10-08
30-10-08
14-11-08
29-11-08
14-12-08
29-12-08
Control
1% CaCl2 + Tween 20
1% CaCl2 + AUA
0.5% Ca-organic_salt + AUA
1 % Ca-organic_salt + AUA
36,34
24,62
20,47
17,08
15,69

Ca

In-season Ca sprays in peach

Vitriscent dark spot

Ca work
EEAD-CSIC

PEACH
Ca-related Physiological disorders

New Ca-treatments

Bagged

Ca-sprays

Before July

Non-bagged

Ca-sprays

Calanda late season cultivars

sticides-free fruits

Other cultivars

Pesticides

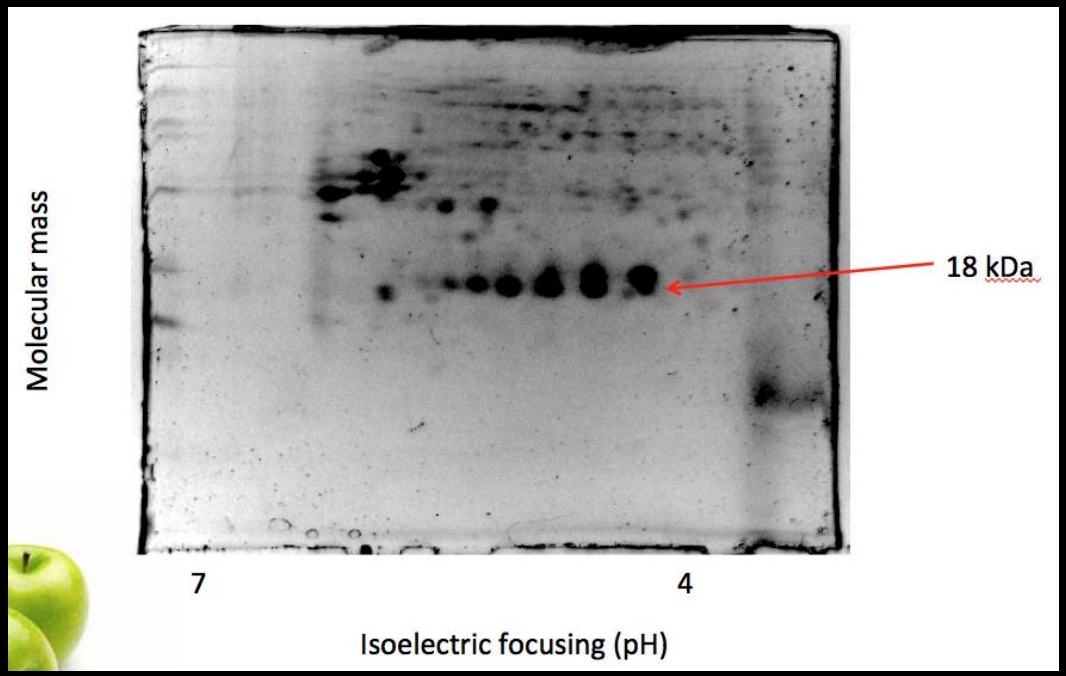
Increase fruit quality and postharvest shelflife

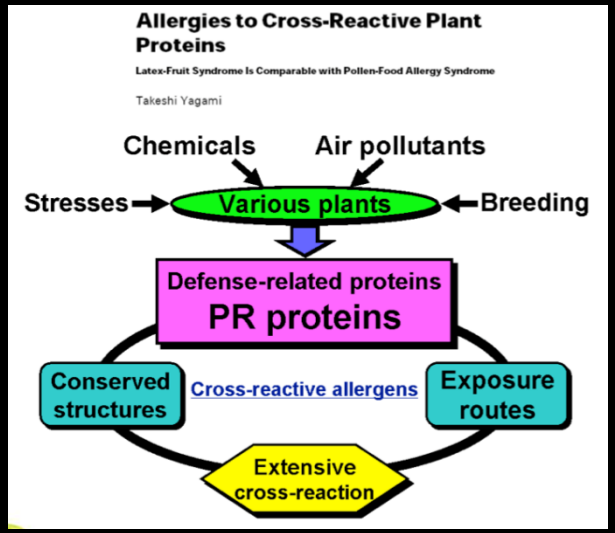
Ca

Proteomics of bitter pit tissues

Ca work EEAD-CSIC

2D-E





Allergy to apple Golden Delicious is common among individuals with allergy to birch pollen

Pathogenesis protein Mal d 1 (18 kD) structurally related with Bet v1 of birch pollen

Other apple proteins with allergenic characteristics are at 9, 14 (Mal d 2), 30 (thaumatin), 40, 60 and 67 kDa

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