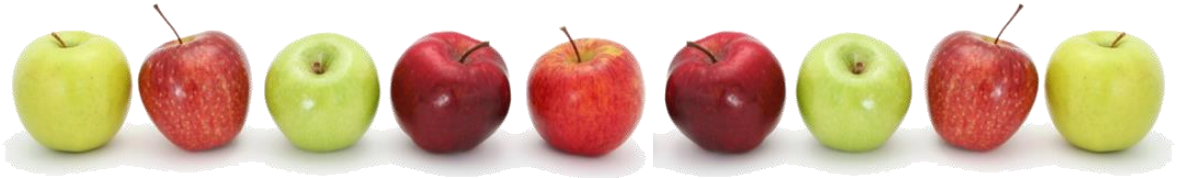
POST HARVEST _CARE

extending shelf-life by BIOON

APPLE

Introduction to the study

Objective	Demostrar los beneficios de eliminar el etileno mediante los sistemas de Bioconservacion
Methodology	Tests in commercial and pilot chambers
Apple variety	Bramley, Royal Gala, Pink Lady, Gramy Smith, Ariane
Study conducted by	CTIFL (France), IRTA (Spain), ICA storage (UK)



POST HARVEST CARE

Apples are the fruit with the **highest post-harvest storage capacity**

It is also the fruit that produces the **highest amount of ethylene.**

Conventional ethylene absorption systems in preservation chambers **are not sufficient** to absorb these high quantities of ethylene.

POST HARVEST CARE

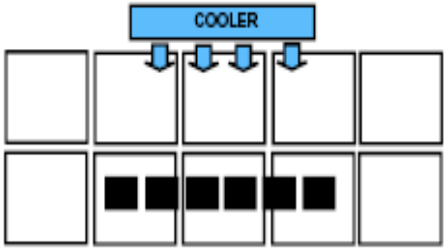
Effects of ethylene

- Softening and loss of firmness
- Over ripening and senescence
- Increased risk of blanching
- Increased risk of internal browning
- Increased incidence of rotting
- Wilt
- Weight loss

STO12 Modules / STO12 Filters

It is a **flexible solution**, the number of units will **depend on the ethylene emission** (variety, quantity, time, atmosphere).

These are self-contained, **single-use filtering units** used for **ethylene removal** when large quantities of granules are required.
They are installed in the chamber in front of the evaporator.



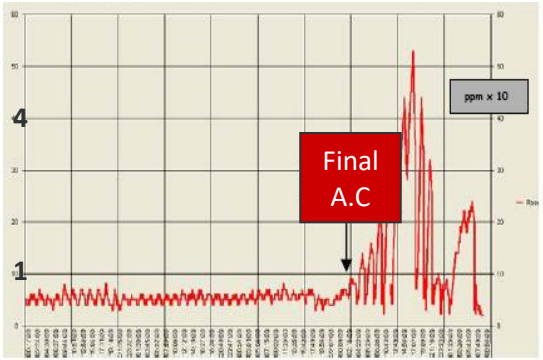
POST HARVEST CARE

Bramley Apple

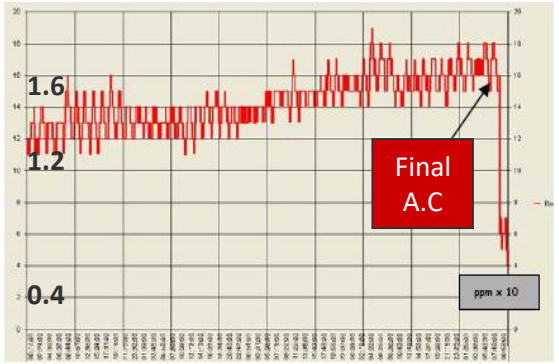
- ICA (UK) July, 2008
- Conditions: 9 months at 4.5ºC and AC(1% O2, 5% CO2)
- Chamber: 380 m3 and 85 Tn of fruit

Apples preserved with **BION**, unlike SmartFresh, recover their **capacity to produce ethylene** when the C.A. is broken.

BION



SmartFresh



POST HARVEST CARE

BION vs SmartFresh

- Better ethylene control
- 50% less rotting
- Similar hardness
- Similar internal ethylene (30 ppb)
- Better fruit quality

POST HARVEST CARE

Royal Gala Apple

- IRTA, Costabrava (Spain), 2011
- Conditions: 4.5 months at ºC and AC (1.5 - 1.8 % O2; 1.0 - 1.3 % CO2; 0.3 - 1.0 ºC).
- Chamber: 1000 m3 and 220 Tn of fruit

Test with internal ETH machine prototype:

- Ethylene measurement
- Apple quality inspection

Ethylene concentration: **< 0.2 ppm throughout storage.**
Commercial apple firmness: **6.1 kg (initial 7.5 kg).**

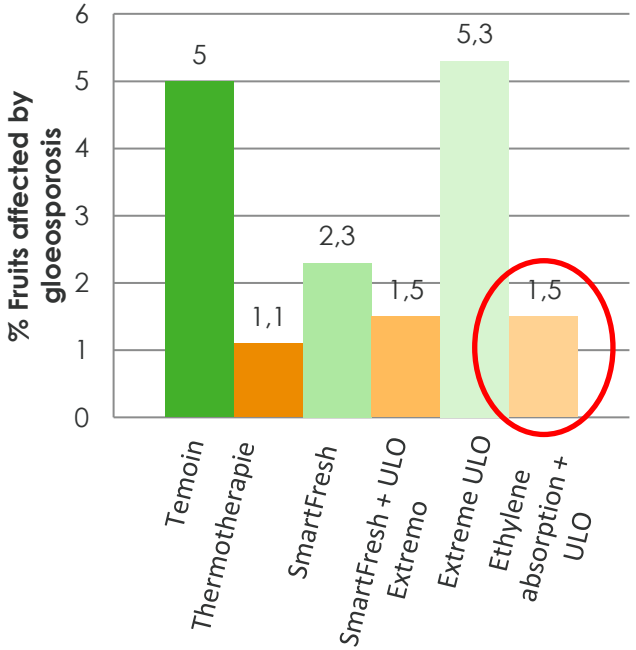
POST HARVEST CARE

Pink Lady Apple

BION in ULO atmospheres:

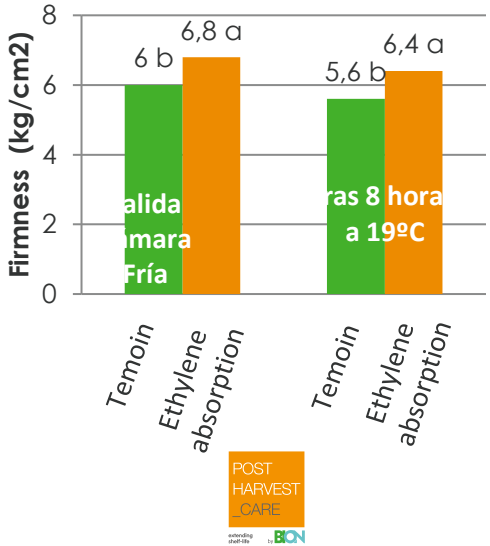
- **Effectively** reduced **gloeosporosis.**
- **Prevented** the appearance of **scald.**

- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2012. Small scale assay.
- Conditions: Apple at 0.5 - 1 ºC, AC (2.2 % O2 and 1.5 %CO2) and ULO (1.2% O2 and 1% CO2) for 7 months.



Pink Lady Apple

- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2008.
- Conditions: 5 months at 0.5 °C, AC (2.2 % O2 and 1.5% CO2).
- Small scale trial.



Pink Lady Apple

BION in ULO atmosphere:

Prevented the appearance of **blanching and internal browning.**

Reduced **gloeosporosis.**

Maintained firmness.

Slowed down **color** evolution.

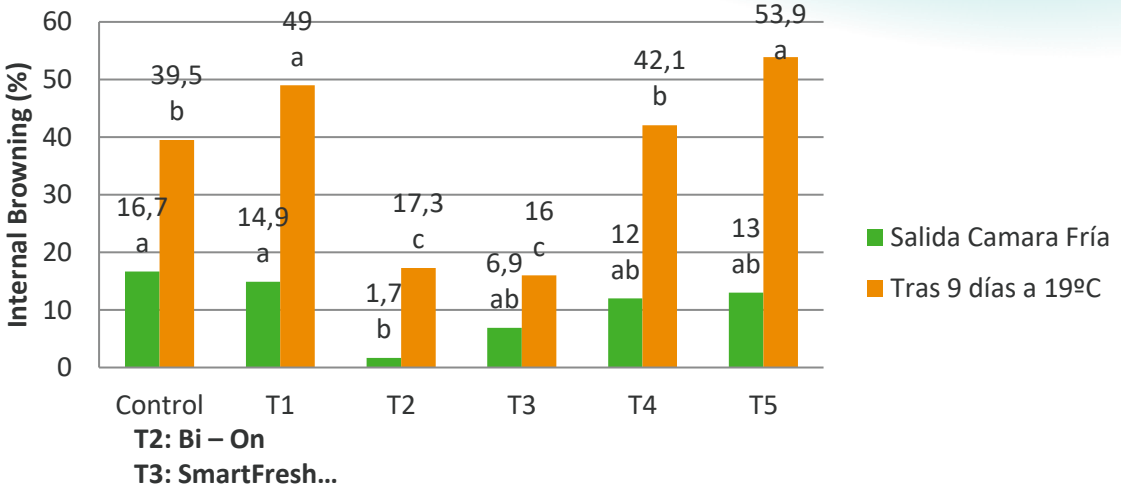
Modalities	Background color of fruits	
	Cold Chamber Output	After 8h at 19ºC
Temoin	4,6 a	4,7 a
Ethylene absorption	4,4 b	4,5 b

POST HARVEST CARE

Pink Lady Apple

BION :

- Reduced internal browning more effectively than other systems.
- Prevented the appearance of blanching and maintained firmness.



T2: Bi – On

T3: SmartFresh…

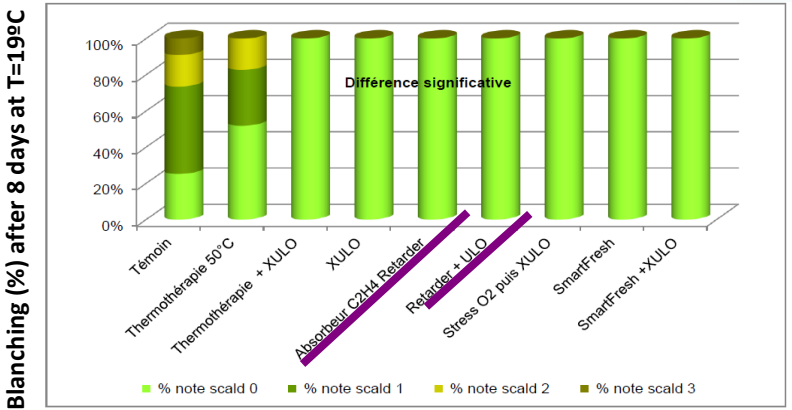
- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2006.
- Conditions: 5 months at 0.5 ºC, AC (2 % O2 and 1.8% CO2).
- Small scale trial.

Granny Smith Apple

BION in both CA and ULO:

Reduced internal browning more effectively than other systems.

Prevented the occurrence of **blanching and maintained firmness.**



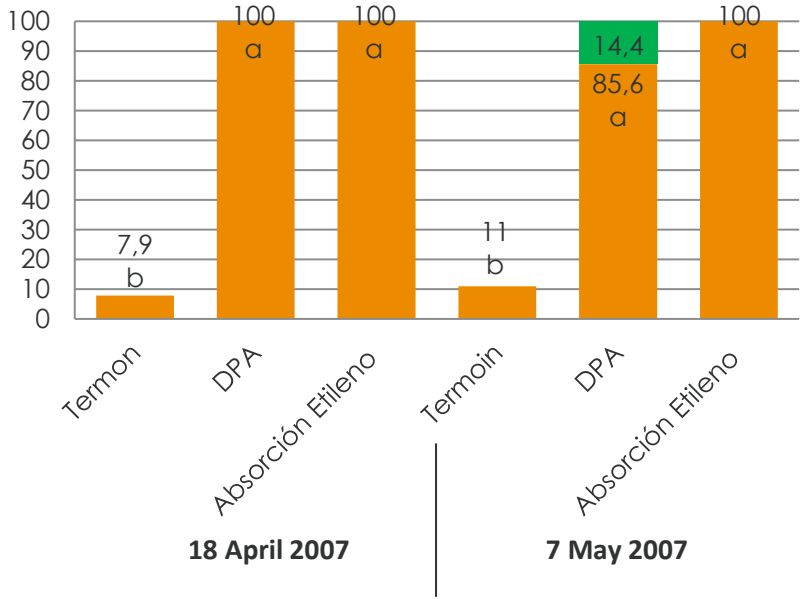
- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2012.
- Conditions: 5 months at 0.5 ºC, AC (2.5 % O2 and 1% CO2) and ULO (1.2 % O2 and 0.8 % CO2) .
- Small-scale study.

Granny Smith Apple

BION:

- **Prevented** the appearance of **scald** better than DPA.
- **Maintained firmness.**

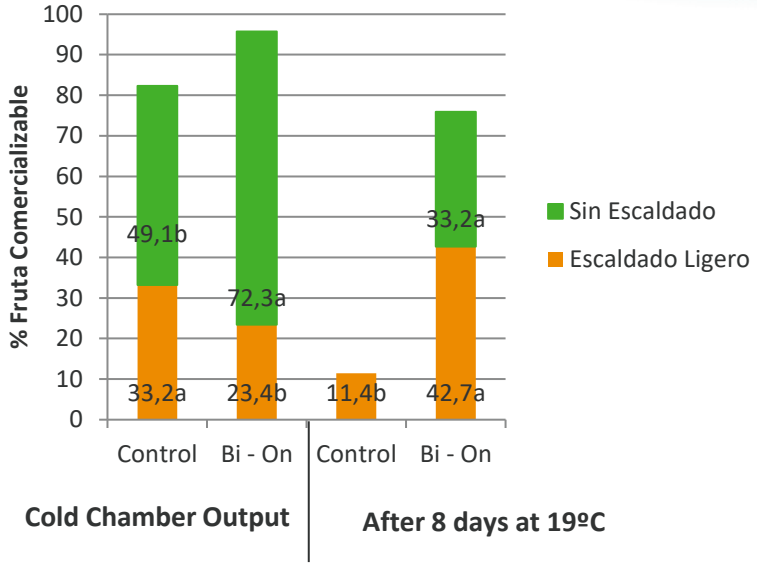
- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2012.
- Conditions: 5 Fruit at 0.5 ºC, AC (2 % O2 and 1.8 % CO2) for 6 and 7 months.
- Small scale trial.



Granny Smith Apple

BION clearly, **reduced blanching** 85% more marketable fruit than the control group.

- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2005.
- Conditions: Fruit at 0.5 ºC, AC (2.5 % O2 and 2% CO2).
- Blanching measurement: at the exit of the chamber and after 8 days at 19ºC.
- Small scale trial.

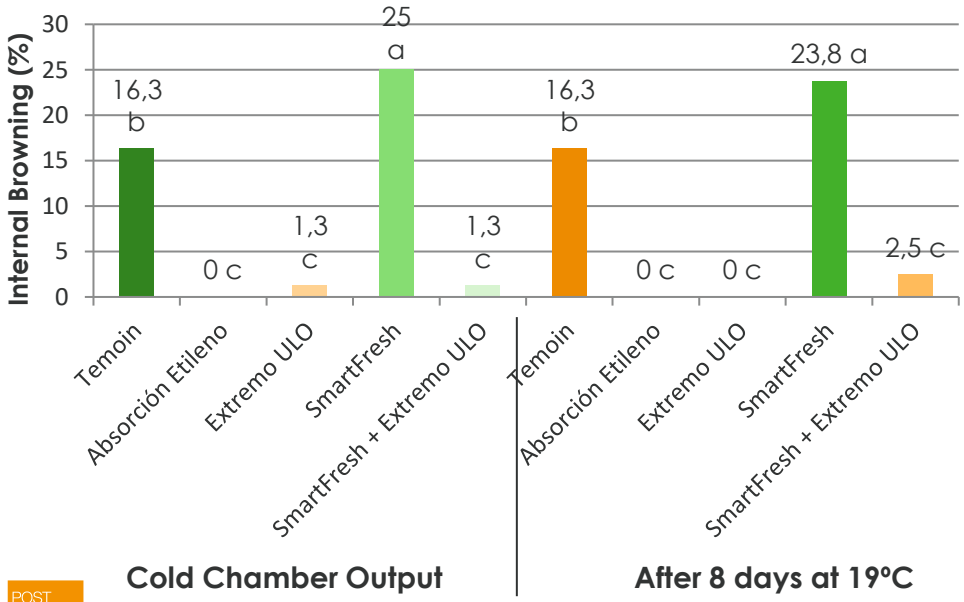


Ariane Apple

BION:

- **Reduced internal browning** more effectively than other systems.
- **Maintained firmness.**

- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2012.
- Conditions: Fruit at 0.5 - 1 ºC and AC (2.5 % O2 and 1% CO2) for 9 months.
- Small scale trial.



BION Advantages

Independent studies show that **BION**

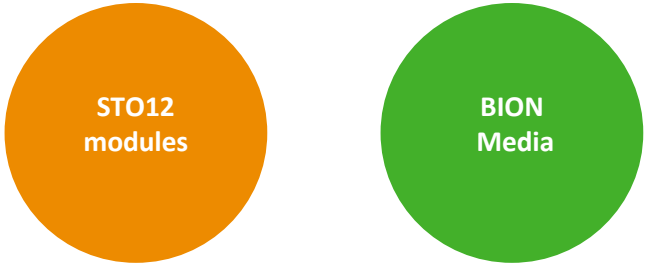
- Maintains **firmness**.
- Slows down **color evolution.**
- **Reduces gloeosporiosis.**
- Reduces the **risk of blanching.**
- Reduces **internal browning.**

In **apple preservation:**
(Bramley, Gala, Pink Lady, Granny Smith and Ariane)

POST HARVEST CARE

Solutions for the effective **removal of high ethylene concentrations**

Produced during **long apple storage** in **CA**



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by BIOON

THANK YOU