POST
HARVEST
_CARE

extending
shelf-life

by BION

Apples

BION

We improve air

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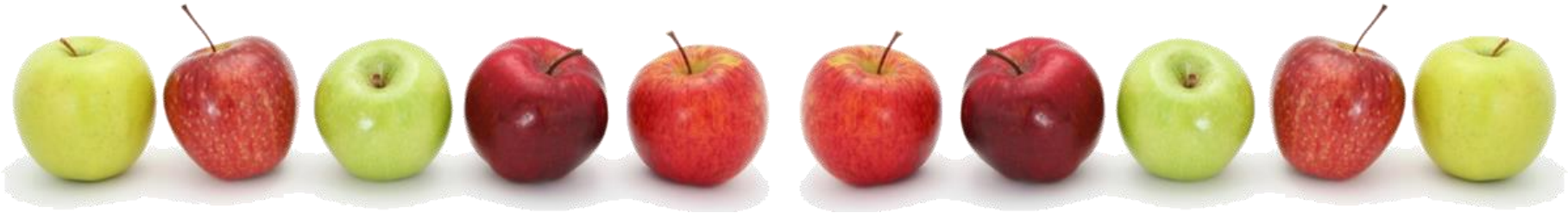
extending shelf-life by BIOCON

Introduction to the Study

Objective	To show the benefits of removing Ethylene with the Bioconservacion systems
Methodology	Trials in commercial fruit ripening chambers and in pilot chambers
Apple Varieties	Bramley, Royal Gala, Pink Lady, Gramy Smith, Ariane
Study performed by	CTIFL (France), IRTA (Spain), ICA storage (UK)



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Apples are the fruits with the **longest post-harvest life of conservation.**

Also is the fruit that produce **highest quantities of Ethylene**

Conventional systems of Ethylene absorption in storage chambers **are insufficient** to absorb theses elevated amounts of Ethylene.

Ethylene Effects

- **Softening** and loss of firmness.
- **Over- ripening** and ageing.
- Higher risk of **scalding.**
- Higher risk of **internal browning.**
- Higher incidence of **rot.**
- **Shrivelling.**
- **Weight loss.**

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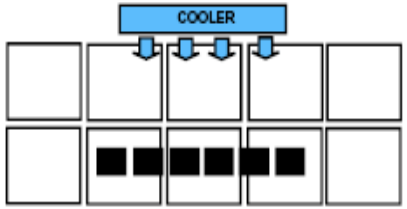
Module STO12 / Filter STO12

Is a **flexible solution**, the number of units **will depend on the Ethylene emissions** (variety and amount of fruit, time, atmosphere).

Is a **single-use filter** developed to being used as an autonomous **ethylene scrubbing** unit when large amounts of granule are required. Installed in the camera in front of the evaporator.



Bramley Apples

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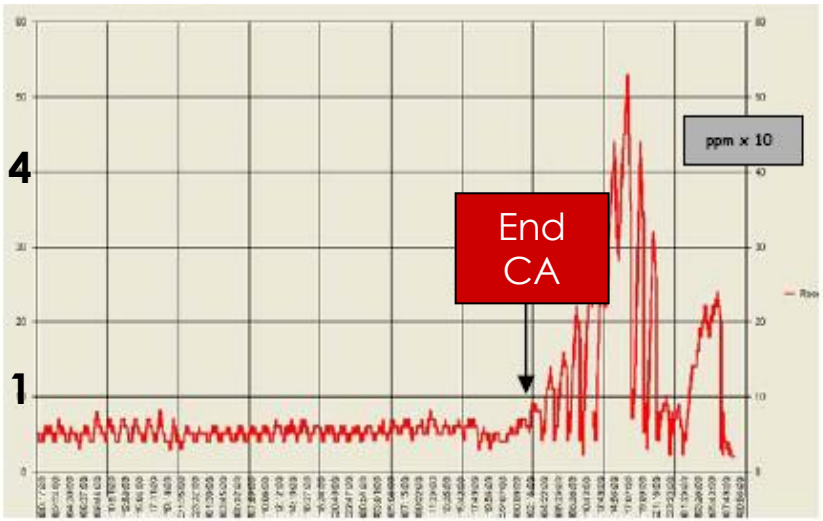
- ICA (UK) July, 2008
- Conditions: 9 months at 4,5ºC and CA(1% O_2, 5% CO_2)
- Chamber: 380 m^3 and 85 Tn of fruit.

Bi-On



SmartFresh

Unlike apples stored with SmartFresh, apple stored with **Bi-On recovered their Ethylene producing capacity** at the end of CA.

Bi-On vs SmartFresh

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

Royal Gala Apple

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- IRTA, Costa Brava (Spain), 2011
- Conditions: 4,5 months preserved at °C and CA(1,5 – 1,8 % O_2; 1,0 – 1,3% CO_2; 0,3 – 1,0 °C)
- Coold Room: 1000 m^3 and 220 Tn of fruit

Trial with prototype ETH internal machine:

- Ethylene measurements
- Apple quality measurements

Ethylene concentration: **< 0,2 ppm during the entire period of preservation.**
Commercial apple hardness: **6,1 kg (initial 7,5 kg).**

Pink Lady Apple

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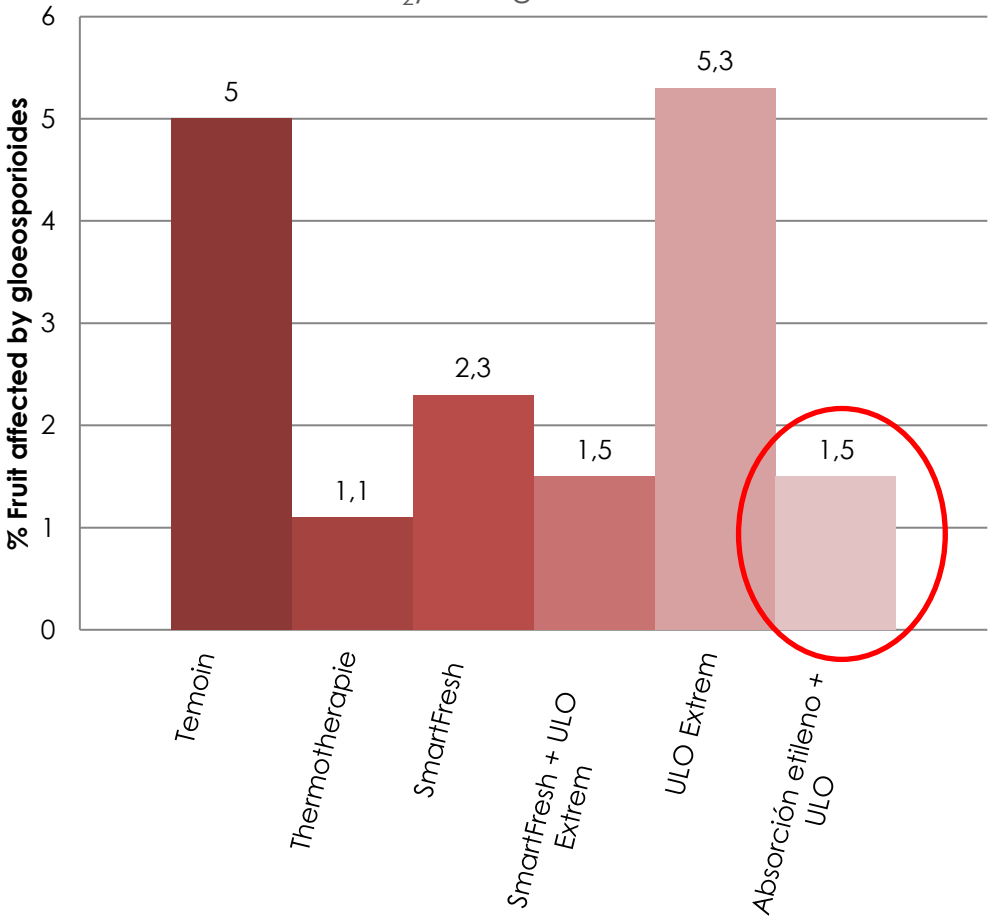
- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2012. Small-scale trial.
- Conditions: Apple at 0,5 – 1 °C, CA(2,2 % O_2 and 1,5 %CO_2) and ULO (1,2% O_2 and 1% CO_2) during 7 months.

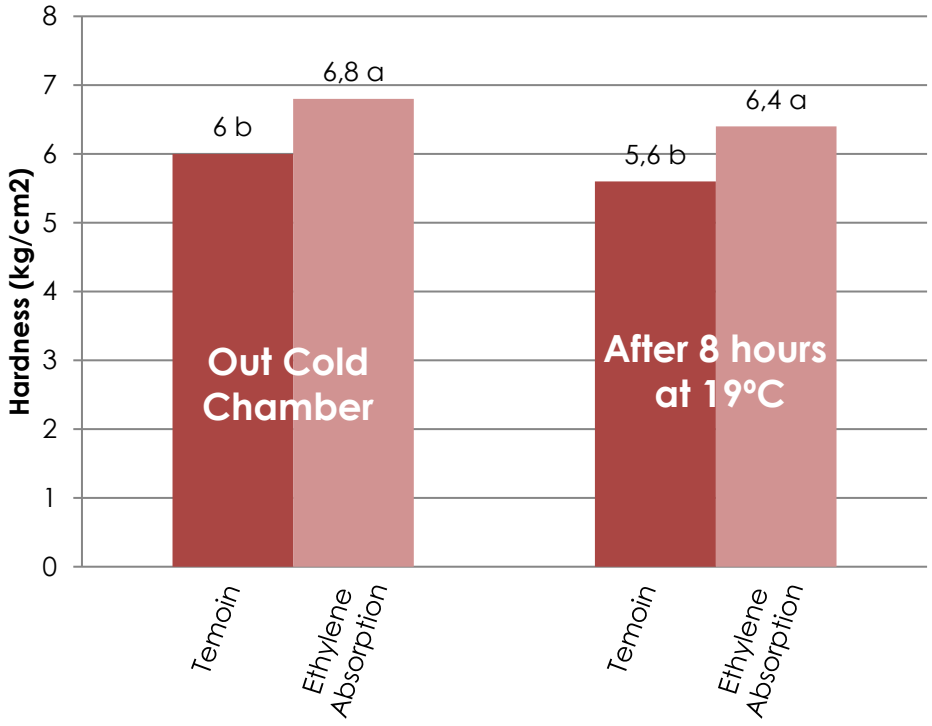


Bi – On in ULO atmosphere:

- Efficiently **reduced gloeosporioides**.
- **Prevented scalding**.

Pink Lady Apple

- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2008.
- Conditions: 5 months at 0,5 °C, CA(2,2 % O_2 and 1,5% CO_2).
- Small-scale trial



Pink Lady Apple

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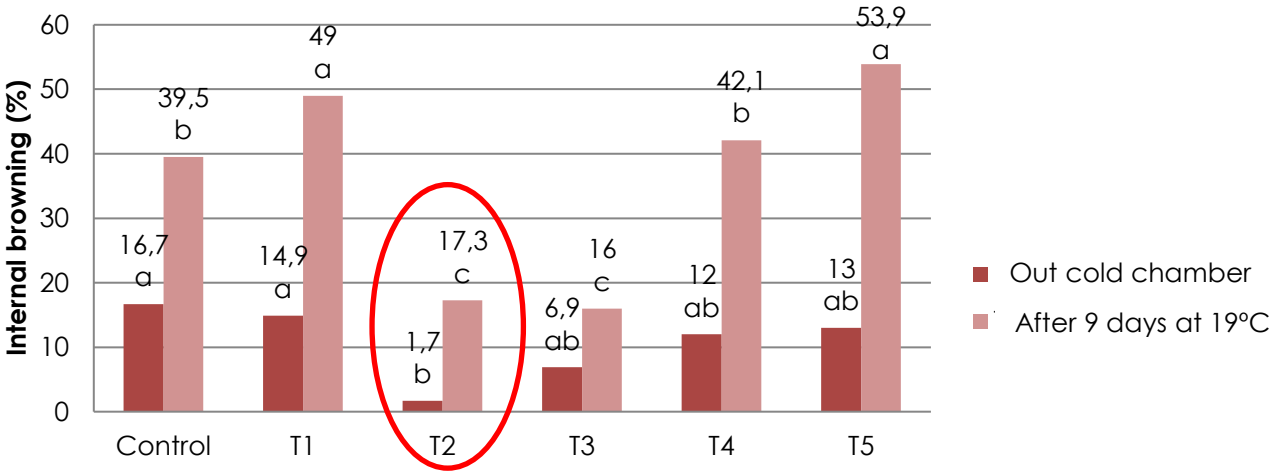
Modalities	Color fruits background	
	Out Cold Chamber	After 8h at 19°C
Temoin	4,6 a	4,7 a
Ethylene Absorption	4,4 b	4,5 b

Bi – On in ULO atmosphere:

- Prevented **scalding**
- Prevented **internal browning**
- **Reduced gloeosporioides**.
- Kept **hardness.**
- **Slowed down colour** development.

Pink Lady Apple

- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2006.
- Conditions: 5 months at 0,5 °C, CA (2 % O_2 and 1,8% CO_2).
- Small-scale trial



T2: Bi – On
T3: SmartFresh
T1, T4, T5: Other atmospheric conditions or applications of authorised additives

Bi – On :

- **Reduce internal browning** more efficiently than other systems.
- **Prevented scalding** and **kept hardness**.

Granny Smith Apple

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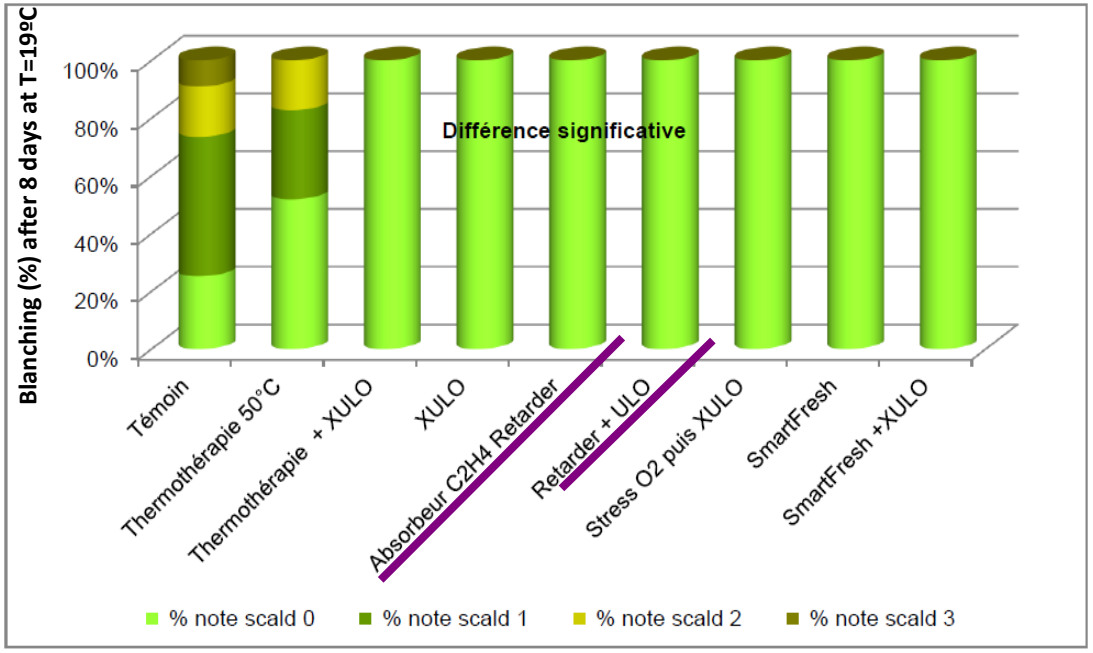
- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2012.
- Conditions: 5 months at 0,5 °C, CA (2,5 % O_2 and 1% CO_2) and ULO (1,2 % O_2 and 0,8 % CO_2).
- Small-scale trial.



Bi – On both in CA as in ULO:

- **Reduced internal browning** more efficiently than other systems.
- **Avoided blanching** and **retained firmness.**

Granny Smith Apple

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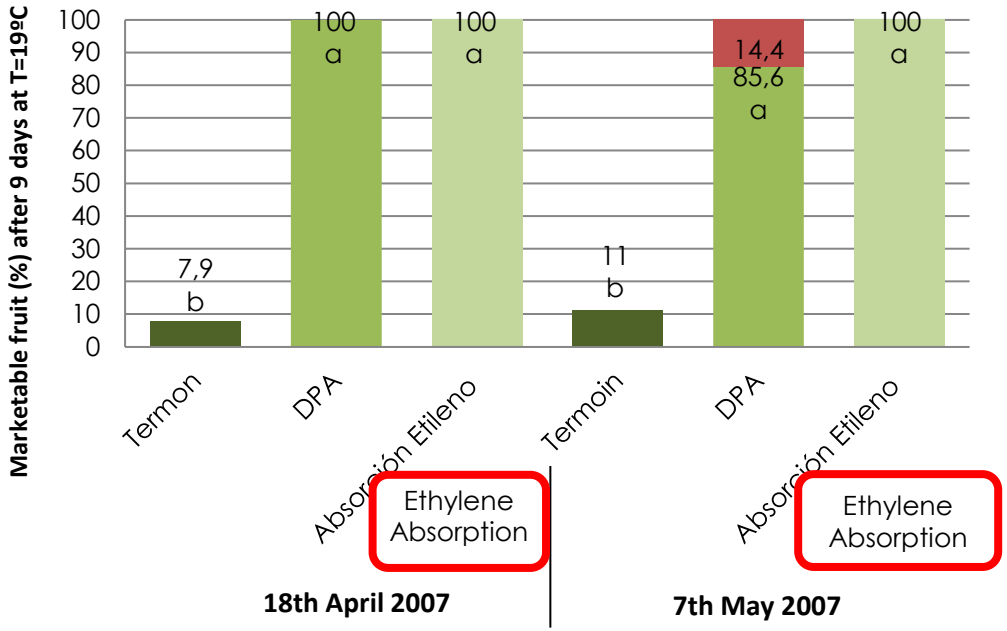
- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2012.
- Conditions: Fruit at 0,5 °C, CA (2 % O_2 and 1,8 % CO_2) for 6 and 7 months.
- Small-scale trial.



Bi – On:

- **Prevents scalding** better than DPA.
- **Retained firmness.**

Granny Smith Apple

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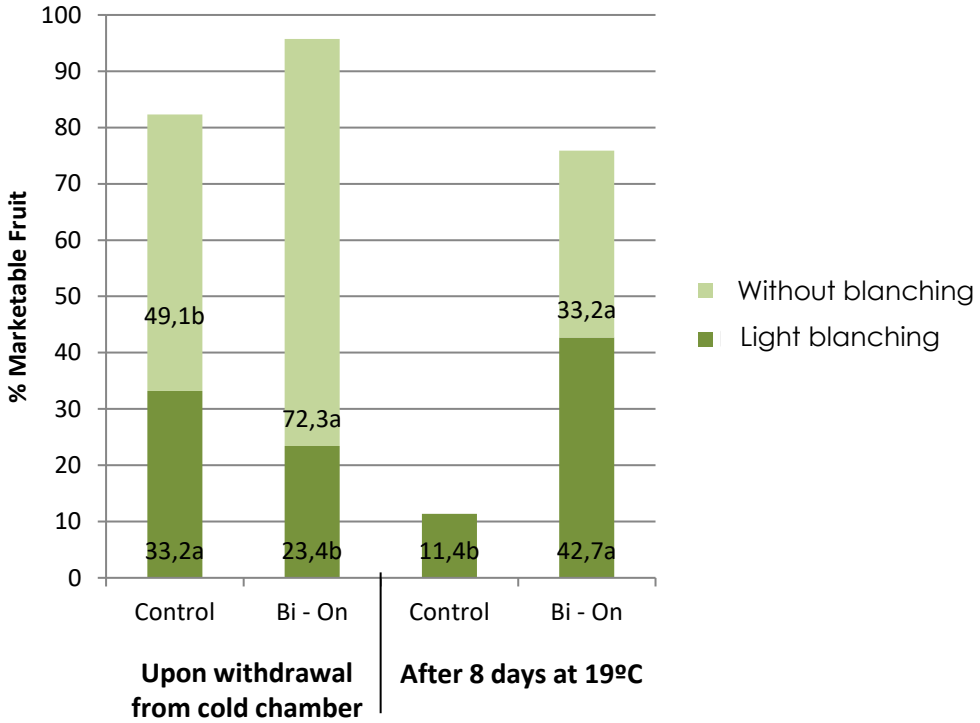
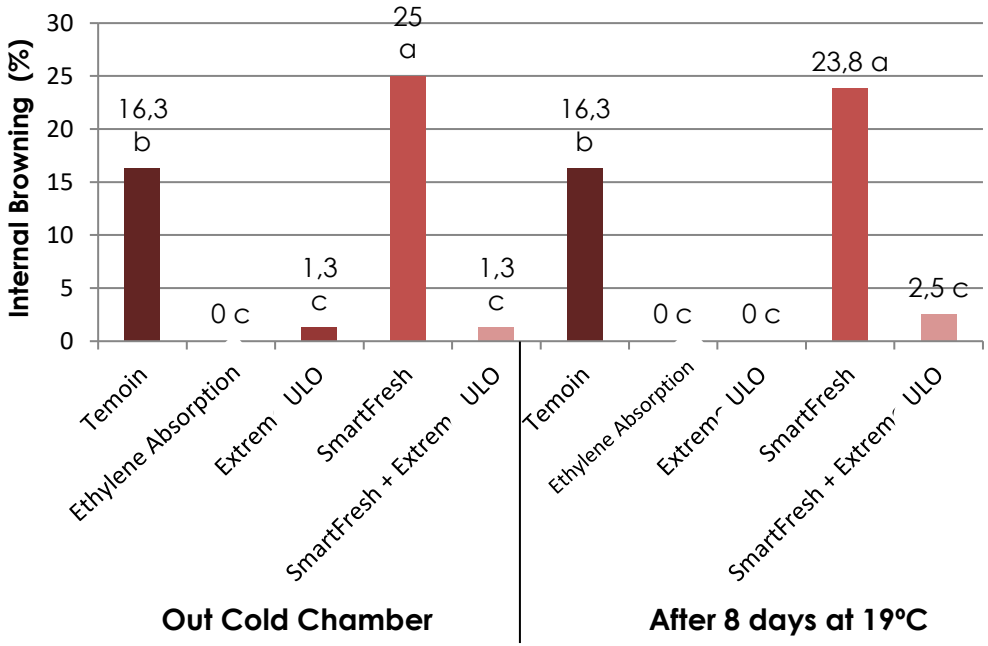
- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2005.
- Conditions: Fruit at 0,5 °C, CA (2,5 % O_2 and 2% CO_2).
- Mesurement of blanching: upon leaving the coold room and after 8 days at 19°C.
- Small-scale trial.



Bi – On clearly **reduced scalding**, 85% more marketable fruit than the control group.

Ariane Apple

- Ctifl/ CEFEL (France) Dr. Monteils and Dr. Westercamp, 2012.
- Conditions: Apple at 0,5 - 1 °C and AC (2,5 % O_2 y 1% CO_2) during 9 months.
- Small-scale trial.



Bi – On:

- **Reduced internal browning** more efficiently than other systems.
- **Retained firmness**.

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Bi – On Advantatges

Independent studies show that **Bi- On**:

- Retains **firmeness**.
- Slows downs **colour development**.
- Reduces **Gloeosporiosis**.
- Reduces the risk of **scalding**.
- Reduces **internal browning**.

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

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Solutions to effectively remove **high concentrations of Ethylene**

Produced during the **long conservation of apples in CA**

STO12 Modules

Bi – On Media

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Thank you

BION

We improve air

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