

POST
HARVEST
_CARE

extending
shelf-life

by **BION**



Strawberries

BION

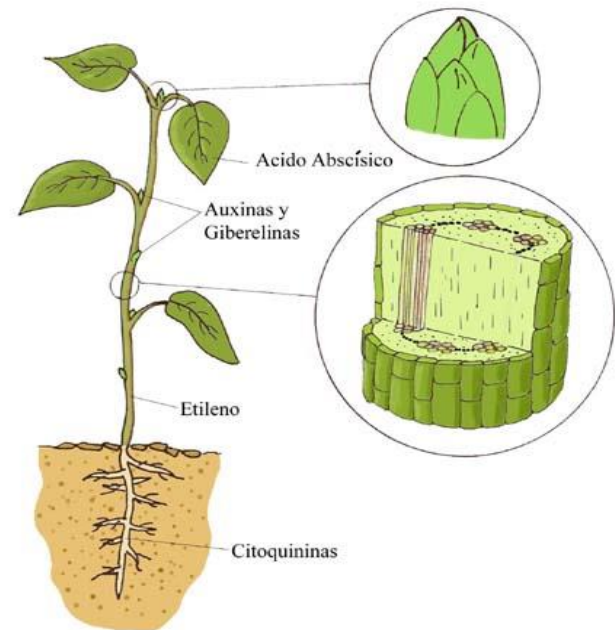
We improve air

What is the Ethylene?

Plant hormone that regulates the processes associated with **ripening and senescence**.

Its accumulate in storage chambers and transport containers.

Physiologically active very **low concentrations** (0,015 ppm)



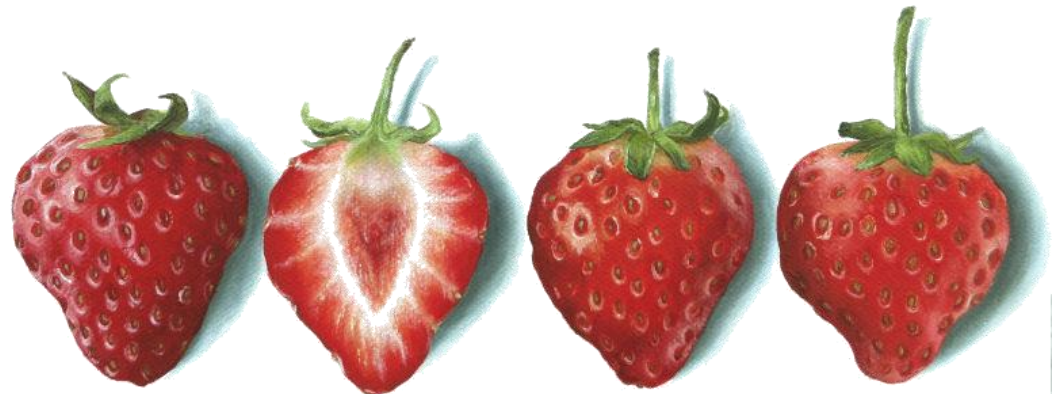
Ethylene Effects

Ethylene contamination along the distribution chain **speeds up the ripening, spoilage and fungal decay** of fruit/vegetables (= economical and quality losses)

Some **fruit pathogenic fungi** produce ethylene to **hasten fruit ripening**. Furthermore, ethylene (and also other gases emitted by fruit) trigger the **growth of some fungal spores**.

Ethylene **production and sensitivity** by fruits/vegetables depend on **different factors**:

- Species and cultivar
- Temperature
- CO₂/O₂ levels
- Physiological age
- Stress



Strawberries & Ethylene

Strawberry is a **non-climacteric fruit**.

Ethylene
Production

$< 0.1 \mu\text{l}/\text{C}_2\text{H}_4/\text{kg} \cdot \text{hr}$ at 20°C

Optimal
Temperature

$0 \pm 0.5^\circ\text{C}$ ($32 \pm 1^\circ\text{F}$)

Optimal
Humidity

90 - 95%

Responses to Ethylene:

- Ethylene causes **senescence** in strawberry
- The elimination of ethylene from the storage can **reduce the development of the disease**.



Strawberries & Ethylene

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Effect of ethylene on postharvest life of strawberries

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Abstract

Strawberries are non-climacteric fruit and therefore regarded as independent of ethylene for ripening. The concentration of ethylene in punnets of strawberries in wholesale markets was found to be in the range 0.03–0.36 $\mu\text{l l}^{-1}$ per punnet. Experiments at 20 and 0°C, where the ethylene concentration was controlled, showed that the storage life of strawberries was extended by reducing the ethylene level. Maximum storage was obtained at the lowest ethylene levels used of 0.05 $\mu\text{l l}^{-1}$ at 20°C and 0.005 $\mu\text{l l}^{-1}$ at 0°C. The addition of potassium permanganate to punnets held at either of the above temperatures significantly extended storage life of the fruit and this may be capable of commercial exploitation.

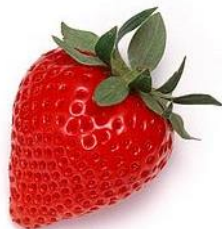
Strawberries & Ethylene

JL de la Plaza (Instituto del Frio-CSIC) obtain benefits of **using ethylene absorbers** in organic strawberry stored at 0 ° C. The commercial life of the fruit is **extended at least 10 days** respect to fruit sold in **traditional basket** and **7 days** respect to fruit packed in **plastic bag**.

AUMENTO DE LA VIDA ÚTIL (“SHELF-LIFE”) DE FRESA ECOLÓGICA REFRIGERADA, UTILIZANDO ABSORBEDOR DE VOLÁTILES

JL de la Plaza

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Botrytis cinerea

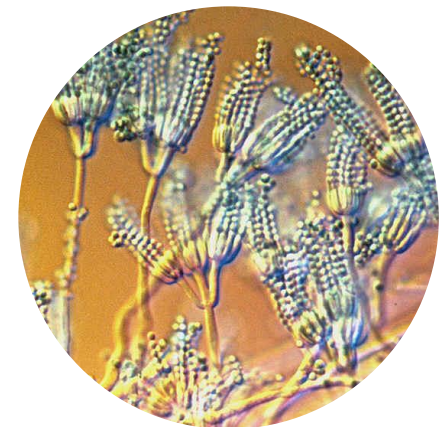
The capacity to produce ethylene of the fungus *Botrytis cinerea* (cause of gray mold disease) has been demonstrated.

According to the authors, this production of ethylene happen in small amounts of mycelium suggests its possible role in the **pathogenesis of the fungus** on sensitive fruit (such as strawberries).



Anti-Microbial Action

- Potassium permanganates is a **powerful disinfectant**.
- Bi-On **attracts and eliminates particles** which often carries microbes in the air.
- Fungi communicate by gas signals. Bi-On removes many of those gases **interrupting fungal development**.
- Ethylene removal **prevents tissue softening**, which is necessary for fungal invasion.



Bi-On in Strawberries

The results showed a significant effect on the strawberries' **shelf life** when the fruits were stored with Bi-ON+ / AC.

- Tested with 3 varieties: *Camosa*, *Pajaro* y *Reina de los Valles* (with and without calyx).
- After 15 days, all the **fruit without Bi-On +/ CA** was **infected** while protected fruit only got a partial loss in the Queen of the Valley variety without calyx.



Strawberry preserved for **13 days at 4 ° C**.

Benefits of use

- Increases **commercial life** of produce.
- Reduces **waste** (excess of ripening, rotting...).
- Maintains **colour**.
- Removes **odours** in the cold chambers.
- **Disposable**.
- Avoids **complaints/returns/claims** from clients.
- More protection against price **fluctuations**.
- **Harmless** to workers, produce and environment.
- **Easy** to handle and **low cost**.
- Enhances product and company **image**.
- Allowed in **organic** produces



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Thank you

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