

POST
HARVEST
_CARE

extending
shelf-life

by **BON**

STRAWBERRY

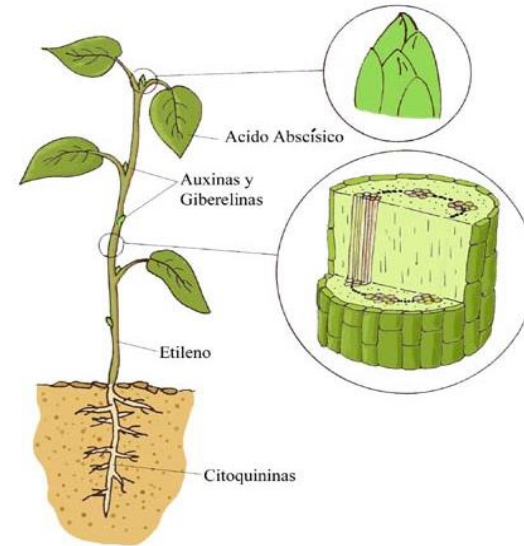


What is ethylene?

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

Accumulates in storage chambers and transport containers.

Physiologically active at **very low concentrations** (0.015 ppm).



Ethylene effects

Ethylene contamination in the distribution chain accelerates **ripening**, **spoilage** and **rotting** of fruits/vegetables (= economic and quality losses).

Some **fruit pathogenic fungi** produce ethylene to stimulate **fruit ripening**. In addition, ethylene (and also other gases emitted by the fruit) stimulate the development of some **fungal spores**.

Ethylene production and sensitivity to ethylene **depends on different factors**:

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



Strawberries and ethylene

The 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
Optimum Temperature	$0 \pm 0.5^\circ\text{C}$ ($32 \pm 1^\circ\text{F}$)
Optimum Humidity	90 - 95%

Ethylene Response:

- Ethylene does **not stimulate** the processes that occur during strawberry **ripening** (fruits should be harvested close to full maturity).
- The elimination of ethylene from storage can **reduce disease development**.



Strawberries and ethylene

Effect of ethylene on postharvest life of strawberries

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Accepted 13 January 1995

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.

The addition of potassium permanganate to the baskets significantly extended the shelf life of the fruit at 0 and 20°C.
This technique could be commercially viable.

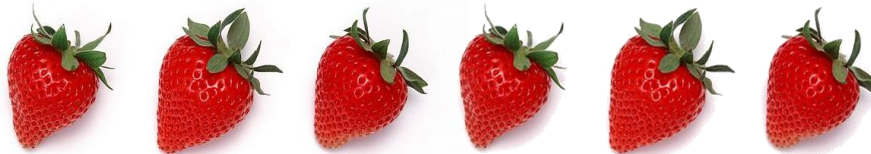
Strawberries and ethylene

JL de la Plaza (Instituto del Frio-CSIC) obtained benefits from the use of potassium **permanganate ethylene sorbents** in organic strawberries preserved at 0°C. The commercial shelf life of the fruit was **extended at least 10 days** with respect to fruit sold in traditional **baskets** and **7 days** with respect to fruit packed in **plastic bags**.

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

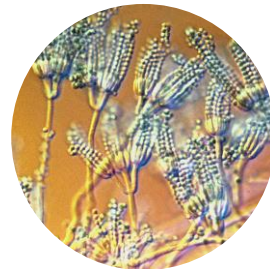
The ethylene-producing capacity of the fungus **Botrytis cinerea** (the cause of gray mold disease) has been demonstrated.

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



Antimicrobial action

- Potassium permanganate is a **powerful disinfectant**.
- Clays **attract particles** on which many microbes often move in the air.
- Fungi communicate by gas signals. **BION** removes many of these gases and **interrupts fungal growth**.
- The elimination of ethylene **delays tissue softening**, which is necessary for fungal invasion.



BION in strawberries

The use of Ethylclean machines with BION granulate + Active Carbon was able to **extend the shelf life** of the milling cutter stored in cold storage.

- Try 3 varieties: Camosa, Pajaro and Reina de los Valles (with and without calyx).
- After 15 days, all **fruit without BION + CA** were **infected**, while the protected fruit only showed partial deterioration for the Reina de los Valles variety without calyx.



Fresas conservadas durante **13 días a 4°C**.

Advantages of use

- Extends the **commercial life** of the fruit
- Reduces **wastage** (overripening, rotting...)
- Maintains **color**
- Prevents **weight loss**
- Is **disposable**
- Avoids customer **complaints/returns/re negotiations**
- Benefits from price **fluctuations**
- **Safe** for workers, product and the environment
- **Easy** to handle and **economical**
- Improves company and product **image**
- Can be used on **organic products**



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THANK YOU

