

POST
HARVEST
_CARE

extending
shelf-life

by **BION**



Tomato

BION

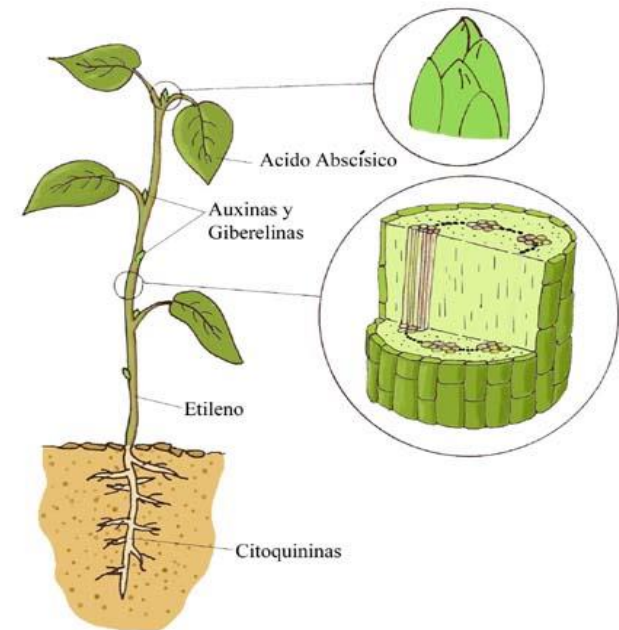
We improve air

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
- Stresses



Tomato & Ethylene

The tomato is a **climacteric fruit**.

Ethylene Production

1,2 – 1,5 $\mu\text{L}/\text{kg}^*\text{h}$ at 10°C
4,3 – 4,9 $\mu\text{L}/\text{kg}^*\text{h}$ at 20°C

Optimal Preservation Temperatures

Mature Green (Stage 2): 12,5 – 15°C
Light Red (Stage 4-5): 10 – 12,5°C
Firm-Ripe (Stage 6-7): 7 – 10°C

Responses to Ethylene:

- Tomatoes are sensitive to **exogenous ethylene** and exposure of mature-green fruit to ethylene will initiate ripening.
- Ripening tomatoes **produce ethylene at a moderate rate** and co-storage or shipment with sensitive commodities, such as lettuce and cucumbers, should be avoided.



Effects of Ethylene

- **Accelerated** ripening and **over-ripening**.
- **Softening** (loss of hardness).
- Color change.
- **Rotting** and **fungal infection** (*Botrytis cinerea*, *Alternaria Alternata*, *Geotrichum Candidum*...).
- More severe chilling **injury symptoms**.
- **Shriveling and loss of weight** caused by increased respiration.
- **Lower batch homogeneity** after the artificial ripening.



Geotrichum Candidum

*Agricultural Research Organization, The Volcani Center, Bet Dagan, Israel,
and The Hebrew University of Jerusalem, Rehovot, Israel*

Stimulation of Fruit Ethylene Production by Wounding and by *Botrytis cinerea* and *Geotrichum candidum* Infection in Normal and Non-Ripening Tomatoes

RIVKA BARKAI-GOLAN, GILA LAVY-MEIR and E. KOPELIOVITCH



Abstract

Inoculations with both *Botrytis cinerea* and *Geotrichum candidum* stimulated ethylene evolution in the pre-climacteric normal tomato fruit and the non-ripening *nor* mutant which did not show any rise in ethylene when uninfected. In the post-climacteric normal fruits, new peaks in ethylene production were formed. The rise in ethylene evolution in all types of infected fruits has already been detected during the incubation period of the disease. Ethylene peaks were detected earlier and were higher in fruits infected with *B. cinerea* than with *G. candidum*, coinciding with the faster rate of growth of the former. Mechanical wounding also stimulated ethylene synthesis by the non-ripening fruits, production being directly proportional to wound dimension. Considerably higher rates of ethylene were recorded for infected fruits than for mechanically-injured fruits in which wound dimensions were similar to those of lesion development.

Alternaria Alternata

Involvement of ethylene in spore germination and mycelial growth of **Alternaria Alternata**

Abstract:

Aminoethoxyvinylglycine, an inhibitor of ethylene synthesis and 2,5-norbomadiene, a competitive inhibitor of ethylene binding, **inhibited development of the fungus Alternaria Alternata.**

The inhibition was reduced by 1-aminocyclopropane-1-carboxylic acid.

The results suggest that **endogenous ethylene** synthesis and action are essential for **growth processes of A. Alternata.**
Mycol Res 98(1):118-120 (1994)



Trial in Tomato var. *Daniela*

Bi-On **slows down ripening** (evolution of hardness) and **rots**.

	Colour	Hardness	°Brix	Acidity	Rots
At start	6	7	2,75	4,8	0
Control	6	3	3,4	4,5	50
Bi-On®	6	5	3,25	4,6	27

Tomato preserved at room temperature during 5 days covered with a PVC film with and without Bi-On



Bi- On



Control



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Thank you

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www.bioconservacion.com

info@bioconservacion.com