
- Advertisement -

Ethylene — silent but deadly

October 25, 2017

Attention football fans — what's a fast way to ripen rock-hard avocados in time for game day guacamole? Place avocados with several apples together in a bag at ambient temperature. It takes a day or two, but apples speed up the ripening rate of avocados. Why? Ethylene gas, naturally released by the apples, kick-starts ripening speed.

Ethylene acts as the ripening hormone for fruits and vegetables, but it is a killer for lots of flowers and ornamental plants. Ethylene-sensitive flowers include, but are not limited to, orchids, delphinium, some varieties of roses, potted mini roses, geraniums, hibiscus, kalanchoe, euphorbias, sweet peas, ficus, freesia, carnations, wax and rice flower.



The dried petals on these daffodils are another telltale sign of damage from ethylene.

Ethylene is not only deadly, but determining the source is tricky, because damage is a dance comprised of moving variables: exposure time, temperature, level of exposure and flower age. Symptoms include very reduced vase life, yellow foliage, transparent petals, leaf and buds falling off stems, distorted bud opening or no opening, droopy plants that look dehydrated but are in fact moist, and rose petals becoming dark and veiny.

Ethylene's irreversible damage is not always immediately apparent — especially in coolers at 40 F — so the problem is often missed during quality checks. But 24-48 hours after flowers come out of cold store and transit, get unpacked and placed on sales display, problems are very apparent.

Savvy buyers know to ask vendors for details about their postharvest procedures because reducing stress and respiration rate is all about saving a flower's energy for vase performance at the consumer's home.

With production areas moving farther away from sales outlets, sea and land long-term storage specifications change. Sea transport logistics have provided a treasure trove of ethylene research and recommendations for fruits and vegetables, including topics around temperatures and efficient controls of respiration, oxygen, carbon dioxide, ethylene levels, cut stage for long transit, Modified Atmosphere Packaging, temperature management, etc. These are all aspects critical to arrival success of mixed loads after two to three weeks in transit.

Ethylene is a stress hormone and it is released in response to rough handling, dehydration, chill damage and disease invasion. But where does it originate? Nature's only gaseous hormone is produced in two ways: internally — in fruits, flowers and veggies as a stress response; and externally — from rotting green trash, auto exhaust, air pollution, cigarette smoke, inefficient space heaters, propane forklifts and/or floor polishers.

Mechanical damage triggers internal ethylene production, too. Slamming flowers is not intentional, but complacency creeps in and bad habits, omissions and careless methods may become norm. Employees forget that floral products are highly perishable and anything that avoids losses helps lift the bottom line. Handling methods directly affect shrink.

Want to reduce poinsettia shrink this season? Teach clerks to remove plant sleeves in a certain way. Here's why: poinsettias suffer irreversible bract droop if plants are pushed up and out of paper sleeves rather than tearing sleeves wide open to free the plant. Epinasty — horti-speak for poinsettia bract droop — is caused by internal ethylene production as a result of pushing the bracts against the way they grow; in other words, mechanical damage.

Buying treated product and working clean are front-line defenses. As far as treatments go, there are three: Silver Thiosulfate Solution taken in systemically, STS as a foliar spray, and Ethylene Buster, which are small white packets filled with 1-methylcyclopropene powder that turns into a gas when the sachet gets a fast dip in water. The 1-MCP powder treatment works like this — flower or plant packers dip one or two sachets in water (depending on flower/plant box size) and then toss the sachets into the box with the cut flowers or flowering plants like kalanchoes and hibiscus, and all orchid boxes.

The second method of protection involves adopting “a take no enemies” mentality to sanitation, culling, rotating products, watering and basic handling. Good sanitation alleviates many quality problems. Promptly dump old bucket water and clean debris from the sink because bacteria and fungi

also off-gas ethylene as colonies develop. Sanitize sinks daily to avoid cross-contamination. Hook hose nozzles up, rather than tossed in the bottom of a drain. Empty trash cans several times daily — botrytis spores are happy to float off trashed diseased petals onto worktables, containers and other flowers, in attack mode.

Finally, no lunches or fruit basket items allowed in coolers that share space with flowers. Yes, 'Lady Apples' look great in autumn flower arrangements, but the ethylene given off by the apples actively kills delphinium and oncidium sprays. Ethylene molecules are small enough to migrate through plastic and cardboard, so just closing up the box does not contain the gas.

At what level will ethylene start to cause flower/plant problems? Measuring levels harmful to flowers requires detection tools far more sensitive than hand-held meters provide. Air has to be captured and tested with a gas chromatograph machine in a lab.

How much ethylene is too much? According to Dr. George Staby, founder at Chain of Life Network and president at Perishables Research Organization in Phoenix, less than 40 parts per billion is the level to maintain in order to avoid damage to sensitive varieties of cut flowers and plants.

Gay Smith is technical consulting manager at Chrysal Americas. She can be contacted at gaysmith@earthlink.net.

[Print](#)