Nearer...

STACY - OSU (12)

A Tonic for Cut Flowers

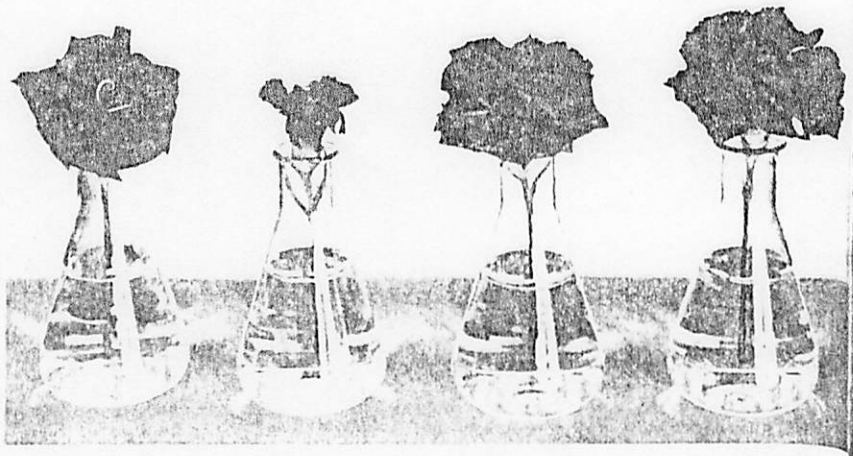
Asen 64

■ New information on the mechanism by which ethylene oxide gas retards aging in cut flowers has been obtained in tests with King Cardinal carnations at the Agricultural Research Center, Beltsville, Md.

Small dosages of ethylene oxide appear to reverse the action of another gas, ethylene, which is associated with aging in plants, say plant physiologist Sam Asen of ARS and physiologist Morris Lieberman of the Agricultural Marketing Service.

Last year, the two scientists reported success in efforts to delay the opening of cut roses through use of ethylene oxide (AGR. RES., June 1963, p. 16). The new experiments with carnations help support their theory that ethylene oxide counteracts the effects of ethylene.

Carnations were used in the new experiments because they are extremely susceptible to the effects of ethylene. Symptoms of ethylene damage, known to flower growers as "sleepiness," include incurving of the edges of the petals and eventual closing of the flower.



A high concentration of ethylene oxide—2,000 ppm for a 24-hour period—is slightly toxic to carnations, early tests proved. If treated at the 1,000-ppm level, the third carnation (from left) would show no deterioration—in contrast to the others—instead of slight deterioration visible here (6 days after 2,000-ppm treatment). Others are (1) untreated, (2) prematurely aged by ethylene, (4) treated with 1 ppm ethylene, 2,000 ppm ethylene oxide.

Gas treatment lasted 24 hours

The carnations were placed in water in flasks and then put in the gas chamber and held for 24 hours at 72 degrees F. Some were exposed to a normal atmosphere, some to 1 part per million ethylene, some to 1,000 ppm ethylene oxide, and some to a combination of 1 ppm ethylene and 1,000 ppm ethylene oxide. After treatment, the flowers were removed from the gas chambers, placed in a laboratory where the temperature varied from 72 to 80 degrees, and evaluated.

Within 24 hours, only the carnations that had been exposed to the ethylene alone showed typical "sleepiness" symptoms; and within 3 days after treatment, this group had completely dried out. Carnations treated with 1,000 ppm ethylene oxide or a combination of 1 ppm ethylene and 1,000 ppm ethylene oxide did not exhibit these symptoms—indicating that ethylene oxide counteracted the adverse effect of ethylene. The untreated carnations and those treated with the combination of the two gases started to deteriorate after 6 days; those treated with ethylene oxide alone did not start to deteriorate until the 8th day.

Asen and Lieberman think that the action of ethylene oxide in reversing the effect of ethylene is somehow related to the water content of the flowers. Those carnations exposed to ethylene lost water rapidly, they point out. Ethylene oxide seems to halt the water loss, and the action of the gas is apparently associated with cell permeability.

Earlier tests in the carnation series showed that a higher concentration of ethylene oxide—2,000 ppm for 2 hours—was somewhat toxic to carnations (see illustration).

The research on ethylene oxide is still at an early stage, and much work must be done before a safe, effective technique might be developed for the florist industry.☆

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