

THE ACTION OF ETHYLENE IN ACCELERATING THE BLANCHING OF CELERY

Preliminary experiments to date have been concerned with the following points:

1. The effects of various concentrations of ethylene on the rate of blanching, on the crispness and flavor, and on the storing quality of the celery.

2. The effect of the treatments on the acidity of the celery juice, as an indicator of physiological changes in the plants.

3. The action of ethylene on the rate of respiration of the celery.

4. The effect of removal of carbon dioxide, a product of respiration, on the blanching process, and also the effect of excess amounts of carbon dioxide, as an index of the rôle of by-products of respiration.

Concentrations varying from one part of ethylene in 500 of air, to one part in 50,000 of air, have been used. The most rapid and complete blanching took place where the lower concentrations were used. Very little difference was apparent between 1:25,000 and 1:50,000; these concentrations, however, were much superior to the stronger ones (1:2500 to 1:500), which showed little more blanching than the untreated check. The larger amounts of ethylene, particularly the concentration of 1:1,000, produced an injury characterized by splitting of the stalks on the inner surface, and pronounced pithiness of the stalks thus split.

The acidity of the celery juice was apparently not changed by the ethylene treatment. Differences in flavor were evidently not caused by the accumulation within the plants of by-products of respiration.

The rate of respiration was more than doubled by exposure to ethylene, as compared to the rate for untreated celery. The most rapid respiration, as indicated by the amount of carbon dioxide given off, took place in the sample exposed to one part of ethylene in 50,000 of air. In other words, the most rapid respiration was accompanied by the best blanching. Samples exposed to this concentration of ethylene were the most crisp and tender, but were the most subject to rot.

The removal of carbon dioxide by the use of calcium oxide and potassium hydroxide increased the rate of blanching and also the amount of rot. In the presence of very high concentrations of carbon dioxide, ethylene at the rate of 1:10,000 failed to produce any blanching at all.

These facts indicate that ethylene accelerates the blanching process by stimulating the activity of enzymes normally concerned with the breaking down of various compounds in the plant. With this in view, further studies are being initiated on the effect of ethylene on the enzymes of the celery plant, particularly oxidase, peroxidase, catalase, protease, cellulase, and pectase.—W. B. MACK, *Division of Vegetable Gardening, Department of Horticulture, State College, Pa.*