

## Abstract

The effects of exogenous and endogenous ethylene combined with or without the ethylene action inhibitor, 1-methylcyclopropene (1-MCP), on the shelf-life of European seedless cucumbers (*Cucumis sativus* L.) were studied. Exogenous ethylene ( $3\text{--}5 \mu\text{l l}^{-1}$ ) accelerated the breakdown of chlorophyll but the degradation pathway was not altered by ethylene treatment. Chlorophyll catabolism in cucumbers seems to follow the same pathway as in parsley with replacement of  $\text{Mg}^{2+}$  as the first step with a minor role for chlorophyllide, followed by oxidative ring cleavage of the pheophytin *a* formed. Degreening was accompanied by an increasing amount of citric acid in the endocarp with a concomitant fall of malic acid but with the onset delayed until 50% of the chlorophyll had disappeared. Fresh cucumbers, fumigated with 1-MCP before continuous exposure to ethylene, did not deviate from those untreated, with inhibited chlorophyll degradation for 14 days in one experiment, but for only 9 days in another experiment, after which 1-MCP + ethylene resulted in a patchy degreening of the peel. However, in pre-stored fruit either continuously exposed to propylene or air, fumigation with 1-MCP prior to exposure did not prevent degreening indicating that breakdown of chlorophyll in aged fruit may be triggered and regulated by developmental factors and not by the low level of endogenous ethylene produced. It is therefore concluded that cucumbers probably show little benefit from fumigation with 1-MCP unless exogenous ethylene is present. Although the cucumbers were harvested before one quarter of the final weight was reached, they were able to develop the same ripening characteristics, i.e. yellowing, accumulation of citrate and tissue softening as if left on the plant until growth has ceased. These results suggest that cucumber ripening and senescence are overlapping processes and internal factors activating senescence-associated genes probably determine the keeping quality of cucumbers.