

Title Development of controlled atmosphere storage technologies
Author David R. Dilley
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Abstract

Purpose of the review: This article provides a brief historical account of how controlled atmosphere (CA) storage of fruits and vegetables came to be, and describes some scientific and technological developments that contributed to its rapid expansion over the past 50 years.

Findings: The concept of CA storage originated nearly two centuries ago when a scientist in France observed that harvested fruits used oxygen and produced carbon dioxide, and when fruits were deprived of oxygen they did not ripen. Nearly a century passed before the first principles underlying the scientific basis for the effects of CA were elucidated. Ultimately, it became clear that the primary benefits of CA storage were accrued largely by attenuating the synthesis and action of the plant hormone ethylene, which is needed to initiate fruit ripening and plant organ senescence.

Limitations: CA storage is not universally adaptable to all crops. It is a process or system in which fresh perishable commodities such as certain fruits, vegetables, cut flowers and seeds, nuts and feedstocks are stored under narrowly defined environmental conditions to extend their useful marketing period after harvest. The absolute or desirable levels of these environmental variables differ according to commodity and stage of development. Moreover, tissue response may vary because of interactions among these variables as influenced by variety, preharvest conditions and climatic factors.

Directions for future research: Commercial interest in the development and implementation of CA or modified atmospheres for transportation and storage of fresh fruits and vegetables will foster research. Economic principles of supply and demand for the commodity in relation to energy use, cost, benefit and practicality will ultimately determine the use of CA storage technology for postharvest maintenance of the product for ultimate consumption or use.