



Compact Membrane Systems

Enhanced Modified Atmospheric Packaging

Modified atmospheric packaging (MAP) has significantly improved shelf life of postharvest fruits, vegetables, and flowers. This is done by controlling the concentration of gases inside the package. Strategy is for oxygen concentrations being lower and carbon dioxide concentrations being higher. Control of oxygen and carbon dioxide is typically managed by controlling the oxygen and carbon dioxide permeation properties of the packaging film. While oxygen and carbon dioxide control is desirable, low concentration (<0.1 parts per million - ppm) of ethylene is also extremely desirable.

Ethylene is a plant growth hormone. Uncontrolled low-level ethylene exposure to fruits, vegetables and flowers has been found to significantly contribute to loss of postharvest quality. Many postharvest fruits generate ethylene. Ethylene accelerates the ripening of those fruit as well as promoting senescence (aging) of all plant tissues. Therefore if packaging could rapidly remove ethylene (generated by the plants) the ripening and aging processes could be significantly slowed. If the ripening and aging processes are slowed, the life of postharvest products would be longer and fruits, vegetables and flowers could be both shipped longer distances and stay fresh for longer times or reduce the need for refrigeration.

Compact Membrane Systems, Inc. (CMS) has developed novel films that have very high transport of ethylene while having low transport for both oxygen and carbon dioxide. As an example, CMS has shown that laboratory bottles containing 100 ppm of ethylene and having small caps (e.g., Erlenmeyer Flasks) of CMS's novel films were able to equilibrate with the outside in 1-2 hours. These CMS novel films when used in MAP offer the opportunity to significantly increase postharvest fruit, vegetable and flower shelf life.

CMS is working with the United States Department of Agriculture to use related films to improve controlled atmosphere in large shipping containers. CMS is also working with the Department of Energy and industry partners to use these films to control ethylene concentrations in refinery and petrochemical streams.

CMS is now actively looking for partners or customers to use these novel films for MAP applications. These films may be used as is or in combination with existing MAP materials.