

Title Membrane technology for postharvest processing of fruits and vegetables
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Abstract

Purpose of the review: This article reviews current membrane technology in postharvest processing of fruits and vegetables and provides practical guidelines for selecting membrane technology for postharvest processing. An overview of the current state-of-the-art membrane technology in fruit and vegetable processing and a practical guideline for designing and scaling-up membrane systems are provided.

Findings: Fruit juice clarification and concentration with membrane filtration dominate current application of membrane technology in postharvest processing; however, flavor compound retention and recovery by pervaporation and osmotic distillation has started gaining foothold in the industry. Other membrane-based concentration processes show a promising future. There is a strong interest in the food research community to utilize membrane technology to recover valuable food components from waste streams.

Limitations/Implications: Wide acceptance of membrane technology in the food industry is not only limited by lack of “track record”, due to relative newness of the technology, but also limited by lack of suitable membrane systems or membrane materials. Many commercial membranes and modules are designed to accommodate the needs of water treatment communities (for example desalination) although there is evidence that the manufacturers are heeding the call from the food processing and biopharmaceutical industries. There is also a tendency for some individuals and membrane suppliers to exaggerate what membrane technology can accomplish and, as a result, the food industry as a whole is wary of any new membrane process that appears on the scene.

Directions for future research: Future research should focus on the fundamental study of membrane fouling, particularly on interactions among biopolymers, inorganic matters, and the membrane surface. Manufacturers should develop a food-oriented evaluation and assessment protocol for constructing membrane property data sheets and improve the reliability and renewability of their membranes. The food science community needs to actively involve in basic

research on membrane separations, not just run-of-the-mill type of study on concentration of yet another new exotic fruit (or vegetable) juice with a well-studied commercial membrane.