

Title Application of modified atmosphere packaging (MAP) with new concepts for respiring foods
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Citation Abstracts, 10th International Controlled & Modified Atmosphere Research Conference, 4-7 April 2009, Antalya, Turkey. 80 pages.
Keyword Modified atmosphere packaging; food product; gas composition

Abstract

Modified atmosphere packaging (MAP) is a shelf-life-enhancing method which is growing rapidly on an international scale. The correct gas mixture in MAP maintains high quality with extended shelf life. However, the initial gas composition in the package headspace often changes as a result of the activity of the food product, the nature of the package, or the environmental conditions. For example, respiration of fresh produce, gas generation by spoilage microorganisms, or gas transmission through the packaging material or package leaks, may cause the gas composition inside the package to change.

MAP application can be combined with new packaging concepts such as active and intelligent packaging technologies in order to monitor gas change and maintain the initial gas level during the whole storage time. Gas indicators or sensors in the form of a package label or printed on packaging films can monitor changes in the gas composition (smart packaging concept). Sensors adapted in the MA package could detect gas levels (smart packaging concept) and also the sensor could release gas to compensate for gas losses in the package (active packaging concept). Thus, the initial gas mixture could be maintained in the MA applied package during the storage time. In addition, gas indicators such as oxygen and carbon dioxide indicators could be used to monitor maturity stage of fruits in the package. Most of the indicators are based on the color change principle due to chemical or enzymatic reactions. These indicators are in contact with gas atmosphere and work based on the gas change in the package. Another application of these indicators is to determine package leakage which not only causes change in internal atmosphere but also microbial contamination from the environment.

In conclusion, MAP combined with active and intelligent packaging concepts will provide a means of monitoring the quality and safety of the respiring products.