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| **Title** | Modified atmosphere packaging for fresh-cut pear-deduction of optimal packaging film and geometry based on respiratory metabolism |
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**Abstract**

Modified atmosphere packaging (MAP) is widely used in fresh-cut fruit. However, kinetics of respiration of fresh-cut 'Rocha' pear as a function of oxygen partial pressure shows that the transition to anaerobic metabolism occurs at ca. 0.75 kPa $O_2$, at 0 to 10 °C. At this oxygen partial pressure maximum respiration rate of fresh-cut 'Rocha' pear stored at 5 °C is reduced by only 24%. This theoretical estimation suggests that optimizing MAP is limited benefit for fresh-cut pears. The kinetics of respiration as affected by oxygen partial pressure was used to design packages with various geometries and permeabilities, to achieve oxygen partial pressures ranging from 18 to 0.5 kPa and carbon dioxide partial pressures ranging from 4 to 8 kPa. Change in gas composition was mathematically simulated and adjustment of packaging dimensions, film permeabilities and thickness, fruit weight, and free volume were manipulated to control the desirable levels of gases. Fresh-cut 'Rocha' pear were stored at 5 °C in the various packages were evaluated for l2 days. Results show that no significant quality improvements were obtained by reducing oxygen partial pressure inside the packages, confirming the theoretical estimation.