Title Determination of O_2 and CO_2 transmission rates through microperforated films for modified atmosphere packaging of fresh fruits and vegetables

Author Jaime González, Ana Ferrer, Rosa Oria and Maria L. Salvador

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Abstract

Microperforated films (perforation diameter <200 μm) are an option for achieving the appropriate gaseous composition in modified atmosphere packaging, especially for fresh-cut products. In this project, static techniques were used to experimentally measure the oxygen and carbon dioxide transmission rates of microperforated films. Twenty nine microperforations of different dimensions (from 40 × 30 μm to 350 × 110 μm) and thickness (from 29 to 57 μm) were tested in the project. A potential equation was found to provide a good prediction of the dependence of the O_2 and CO_2 transmission rates on the perforation area. The data predicted by the equation was compared with those from five other bibliographic models. The empirical equation agrees, within the experimental range, with the modified Fick's law (considering the total diffusive pass length of a perforation as the sum of the perforation length and end correction term). The predictions of the proposed equation for thicker films and holes of larger dimensions (equivalent radius >3000 μm) correspond to those of the empirical models.