

Title The influence of plastic composition and ventilation area on ozone diffusion through some food packaging materials

Author Hakan Karaca and Joseph L. Smilanick

Citation Postharvest Biology and Technology, Volume 62, Issue 1, October 2011, Pages 85-88

Keywords Ozone; Diffusion; High-density polyethylene; Low-density polyethylene; Polypropylene; Ventilation area

Abstract

Regulatory approval of ozone has increased commercial interest in the development of applications to ensure produce quality and safety. However, ozone sometimes fails to inactivate microorganisms on packaged produce and this may be a consequence of poor diffusion into packages. Gaseous ozone ($900 \pm 12 \mu\text{L/L}$) was applied to several common plastic films with a range of ventilation areas and diffusion through them determined. A semi-quantitative method using the reaction of ozone with indigo trisulfonate or with indigo carmine dye solutions was used. Dye de-colorization occurred relatively rapidly (in less than 1 h) after exposure to ozone, indicating that it diffused through all tested materials. Although the extent of ozone diffusion followed the sequence of high-density polyethylene > polypropylene > low density polyethylene, differences among them were small and not significant ($P > 0.05$). Ozone diffusion was also determined through a low density polyethylene film with ventilation areas of 1.3, 5.2, and 10.4% created by circular holes 6.5 mm in diameter. Gradual but modest increases in ozone diffusion occurred as the ventilation area increased.