

**Title** Gas transmission rates of commercially available polyethylene and polypropylene films for modified atmosphere packaging

**Author** Yaptengco K.F., Kim J.G. and Lim B.S.

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#### **Abstract**

Oxygen transmission rates (OTR) of low-density polyethylene (PE) and polypropylene (PP) films were measured at 10, 15 and 17 deg C using the whole-bag method of Moys (2004) for unperforated films. PE films with the normal thickness of 30, 40, 60 and 80 micro m (PE30, PE40, PE60, and PE80, respectively) were analyzed; thickness of the PP film was 40 micro m. Oxygen and CO<sub>2</sub> transmission rates (CO<sub>2</sub>TR) of 35-microporated polypropylene (MPP) were measured at 10, 15 and 17 deg C using the method described by Ozdemir et al. (Ozdemir I, Monnet F., Gouble B. 2005 Postharvest Bio Tech 36:209-213). Temperature effects on unperforated PE and PP films followed Arrhenius Kinetics (R<sup>2</sup>0.970). Activation energy (E<sub>a</sub>) of the PE film had a range of 28.1-35.0 KJ/mol; for the PP film, E<sub>a</sub> was 38.1 KJ/mol. In general E<sub>a</sub> of PE film increased as film thickness (t<sub>F</sub>) increased Q<sub>sub 10</sub> Tr values at 10-20 deg C for PE and PP were 1.50-1.66 and 1.74, respectively. Temperature had no definite effect on OTR and CO<sub>2</sub>TR of MPP. Mean OTR and CO<sub>2</sub>TR for MPP were 10,848 and 9,554 mL/sq m/d, respectively. The average perforation diameter (D<sub>mp</sub>) and density (d<sub>mp</sub>) was 41.0 micro m and 125 perforations per sq m, respectively, for a 20 cm x 28 cm bag. Comparisons with published data showed the sample film to have gas transmission rates at the lower end of the range for such types of packaging film.