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## **Gas permeability of polyurethane films for fresh produce packaging: Response of O<sub>2</sub> permeability to temperature and relative humidity**

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### **Abstract:**

Thermoplastic shape memory polyurethane (SMPU) polymers were synthesized, cast to films, and their gas barrier properties were characterized. In addition, performance of an optical method was assessed by measuring oxygen permeability ( $P_{O_2}$ ) of the films.  $P_{O_2}$  of the SMPU film was at least two times higher than that of low density polyethylene (LDPE) and increased at higher relative humidity. Permselectivity ( $P_{CO_2}/P_{O_2}$ ) of the SMPU film was 15, which is approximately three times higher than for LDPE. The film absorbed circa 18 % water vapor at 98 % relative humidity. The optical method agreed very well (maximum 20 % deviation) with a standard carrier gas method in  $P_{O_2}$  measurement. Overall our results show that SMPU is an attractive polymer for fresh produce packaging.

Keywords: Polyurethane, gas permeability, temperature sensitive smart film, fresh produce packaging