Title	Depletion of 1-MCP by 'non-target' materials from fruit storage facilities
Author	Fernando Vallejo and Randolph Beaudry
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## Abstract

The sorption of 1-methylcyclopropene (1-MCP) by a number of 'non-target' materials found in apple (Malus × domestica Borkh.) and pear (Pyrus communis L.) fruit storages was measured as a function of time, temperature, and moisture content. Materials included bin construction materials [high density polyethylene (HDPE), polypropylene (PP), extensively- and slightly-weathered oak (*Quercus* sp.), weathered fir (Abies sp.) plywood, and cardboard] and wall surface materials (polyurethane foam and cellulose-based fire retardant). Bin construction materials test pieces had an external surface area of 180 cm<sup>2</sup>. We placed 'non-target' materials in 1-1 glass jars and added 1-MCP gas to the headspace at an initial concentration of approximately 30  $\mu$ l 1<sup>-1</sup>. Gas concentrations were measured after 2, 4, 6, 8, 10, and 24 h. The concentration of 1-MCP in empty jars was stable for the 24-h holding period. There was little to no sorption by HDPE, PP, polyurethane foam, or fire retardant. However, plywood, cardboard, slightly-weathered oak, and extensively-weathered oak absorbed 16, 18, 55, and 75% of the 1-MCP after 24 h. Moistening the test material increased the rate of sorption of 1-MCP for cardboard, plywood, weathered oak, and non-weathered oak, resulting in a depletion of approximately 98, 70, 98, and 98%, respectively, in 24 h. For oak bin material, the rate of sorption was not impacted by temperature and increasing the surface area by approximately 100% only marginally increased the rate of sorption. When moistened oak bin material was included with apple fruit in a proportion similar to that found in fruit storage, 90% depletion occurred in 6 h compared to approximately 80% in 24 h for fruit alone. The data suggest that 1-MCP levels can be compromised by wooden and cardboard bin and bin liner materials, but not by plastic bin materials or wall surface materials commonly used in Michigan.