

**Title** Low oxygen effect on *Penicillium expansum* mould in stored apple  
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#### **Abstract**

*P. expansum* causing blue mould, is a serious postharvest pathogen in all growing pome fruit areas. Physical treatments, including storage atmosphere manipulation, have been developed to control postharvest fungal decay. The present study aimed to determine the influence of oxygen (O<sub>2</sub>) levels on growth of *P. expansum* (P37 strain). Pathogen enzymatic production at low O<sub>2</sub> levels was also tested in in vitro trials by agarose diffusion assay. In in vitro trials, 100 ml of conidial suspension (103 conidia per ml) was spread on PDA dishes, stored for 30 days at 0°C with 0.7; 1.5; 3; 6 and 21 % O<sub>2</sub>. The concentration of carbon dioxide was 1 %. In in vivo trials, fruit were wounded and inoculated with 20 ml of a conidial suspension (103 conidia per ml) of *P. expansum* and stored with the same O<sub>2</sub> concentrations for five months at 0°C plus 3 days at 20°C. No significant difference have been observed, within the different O<sub>2</sub> concentrations, on *P. expansum* growth in vitro. The percentage of infected fruit was significantly greater at low O<sub>2</sub> levels (0.7; 1.5; 3 %) than at 6 or 21%. However the dimensions of decay lesions, on apple exposed to 21 and 6% of O<sub>2</sub>, were significantly wider than those of apples stored at 0.7; 1.5; 3 % O<sub>2</sub>. In addition O<sub>2</sub> levels deeply influenced the enzymatic activity. Polygalacturonases, proteases and amylases activities were increased by low O<sub>2</sub> level (0.7%), whereas cellulases were reduced by the same O<sub>2</sub> concentration. More investigations are required to better elucidate the interactions between pathogen-fruit-oxygen level and the role of the enzymes in pathogenicity.