

Title Changes in color, antioxidant, and free radical scavenging enzyme activity of mushrooms under high oxygen modified atmospheres

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Abstract

The effects of high oxygen concentration (80% O₂) on color, antioxidant enzyme and free radical scavenging activity of mushrooms (*Agaricus bisporus*) were investigated. High oxygen modified atmosphere chambers were designed. Mushrooms (*A. bisporus*) were held at 2 °C for 12 d in modified atmosphere chambers, linked by separate lines to continuous flow (1.67 mL s⁻¹) of humidified air (control) and 80% O₂ (balance N₂). Browning of mushroom flesh and surface exposed to 80% O₂ was prevented and the expected increase in membrane permeability and lipid peroxidation was delayed. Compared to the control treatment, high oxygen significantly inhibited the reactive oxygen species (ROS) such as O₂⁻ and H₂O₂. The corresponding oxygen radical scavenging enzyme activities including SOD, CAT and POD in 80% O₂ were also higher than those in the control ($P < 0.05$). Higher antioxidant activity was found in high oxygen treated mushrooms. The treatment with 80% O₂ could be used in modified atmosphere of mushrooms to avoid browning, which was due to enhanced antioxidant and free radical scavenging enzyme activity.