

Polyethylene-based packaging material loaded with nano-Ag/TiO₂ delays quality deterioration of *Agaricus bisporus* via membrane lipid metabolism regulation

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Abstract

Agaricus bisporus is prone to deteriorate after harvest. In this study, polyethylene-based packaging material loaded with nano-Ag/TiO₂ (Nano-PM) was used for the preservation of *A. bisporus*, and compared with the polyethylene packaging material. The samples were stored at 4 ± 1 °C and a relative humidity of 90 % for ten days. Membrane lipid metabolism was taken as a breakthrough point in this study. The cell membrane phenotype and ultrastructure were documented. The changes of key enzyme activities, phospholipids and fatty acids in membrane lipid metabolism were also studied. The results showed that at the end of storage, the electrolyte leakage of the mushrooms in Nano-PM was 19 %, which was lower than that of the control groups (27 %). Nano-PM delayed the decrease of cell membrane fluidity, maintained a good cell structure, also maintained the ascorbic acid (AsA) content, kept glutathione (GSH) and proline at high levels. Furthermore, the phospholipase D (PLD), lipase (LPS) and lipoxygenase (LOX) activities of the mushrooms in Nano-PM were reduced by 16%, 25% and 10% compared with those in control groups. Nano-PM also alleviated the degradation of cell membrane phospholipids and maintained a higher relative content of unsaturated fatty acids. Generally, Nano-PM can delay quality deterioration of *A. bisporus* by regulating membrane lipid metabolism.