

## Abstract

Rapid deterioration of postharvest *Agaricus bisporus* is a serious problem. Measures to improve the shelf-life are of great importance. Therefore, we used a nanocomposite-based packaging material (Nano-PM) containing nano-TiO<sub>2</sub>, nano-SiO<sub>2</sub>, nano-Ag and attapulgite to study its effect on microstructure and energy metabolism of *A. bisporus*. Nano-PM reduced the oxidation of lipids and proteins by activating antioxidant enzyme activities and inhibiting the accumulation of ROS, thereby maintained high level of energy status. Meanwhile, ATP content and energy charge of *A. bisporus* in Nano-PM increased through the energy metabolism system. This was attributed to the lower respiration rate and higher mitochondrial respiratory enzyme activities. These results indicated that Nano-PM could maintain the dense and intact microstructure of *A. bisporus* thus improve its shelf-life.