

# Effects of high N<sub>2</sub>/CO<sub>2</sub> in package treatment on polyamine-derived 4-Aminobutyrate (GABA) biosynthesis in cold-stored white mushrooms (*Agaricus bisporus*)

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## Abstract

White mushrooms were harvested and then packaged, the air was evacuated from the package, and then one of two inert gases, N<sub>2</sub> or CO<sub>2</sub>, was pumped into the sealed packages. After storing all mushrooms at 4 °C, dynamic quantitative changes in polyamines and amino acids were subsequently detected. The results showed that the content of polyamines (PAs) in the white mushrooms was significantly increased due to the climacteric effect after 24 h of cold storage, but anaerobic treatment inhibited the biosynthesis of PAs and maintained a level as low as that of fresh mushrooms. In addition, anaerobic treatment significantly changed the amino acid content, especially the content of  $\gamma$ -aminobutyric acid (GABA), which was more markedly increased when the mushrooms were treated with N<sub>2</sub>. Then, the multiple enzymatic activities related to the GABA synthesis pathway were determined, including that of arginine decarboxylase (ADC), ornithine decarboxylase (ODC), diamine oxidase (DAO), polyamine oxidase (PAO), and glutamate decarboxylation (GAD), and the results showed that PAs metabolism played a great role in driving GABA biosynthesis in mushrooms that were exposed to N<sub>2</sub>.