Polyamine biosynthesis and distribution in different tissues of *Agaricus bisporus* during postharvest storage

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Abstract

This study investigated changes in endogenous polyamine (PA) content, PA-related amino acid content, and the expression of PA-related genes in different tissues (cap, gill, and stipe) of the edible mushroom (*Agaricus bisporus* J.E. Lange Imbach) during postharvest storage. The results showed that the putrescine (Put) content increased substantially and continuously in all tissues, and was highest in stipe during storage. Strong positive correlations were observed between Put content and the extent of cap opening. Minor changes in spermidine (Spd) and spermine (Spm) contents were observed during storage, both of which were highest in gills during spore production. PA-related amino acid content and PA-related gene expression were also developmentally and tissue-specifically regulated. The expression levels of *AbASS*, *AbASL*, *AbARG*, and *AbOAT* increased in gills and reached the highest level when the pileus started cap opening; however, at the same time, in the stipe these expression levels decreased rapidly to the lowest level. The expression levelsof *AbODC* and *AbSAMDC* increased in gills with storage duration, which possibly contributed to the highest Spd level. Furthermore, proline and glutamate contents presented an opposite changing trend during storage, indicating that they are likely generated in a coordinated way in different tissues. In addition, Put biosynthetic pathways are likely differently regulated in gill and stipe: Put production in gills mainly happened via ornithine decarboxylase, while Put in stipes may be synthesized via an alternative pathway. These results indicate that PA biosynthesis and its distribution correlate positively with the continuing development of *A. bisporus* postharvest.