

Title Differential expression of a putative riboflavin-aldehyde-forming enzyme (*raf*) gene during development and post-harvest storage and in different tissue of the sporophore in *Agaricus bisporus*

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Citation Applied Microbiology and Biotechnology 70 (4): 470-476. 2005.

Keywords mushroom; *Agaricus bisporus*; sporophore

Abstract

Cloning and characterisation of a putative riboflavin-aldehyde-forming enzyme gene (*raf*) from the cultivated mushroom *Agaricus bisporus* and its expression during morphogenesis are described. Three cDNA clones were isolated following differential screening of cDNA libraries from rapidly expanding sporophores and post-harvest stored sporophores. The cDNA sequence and predicted translation analysis revealed an open reading frame (ORF) of 348 nucleotides encoding a polypeptide of 115 amino acids, with three introns (56–66 bases) interrupting the genomic ORF. Blast X searches of the databases with the gene sequence showed homology (40% identity and 56% similarity) to the riboflavin-aldehyde-forming enzyme gene from *Schizophyllum commune*. In *A. bisporus*, the *raf* gene sequence upstream of the ORF contained a large CT-rich putative regulatory element (−64 to −24 bases) found in highly expressed genes in various mushrooms, and a 6-base motif present in the 3′ end of the genomic sequence, but not in the corresponding 3′ non-coding part of the cDNA, was identified. The *raf* gene transcripts increased abundantly in rapidly developing sporophores as well in post-harvest stored sporophores. Differential expression of the *raf* gene transcripts in different tissues of the sporophore was also observed, with higher levels in the stipe compared with the cap and gills. The temporal and spatial expression patterns observed suggest transcriptional regulation of the *raf* gene during *A. bisporus* morphogenesis.