

MODIFICATION OF THE CAROTENOID PRODUCTION OF *MUCOR CIRCINELLOIDES* USING DIFFERENT *XANTHOPHYLLOMYCES DENDRORHOUS CRTS* GENES

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ABSTRACT

Canthaxanthin and astaxanthin are oxygenated derivatives of β -carotene and have several beneficial effects on the animal and human health. They are mainly used as feed additives, especially for fishes and poultry. The aim of the present study is to examine the biological requirements for the microbial production of these natural pigments. *Mucor circinelloides* has been used as model organism of the microbial carotenoid biosynthesis. Previously, canthaxanthin production was achieved in this fungus by integrating a modified bacterial β -carotene-ketolase gene in the genome of *M. circinelloides*. In the present study, *crtS* genes of different *X. dendrorhous* strains were cloned and expressed in β -carotene producing wild type and canthaxanthin producing mutant *M. circinelloides* strains. *X. dendrorhous* is an astaxanthin producing basidiomycete yeast. Previously, it was proven, that the cytochrome-P450 hydroxylase enzyme encoded by the *crtS* gene has β -carotene-hydroxylase activity (ÁLVAREZ et al., 2006). A hypothetical β -carotene-ketolase activity has also been suggested (OJIMA et al., 2006), but it has not been verified yet. In our study, *crtS* genes with different sequences were amplified and several plasmids were constructed carrying the isolated genes under the control of the regulator regions of the *Mucor* glyceraldehyde-3-phosphate dehydrogenase 1 gene. The plasmids were transformed into the fungal protoplasts. Analysis of the carotenoid content of the transformants revealed astaxanthin production in the resulting strains.

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