

# Carotenoid production and gene expression in an astaxanthin-overproducing *Xanthophyllomyces dendrorhous* mutant strain

Castelblanco-Matiz, Lina M.

Barbachano-Torres, Alejandra

Ponce-Noyola, Teresa

Ramos-Valdivia, Ana C.

Cerda García-Rojas, Carlos M.

Flores-Ortiz, César M.

Barahona-Crisóstomo, Salvador K.

Baeza-Cancino, Marcelo E.

Alcaíno-Gorman, Jennifer

Cifuentes-Guzmán,

© 2015, Springer-Verlag Berlin Heidelberg. The primary carotenoid synthesized by

*Xanthophyllomyces dendrorhous* is astaxanthin, which is used as a feed additive in aquaculture. Cell growth kinetics and carotenoid production were correlated with the mRNA levels of the *idi*, *crtE*, *crtYB*, *crtI*, *crtS* and *crtR* genes, and the changes in gene sequence between the wild-type and a carotenoid overproducer XR4 mutant strain were identified. At the late stationary phase, the total carotenoid content in XR4 was fivefold higher than that of the wild-type strain. Additionally, the mRNA levels of *crtE* and *crtS* increased during the XR4 growth and were three times higher than the wild-type strain in the late stationary phase. Moreover, the nucleotide sequences of *crtYB*, *crtI* and *crtR* exhibited differences between the strains. Both the higher *crtE* and *crtS* transcript levels and the *crtYB*, *crtI* and *crtR* mutations can, at least in part, act to up-regulate the carotenoid biosynthesis pathway in the XR4 strain.