

Identification and expression pattern of a new carotenoid cleavage dioxygenase gene member from *Bixa orellana*

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Abstract:

Carotenoid cleavage dioxygenases (CCDs) are a class of enzymes involved in the biosynthesis of a broad diversity of secondary metabolites known as apocarotenoids. In plants, CCDs are part of a genetic family with members which cleave specific double bonds of carotenoid molecules. CCDs are involved in the production of diverse and important metabolites such as vitamin A and abscisic acid (ABA). *Bixa orellana* L. is the main source of the natural pigment annatto or bixin, an apocarotenoid accumulated in large quantities in its seeds. Bixin biosynthesis has been studied and the involvement of a CCD has been confirmed in vitro. However, the CCD genes involved in the biosynthesis of the wide variety of apocarotenoids found in this plant have not been well documented. In this study, a new CCD1 gene member (*BoCCD1*) was identified and its expression was characterized in different plant tissues of *B. orellana* plantlets and adult plants. The *BoCCD1* sequence showed high homology with plant CCD1s involved mainly in the cleavage of carotenoids in several sites to generate multiple apocarotenoid products. Here, the expression profiles of the *BoCCD1* gene were analysed and discussed in relation to total carotenoids and other important apocarotenoids such as bixin.