



## TECHNOLOGY

# Biological Production of Carotenoids

## OVERVIEW

The plant species *Adonis aestivalis* produces flowers with petals that are deep red in color and nearly black at the base of the petals due to the accumulation of ketocarotenoid and other carotenoid pigments (Neamtu et al., Rev. Roum. Biochim. 6:157, 1969). This pattern of carotenoid accumulation accounts for the common name of some varieties of this species: summer pheasant's eye.

Among the carotenoids identified in the petals of the red petal varieties of these various species is the ketocarotenoid astaxanthin (3,3'-dihydroxy-4,4'-diketo-b,b-carotene; see FIG. 1). Various other ketocarotenoids (see FIG. 1) including 3-hydroxyechinenone (3-hydroxy-4-keto-b,b-carotene), adonirubin (3-hydroxy-4,4'-diketo-b,b-carotene) adonixanthin (3,3'-dihydroxy-4-keto-b,b-carotene) and isozeaxanthin (4,4'-dihydroxy-b,b-carotene).

The carotenoid astaxanthin is of particular interest. It can be used as a food supplement or pigmented feed supplement imparting a salmon color to fish that consume it. It is also a known antioxidant used in suntan lotions.

This invention relates to the isolation and use of two different *Adonis* ketolases that are similar in sequence, sharing about 91 percent identity. The invention also relates to modifications of these enzymes. These enzymes and their modifications are enzymes that can lead to the production of astaxanthin.

## CONTACT INFO

UM Ventures  
0134 Lee Building  
7809 Regents Drive  
College Park, MD 20742  
Email: [umdtechtransfer@umd.edu](mailto:umdtechtransfer@umd.edu)  
Phone: (301) 405-3947 | Fax: (301) 314-9502

## Additional Information

### INSTITUTION

University of Maryland, College Park

### LICENSE STATUS

Contact OTC for licensing information

### CATEGORIES

- Natural Compounds

### EXTERNAL RESOURCES

- [US Patent 6,551,807](#)

LS-98-029