

Carotenoid(s) structure and function in *G. phototrophica*

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Carotenoids are natural pigments present in a number of organisms representing all known domains. In photosynthetic organisms, carotenoids play three main roles: light-harvesting, structural and photoprotective. *G. phototrophica*, a novel phototrophic strain from the family of *Gemmatimonadetes*, contains more than 10 different carotenoids. Most of these carotenoids are assumed to play a photoprotective role, as they are eluted separately from the photosystem complexes (PS). The small amount of unknown carotenoids, which remained bound to the PS, indicated light-harvesting function by fluorescence excitation spectroscopy. The efficiency of excitation energy transfer from carotenoid to BChl is ~70%. Further, HPLC analysis of bounded carotenoids to PS revealed the presence of one major unknown carotenoid, having a single rounded peak at 494 nm in methanol and characteristic three peaks were observed after reducing it with NaBH₄ – indicating the presence of conjugated carbonyl group. LC/MS/MS analysis revealed molecular weight 613, molecular formula C₄₁H₅₆O₄; and along with its structure prediction led us to speculate it to be a novel carotenoid.

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