

Efficient methods for fast, producible, C-Phycocyanin from *Thermosynechococcus elongatus*

Authors:

El-Mohsnawy Eithar.

Institution:

Botany Department,
Faculty of Science,
Damanhour University,
22713, Egypt.

Corresponding author:

El-Mohsnawy Eithar.

ABSTRACT:

This article describes different protocols that enhance the extraction, isolation and purification of phycocyanin from the cyanobacterium, *Thermosynechococcus elongatus* as well as absorbance and fluorescence spectral characterization. A combination of enzymatic degradation by Lysozyme followed by high pressure showed a mild cell wall destruction except for the composition of thylakoid membrane compared with glass beads. The use of ammonium sulfate precipitation as the first purification step exhibited high efficiency in removing most of the protein contamination. The best purified phycocyanin was obtained after using the second purification step that could be ion exchange chromatography or sucrose gradient. Unexpected results that were not used earlier were obtained by sucrose gradient, where a large amount of highly pure phycocyanin was assembled compared with published methods. An evaluation of C-phycocyanin throughout the series steps of isolation and purification was achieved by using absorbance and 77K fluorescence spectral analysis. Besides a spectroscopical evaluation, SDS-PAGE, productivity, and A_{620}/A_{280} values pointed to the purity and structural preservation of a purified complex. Compared with published methods, the existing method not only reduces purification time but also enhances the productivity of phycocyanin in its native structure.

The optimization of each purification step presented different purified phycocyanin levels; hence, it could be used not only by microbiologists but also by other researchers such as physicians and industrial applicants. In addition, this method could be used as a model for all cyanobacterial species and could be also used for Rhodophytes with some modifications.

Keywords:

A_{620}/A_{280} value, C-PC purification, C-Phycocyanin, Cyanobacteria, Fluorescence Spectra, IEC, Phycobilines, Sucrose Gradient, *Thermosynechococcus elongatus*.