# Product Data Sheet

Product Name: C-Phycocyanin (C-PC)
Cat. No.: GC33095

## Chemical Properties

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|---|---|---|---|
| Cas. No. | 11016-15-2 | | |
| SMILES | [C-Phycocyanin] | | |
| Formula | | M.Wt | |
| Solubility | Water : 14.29 mg/mL | Storage | 4°C, protect from light |
| General tips | For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20°C for several months. | | |
| Shipping Condition | Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request. | | |
| Structure | | | |

C-Phycocyanin

## Protocol

**Cell experiment [1]:**

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| Cell lines | H292 cells (human non-small cell lung cancer cell line) |

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| Preparation Method | H292 cells were cultured in DMEM medium containing 10% fetal bovine serum (FBS) at 37°C, 5% $CO_2$. H292 cells were pre-treated with C-Phycocyanin (10–50μM) for 48 hours. |
| Reaction Conditions | 10-50μM; 48 hours |
| Applications | C-Phycocyanin significantly inhibited cell proliferation and migration, promoted apoptosis, reduced the expression of fibrosis-related proteins (such as FAP1, S100A4, vimentin, α-SMA, collagen I and III), and downregulated the expression of lncIAPF and its binding protein HuR, thereby alleviating pulmonary fibrosis. |

**Animal experiment [2]:**

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| Animal models | Wistar rats |
| Preparation Method | Rats were divided into four groups: (1) sham + vehicle (0.9% saline solution by oral gavage, OG); (2) sham + C-Phycocyanin (50mg/kg/d, OG); (3) Acute myocardial infarction (AMI) + vehicle; (4) AMI + C-Phycocyanin. AMI was induced by administering isoproterenol (20, 10, 5, and 3mg/kg each dose per day). C-Phycocyanin was administered 30 minutes after Isoproterenol administration. |
| Dosage form | 50mg/kg/d; OG |

***Caution: Product has not been fully validated for medical applications. For research use only.***
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# Product Data Sheet

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| Applications | C-Phycocyanin significantly reduced AMI-induced cardiac enzymes, oxidative stress markers, inflammatory markers, and apoptosis-related proteins. C-Phycocyanin also reduced histological changes related to myonecrosis, interstitial edema, and inflammatory infiltration in the heart muscle. |

References:
[1] Chaowen H, Dongxuan H, Dongsheng H, et al. C-Phycocyanin Suppresses Cell Proliferation and Promotes Apoptosis by Regulating the AMPK Pathway in NCL-H292 Non-Small Cell Lung Cancer Cells. Folia Biol (Praha). 2022;68(1):16-24.
[2] Blas-Valdivia V, Moran-Dorantes DN, Rojas-Franco P, et al. C-Phycocyanin prevents acute myocardial infarction-induced oxidative stress, inflammation and cardiac damage. Pharm Biol. 2022 Dec;60(1):755-763.

## Background

C-Phycocyanin (C-PC) is a natural pigment protein extracted from blue-green algae such as *Spirulina platensis*, characterized by C-Phycocyanin unique blue appearance and commonly used as a natural coloring agent in food and cosmetics[1]. Through C-Phycocyanin light absorption and energy transfer properties in blue-green algae, C-Phycocyanin can help us gain a deeper understanding of the photochemical processes of photosynthesis[2]. C-Phycocyanin has antioxidant activity, capable of scavenging free radicals in the body and reducing cell damage caused by oxidative stress[3]. C-Phycocyanin also has anti-inflammatory and immunomodulatory effects, regulating the activity of immune cells and enhancing the body's immune response[4].

In vitro, C-Phycocyanin (100–500μg/mL) pre-treatment of RGM-1 cells for 24 hours, followed by 3 hours of damage induction with Aspirin (21mM), significantly reduced the secretion of pro-inflammatory cytokines TNF-α and IL-6 in cells. It also inhibited the DNA binding activity of NF-κB (p65), alleviated inflammatory responses, suppressed the expression of pro-apoptotic protein Bax and the activity of Caspase 3, and reduced the activation of the ERK and JNK signaling pathways, thereby exerting anti-inflammatory and anti-apoptotic effects[5]. C-Phycocyanin (10–50μM) pre-treatment of H292 non-small cell lung cancer cells for 48 hours significantly inhibited cell proliferation and migration while promoting apoptosis[6].

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In vivo, C-Phycocyanin (50mg/kg/d) was administered orally to Wistar rats induced with acute myocardial infarction (AMI). C-Phycocyanin significantly reduced AMI-induced cardiac damage, decreased levels of oxidative stress markers, reduced the expression of inflammatory markers, lowered the expression of apoptosis-related proteins, and alleviated AMI-induced histological abnormalities in myocardial tissue, including myofibrillar necrosis, interstitial edema, and inflammatory cell infiltration[7]. C-Phycocyanin (25, 50, 100mg/kg) was administered orally to C57BL/6 mice models of bleomycin (5mg/kg)-induced pulmonary fibrosis for 28 days. C-Phycocyanin significantly improved the condition, enhanced lung function in mice, increased lung compliance and total lung capacity, reduced collagen deposition and inflammatory cell infiltration in lung tissue, and decreased the expression of fibrosis-related proteins [8].

References:

[1] Liu R, Qin S, Li W. Phycocyanin: Anti-inflammatory effect and mechanism. Biomed Pharmacother. 2022 Sep;153:113362.
[2] Squires AH, Moerner WE. Direct single-molecule measurements of phycocyanobilin photophysics in monomeric C-phycocyanin. Proc Natl Acad Sci U S A. 2017 Sep 12;114(37):9779-9784.
[3] Castro-Gerónimo VD, García-Rodríguez RV, Sánchez-Medina A, et al. C-Phycocyanin: A Phycobiliprotein from *Spirulina* with Metabolic Syndrome and Oxidative Stress Effects. J Med Food. 2024 Sep;27(9):807-813.
[4] Bannu SM, Lomada D, Gulla S, et al. Potential Therapeutic Applications of C-Phycocyanin. Curr Drug Metab. 2019;20(12):967-976.
[5] Liu YC, Chang CC, Matsui H, et al. C-Phycocyanin and *Lycium barbarum* Polysaccharides Protect against Aspirin-Induced Inflammation and Apoptosis in Gastric RGM-1 Cells. Nutrients. 2022 Dec 1;14(23):5113.
[6] Chaowen H, Dongxuan H, Dongsheng H, et al. C-Phycocyanin Suppresses Cell Proliferation and Promotes Apoptosis by Regulating the AMPK Pathway in NCL-H292 Non-Small Cell Lung Cancer Cells. Folia Biol (Praha). 2022;68(1):16-24.
[7] Blas-Valdivia V, Moran-Dorantes DN, Rojas-Franco P, et al. C-Phycocyanin prevents acute myocardial infarction-induced oxidative stress, inflammation and cardiac damage. Pharm Biol. 2022 Dec;60(1):755-763.
[8] Hu W, Wang Y, Yang H, et al. C-phycocyanin reinforces autophagy to block pulmonary fibrogenesis by inhibiting lncIAPF biogenesis. Arch Pharm Res. 2024 Jul;47(7):659-674.

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