

Product Data Sheet

Product Name: Pyocyanin

Cat. No.: GC13137

Chemical Properties

Cas. No. 85-66-5

Chemical Name 5-methyl-1(5H)-phenazinone

SMILES Cn1c2ccccc2nc2c(=O)cccc12

Formula $C_{13}H_{10}N_2O$

M.Wt 210.2

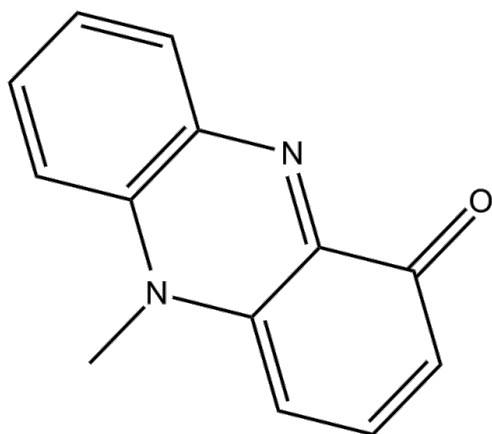
Solubility 5mg/ml in ethanol, or in DMSO;
2.5mg/ml in DMF

Storage Store at -20°C

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



Protocol

Cell experiment [1]:

Cell lines

NCI-H292 cells

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

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Address: 10292 Central Ave. #205, Montclair, CA, USA

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Preparation Method	NCI-H292 cells were treated with 25µg/mL Pyocyanin for 24h, then total cellular RNA was extracted and subjected to qRT-PCR analysis using specific primers for MUC5AC and GAPDH (as internal control) to assess MUC5AC mRNA expression levels.
Reaction Conditions	25µg/mL; 24h
Applications	Treatment with Pyocyanin induced an approximately 4-fold increase in the transcriptional level of the mucin synthesis gene MUC5AC.
Animal experiment [2]:	
Animal models	Swiss albino mice infected with <i>S. mansoni</i>
Preparation Method	Swiss albino mice infected with <i>S. mansoni</i> cercariae were orally given Pyocyanin (25mg/kg/day) for 5 days from day 21 post-infection. On day 49, adult worms were recovered by perfusion and counted to calculate worm reduction.
Dosage form	25mg/kg/day; 5 days; p.o.
Applications	Pyocyanin was used to treat mice for 5 days starting on day 21 of infection with <i>S. mansoni</i> . At day 49, the total worm burden (23.83 ± 2.79) was significantly lower than that of the control group (36.33 ± 3.98), with a reduction rate of 34.41%.

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References:[1] Caldwell C C, Chen Y, Goetzmann H S, et al. *Pseudomonas aeruginosa* exotoxin pyocyanin causes cystic fibrosis airway pathogenesis[J]. *The American journal of pathology*, 2009, 175(6): 2473-2488.[2] Eltarahony M M, Younis S S, Abdel Salam S A, et al. An insight into pyocyanin: production, characterization, and evaluation of its in vitro antibacterial, antifungal, antibiofilm and in vivo anti-schistosomal potency[J]. *BMC microbiology*, 2025, 25(1): 532.

Background

Pyocyanin is a toxic metabolite produced by the Gram-negative bacterium *Pseudomonas aeruginosa*^[1]. Pyocyanin is a blue secondary metabolite that turns red when the pH is below 4.9 and possesses redox activity.^[2] Pyocyanin is commonly applied in research on bacterial pathogenesis, host immune responses, and cytotoxicity assessment in chronic infection models^[3,4].

In vitro, treatment of human pulmonary mucoepidermoid carcinoma NCI-H292 cells with Pyocyanin (25µg/mL) for 24h induced an approximately 4-fold increase in the transcriptional level of the mucin synthesis gene MUC5AC^[5]. Treatment of A549 cells with Pyocyanin (1, 5, 10µM) for 24h showed no effect on cell growth at 1µM, transient inhibition of proliferation at 5µM, and complete and sustained growth arrest at 10µM^[6].

In vivo, Pyocyanin (25mg/kg/day; p.o.) treatment of mice was initiated on day 21 post-infection with *Schistosoma mansoni* (larval stage) and continued for 5 days. On day 49 post-infection, the total worm burden (23.83 ± 2.79) was significantly reduced compared with that of the control group (36.33 ± 3.98), with a reduction rate of 34.41%^[7].

References:

- [1] Hall S, McDermott C, Anoopkumar-Dukie S, et al. Cellular effects of pyocyanin, a secreted virulence factor of *Pseudomonas aeruginosa*[J]. *Toxins*, 2016, 8(8): 236.
- [2] Hassan H M, Fridovich I. Mechanism of the antibiotic action pyocyanine[J]. *Journal of bacteriology*, 1980, 141(1): 156-163.
- [3] Jayaseelan S, Ramaswamy D, Dharmaraj S. Pyocyanin: production, applications, challenges and new insights[J]. *World Journal of Microbiology and Biotechnology*, 2014, 30(4): 1159-1168.
- [4] Rada B, Leto T L. Pyocyanin effects on respiratory epithelium: relevance in *Pseudomonas aeruginosa* airway infections[J]. *Trends in microbiology*, 2013, 21(2): 73-81.
- [5] Caldwell C C, Chen Y, Goetzmann H S, et al. *Pseudomonas aeruginosa* exotoxin pyocyanin

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causes cystic fibrosis airway pathogenesis[J]. The American journal of pathology, 2009, 175(6): 2473-2488.

[6] Muller M. Premature cellular senescence induced by pyocyanin, a redox-active Pseudomonas aeruginosa toxin[J]. Free Radical Biology and Medicine, 2006, 41(11): 1670-1677.

[7] Eltarahony M M, Younis S S, Abdel Salam S A, et al. An insight into pyocyanin: production, characterization, and evaluation of its in vitro antibacterial, antifungal, antibiofilm and in vivo anti-schistosomal potency[J]. BMC microbiology, 2025, 25(1): 532.

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