

Product Data Sheet

Product Name: Astaxanthin

Cat. No.: GC31350

Chemical Properties

Cas. No. 472-61-7

SMILES CC(/C=C/C(C(C)(C[C@H](O)C1=O)C)=C1C)=C\C=C\C(C(C)=C\C=C\C(C)=C(C)\C=C\C=C(C)\C=C\C(C(C)(C[C@H](O)C2=O)C)=C2C

Formula C₄₀H₅₂O₄ M.Wt 596.84

Solubility DMSO : 2 mg/mL (3.35 mM),
Acetone : < 1 mg/mL (insoluble)

Storage -20°C, protect from light, stored under nitrogen, unstable in solution, ready to use.

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.

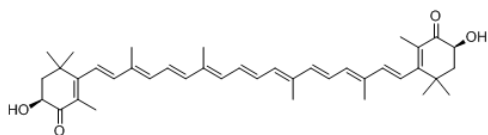
Caution: Product has not been fully validated for medical applications. For research use only.

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Structure



Protocol

Cell experiment [1]:	
Cell lines	A172 cells (human glioblastoma cell line)
Preparation Method	A172 cells were treated with Astaxanthin at 50-100μM for 24-48h. After treatment, cell migration was assessed by scratch assays, invasion was assessed by Boyden chamber assays, MMP-2 expression was observed by immunoblotting, and MMP-9 activity was analyzed by gelatin zymography.

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Reaction Conditions	50-100µM; 24-48h
Applications	Astaxanthin decreased migration and invasion of A172 cells. Astaxanthin reduced MMP-2 expression and attenuated MMP-9 activity.
Animal experiment [2]:	
Animal models	Swiss albino mice
Preparation Method	Mice were intraperitoneally administered Astaxanthin (40mg/kg) for 5 days, then fasted 24h and given a single oral dose of indomethacin (40mg/kg); 4h after indomethacin, mice were sacrificed for gastric juice pH, ulcer scoring, histopathology, GSH, MDA, NF-kB and caspase-3 assessment.
Dosage form	40mg/kg; i.p.; 5 days
Applications	Astaxanthin pre-treatment elevated gastric juice pH, normalized gastric tissue GSH levels, lowered MDA levels, and reduced NF-kB and caspase-3 expression in gastric tissue of indomethacin-treated mice.
References: [1] Siangcham T, Vivithanaporn P, Sangpairaj K, et al. Anti-Migration and Invasion Effects of Astaxanthin against A172 Human Glioblastoma Cell Line. Asian Pac J Cancer Prev. 2020 Jul;21(7):2029-33. [2] Aly MH, Said AK, Farghaly AM, et al. Protective effect of astaxanthin on indomethacin-induced gastric ulcerations in mice. Naunyn-Schmiedeberg's Archives of Pharmacology. 2024;397(10):9897-9907.	

Background

Astaxanthin is a natural ketocarotenoid and a potent antioxidant. Astaxanthin possesses protective

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Astaxanthin is a natural ketocarotenoid and a potent antioxidant. Astaxanthin scavenges reactive oxygen species and activates the Nrf2/HO-1 pathway to upregulate endogenous antioxidant enzymes such as SOD, CAT, and GPx. Astaxanthin inhibits NF- κ B activation to reduce the release of inflammatory factors including TNF- α , IL-6, and IL-1 β . Astaxanthin can be used in studies on oxidative stress, skin photoaging, cardiovascular diseases, and neurodegenerative diseases^[1-4].

In vitro, treatment of SH-SY5Y cells with 0.032-20 μ M Astaxanthin for 24h reduced amyloid β aggregation and deposition around the cells, inhibited amyloid β fibril formation, suppressed amyloid β -induced early apoptosis, and restored impaired cell migration speed and directional persistence^[5]. Treatment of A172 cells with 50 μ M-100 μ M Astaxanthin for 24-48h decreased cell migration and invasion abilities, downregulated MMP-2 expression, and attenuated MMP-9 activity^[6]. Treatment of KATO-III and SNU-1 cells with 10-100 μ M Astaxanthin for 24h inhibited cell proliferation, increased the proportion of cells in the G0/G1 phase, decreased the proportion of cells in the S phase, and reduced p-ERK levels^[7].

In vivo, intraperitoneal injection of 40mg/kg Astaxanthin into Swiss albino mice for 5 consecutive days followed by indomethacin administration increased gastric juice pH, restored gastric tissue reduced glutathione levels to normal, decreased malondialdehyde levels, attenuated NF- κ B and caspase-3 expression in gastric tissue, and reduced gastric mucosal ulcer damage^[8]. Intraperitoneal injection of 10-30mg/kg Astaxanthin into BALB/c mice 30min before tert-butyl hydroperoxide administration for 60 consecutive days improved learning and memory performance, decreased ROS, Cyt-C, Apaf-1, Casp-3, and CAD levels and Bax expression in hippocampal tissue, increased GSH and Bcl-2 expression, and downregulated p-ERK1/2, FOS, and JUN expression while increasing phospho-CREB levels^[9]. Gavage of 5mg/mL Astaxanthin at 0.5mL per day for 4 weeks in a C57BL/6 mouse model of oligoasthenospermia increased body weight, improved sperm concentration and forward motility, promoted spermatogenesis, decreased MDA and iron ion levels in testicular tissue, enhanced GSH-Px activity, and upregulated GPX4, GLS2, Steap3, and VDAC expression to regulate ferroptosis and fatty acid metabolism, reduce mitochondrial oxidative stress damage, and promote spermatogenesis^[10].

References:

[1] Si P, Zhu C. Biological and neurological activities of astaxanthin (Review). Mol Med Rep. 2022 Oct;26(4):300.

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- [2] Higuera-Ciapara I, Félix-Valenzuela L, Goycoolea FM. Astaxanthin: a review of its chemistry and applications. Crit Rev Food Sci Nutr. 2006;46(2):185-96.
- [3] Snell TW, Carberry J. Astaxanthin Bioactivity Is Determined by Stereoisomer Composition and Extraction Method. Nutrients. 2022 Apr 6;14(7):1522.
- [4] Sun L, Li Y, Yang A, et al. Astaxanthin: A comprehensive review of synthesis, biological activities and applications. Food Chem. 2025 Oct 1;488:144847.
- [5] Ananda SH, Kuragano M, Tokuraku K. Elucidation of the Neuroprotective Effects of Astaxanthin Against Amyloid β Toxicity in the SH-SY5Y Human Neuroblastoma Cell Line. Molecules. 2025 Nov;30(21):4271.
- [6] Siangcham T, Vivithanaporn P, Sangpairaj K, et al. Anti-Migration and Invasion Effects of Astaxanthin against A172 Human Glioblastoma Cell Line. Asian Pac J Cancer Prev. 2020 Jul;21(7):2029-33.
- [7] Kim JH, Park JJ, Lee BJ, et al. Astaxanthin Inhibits Proliferation of Human Gastric Cancer Cell Lines by Interrupting Cell Cycle Progression. Gut Liver. 2016 May;10(3):369-374.
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- [9] Xiong Z, Li Z, Sima X, et al. Astaxanthin reduces TBPH-induced neurobehavioral deficits in mice by the ROS-ERK1/2-FOS pathway. Ecotoxicology and Environmental Safety. 2024;281:116674.
- [10] Liu H, Chen X, Feng X, et al. Astaxanthin Promotes Spermatogenesis in by Reducing Mitochondrial Oxidative Stress Damage and Regulating Fatty Acid Metabolism and Ferroptosis. Drug Des Devel Ther. 2025;19:7777-7794.

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