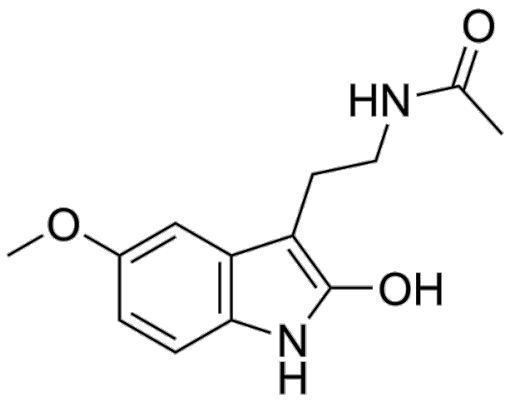
Product Data Sheet

Product Name: 2-Hydroxymelatonin
Cat. No.: GC81601

Chemical Properties

Cas. No.	229018-17-1		
Formula	$C_{13}H_{16}N_2O_3$	M.Wt	248.28
Solubility		Storage	Store at room temperature, keep dry and cool
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



Background

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2-Hydroxymelatonin is a major hydroxylated metabolite of Melatonin. It is enzymatically produced in plants by melatonin 2-hydroxylase (M2H/AsMT), while in animals, it is generated in trace amounts via CYP450 or spontaneous oxidation. 2-Hydroxymelatonin acts as a respiratory burst oxidase homolog (RBOH)-dependent ROS burst inducer, thereby regulating stress tolerance, seed germination and growth in plants. In animal cells, 2-Hydroxymelatonin synergizes with BMP-4 to promote osteogenesis, and exerts pro- apoptotic and anti-metastatic activities against colorectal cancer cells. 2-Hydroxymelatonin can be used in studies related to plant premature senescence, osteoporosis and colorectal cancer [1] [2] [3] [4] [5].

In Vitro, 2-Hydroxymelatonin (50-150 μM; 15 days) exerts the optimal effect on alleviating cadmium toxicity in cucumber seedlings at a concentration of 100 μM. It promotes seedling growth, increases photosynthetic and gas exchange parameters, antioxidant enzyme activities, polyamine levels, and the expression of the CS-ERS gene, while reducing cadmium uptake and the levels of oxidative stress markers[1]. 2-Hydroxymelatonin (5-20 μM; 40 h) potently promotes the germination of non-dormant and dormant seeds of Arabidopsis thaliana (L.) Heynh. Columbia-0 wild type, with the germination rate increased to 80% and 40%, respectively, after treatment with 20 μM for 40 h[3]. 2-Hydroxymelatonin (20 μM; 24 h) upregulates the expression of gibberellin (GA) biosynthesis and response genes in non-dormant *Arabidopsis thaliana* (L.) Heynh. Columbia-0 wild-type seeds after 24 h of incubation[3]. 2-Hydroxymelatonin (20 μM) promotes the production of superoxide anions (ROS) in non-dormant seeds of Arabidopsis thaliana (L.) Heynh. Columbia-0 wild type, which is confirmed by enhanced NBT staining[3]. 2-Hydroxymelatonin (20 μM; 40 h) increases the germination rate of non-dormant Arabidopsis thaliana m2h knockout mutant seeds from 20% to 80%, fully restoring it to the wild-type level after 40 h of incubation[3]. 2-Hydroxymelatonin (125-2000 μM; 48 h) potently reduces the viability of Caco2, HCT116, DLD1, and CT26 colorectal cancer cells, with IC_{50} values of 1010.3 μM, 1482.3 μM, 2136.5 μM, and 1036.1 μM, respectively [5]. 2-Hydroxymelatonin (1000 μM; 24 h) induces significant apoptosis and nuclear pyknosis in Caco2 colorectal cancer cells[5]. 2-Hydroxymelatonin (50-100 μM; 24 h) inhibits the invasive ability of Caco2 colorectal cancer cells[5]. 2-Hydroxymelatonin (50-100 μM; 24 h) inhibits the invasive ability of Caco2 colorectal cancer cells by downregulating the mRNA expression of EMT markers (Snail, Twist, N-cadherin) and the Wnt pathway marker β-catenin[5].

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References:

[1]. Shah AA, et al. 2-Hydroxymelatonin mitigates cadmium stress in cucumis sativus seedlings: Modulation of antioxidant enzymes and polyamines. Chemosphere. 2020 Mar;243:125308.
[2]. Lee HY, et al. 2-Hydroxymelatonin, Rather Than Melatonin, Is Responsible for RBOH-Dependent Reactive Oxygen Species Production Leading to Premature Senescence in Plants. Antioxidants (Basel, Switzerland). 2021 Oct 29;10(11):1728.
[3]. Lee HY, Back K. 2-Hydroxymelatonin Promotes Seed Germination by Increasing Reactive Oxygen Species Production and Gibberellin Synthesis in Arabidopsis thaliana. Antioxidants (Basel). 2022 Apr 8;11(4):737.
[4]. Lee SH, et al. Synergistic stimulating effect of 2-hydroxymelatonin and BMP-4 on osteogenic differentiation in vitro. Biochemical and biophysical research communications. 2020 Jul 05;527(4):941-946.
[5]. Yang Y, et al. 2-Hydroxymelatonin, a Predominant Hydroxylated Melatonin Metabolite in Plants, Shows Antitumor Activity against Human Colorectal Cancer Cells. Molecules (Basel, Switzerland). 2017 Mar 14;22(3):453.

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