# PRODUCT INFORMATION

## 3-Methylglutaric Acid

*Item No. 34357*

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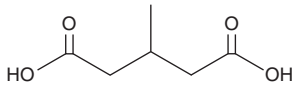
|---|---|
| **CAS Registry No.:** | 626-51-7 |
| **Formal Name:** | 3-methyl-pentanedioic acid |
| **Synonym:** | NSC 14870 |
| **MF:** | $C_6H_{10}O_4$ |
| **FW:** | 146.1 |
| **Purity:** | ≥95% |
| **Supplied as:** | A solid |
| **Storage:** | -20°C |
| **Stability:** | ≥4 years |




*Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.*

### Laboratory Procedures

3-Methylglutaric acid is supplied as a solid. A stock solution may be made by dissolving the 3-methylglutaric acid in the solvent of choice, which should be purged with an inert gas. 3-Methylglutaric acid is soluble in organic solvents such as ethanol, DMSO, and dimethyl formamide. The solubility of 3-methylglutaric acid in these solvents is approximately 30 mg/ml.

Further dilutions of the stock solution into aqueous buffers or isotonic saline should be made prior to performing biological experiments. Ensure that the residual amount of organic solvent is insignificant, since organic solvents may have physiological effects at low concentrations. Organic solvent-free aqueous solutions of 3-methylglutaric acid can be prepared by directly dissolving the solid in aqueous buffers. The solubility of 3-methylglutaric acid in PBS (pH 7.2) is approximately 10 mg/ml. We do not recommend storing the aqueous solution for more than one day.

### Description

3-Methylglutaric acid is a metabolite of the essential amino acid L-leucine (Item No. 34342).[1] It is produced by hydrolysis of the L-leucine catabolic intermediate 3-methylglutaconyl-CoA (3-MG-CoA), which accumulates when the activity of 3-MG-CoA hydratase, the enzyme that converts 3-MG-CoA to HMG-CoA, is deficient, in the mitochondria. 3-Methylglutaric acid (5 mM) inhibits $N^+/K^+$-ATPase activity and induces the production of reactive oxygen species (ROS) in rat cortical synaptosomes, as well as induces lipid peroxidation in rat cortical supernatants.[2,3] Urinary levels of 3-methylglutaric acid are increased in patients with 3-methylglutaconic aciduria type I, an inborn error of metabolism characterized by mutations in the gene encoding 3-MG-CoA hydratase that can lead to neurological impairments.[3]

### References


1. Mack, M., Schniegler-Mattox, U., Peters, V., *et al.* Biochemical characterization of human 3-methylglutaconyl-CoA hydratase and its role in leucine metabolism. *FEBS J.* **273(9)**, 2012-2022 (2006).
2. Riberio, C.A.J., Hickmann, F.H., and Wajner, M. Neurochemical evidence that 3-methylglutaric acid inhibits synaptic $Na^+$,$K^+$-ATPase activity probably through oxidative damage in brain cortex of young rats. *Int. J. Dev. Neurosci.* **29(1)**, 1-7 (2011).
3. Leipnitz, G., Seminotti, B., Amaral, A.U., *et al.* Induction of oxidative stress by the metabolites accumulating in 3-methylglutaconic aciduria in cerebral cortex of young rats. *Life Sci.* **82(11-12)**, 652-662 (2008).





**CAYMAN CHEMICAL**
1180 EAST ELLSWORTH RD
ANN ARBOR, MI 48108 · USA
**PHONE:** [800] 364-9897
[734] 971-3335
**FAX:** [734] 971-3640
CUSTSERV@CAYMANCHEM.COM
WWW.**CAYMANCHEM**.COM