

Product Data Sheet

Product Name: Maltose
Cat. No.: GC36537

Chemical Properties

Cas. No. 69-79-4

SMILES O[C@H]1[C@H](O)[C@@H](O)[C@@H](O[C@H]2[C@H](O)[C@@H](O)[C@@H](O)[C@@H]2CO)O[C@@H]1CO

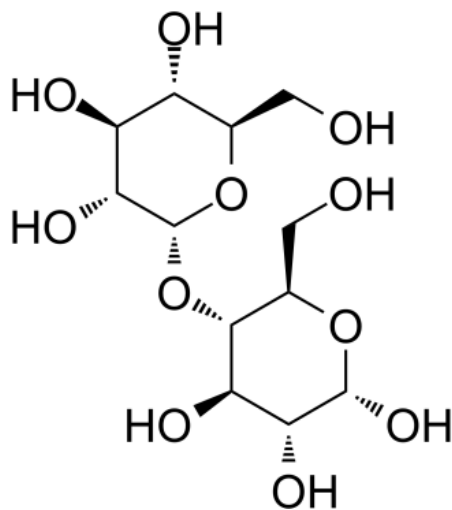
Formula $C_{12}H_{22}O_{11}$ M.Wt 342.3

Solubility DMSO : 68mg/mL 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 Caco-2/TC7 cells

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

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Preparation Method Treatment of the Caco-2/TC7 cells with the Maltose (12.5mM), expression of SI was measured at different time points using qRT-PCR.

Reaction
Conditions 12.5mM; 24h

Applications Maltose treatment can time-dependently upregulate the expression of the SI gene within 24h.

Animal experiment [2]:

Animal models Normal C57BL/6J mice that have been fasted overnight

Preparation Method Normal C57BL/6J mice were administered Maltose orally (2g/kg body weight) after an overnight fast. Blood samples were acquired from the tip of tail vein 0-120min after Maltose administration. Glucose levels were measured using the Glucotrend glucometer, and the AUC for glucose were calculated.

Dosage form 2g/kg; p.o.

Applications Oral administration of Maltose (2g/kg) to normal C57BL/6J mice after overnight fasting induced a significant increase in postprandial blood glucose, which peaked at 30min, and produced a high area under the blood glucose curve.

References:

- [1] CHENG M W, CHEGENI M, KIM K H, et al. Different sucrose-isomaltase response of Caco-2 cells to glucose and maltose suggests dietary maltose sensing[J]. Journal of Clinical Biochemistry and Nutrition, 2014, 54(1): 55-60.
- [2] KIM J I, BAEK H J, HAN D W, et al. Autumn olive (*Elaeagnus umbellata* Thunb.) berry reduces fasting and postprandial glucose levels in mice[J]. Nutrition Research and Practice, 2019, 13(1): 11-16.

Background

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Background

Maltose is a disaccharide composed of two glucose units linked by an α -1,4 glycosidic bond [1]. Maltose can be produced by the breakdown of starch, is slightly sweet (less sweet than sucrose), soluble in water, and exists in α and β isomers [2]. The applications of Maltose span various fields such as food, biology, and daily chemicals, primarily as a sweetener, fermentation sugar in beer brewing, a carbon source for cell culture, and a humectant in skincare products [3].

In vitro, when barley microspore were cultured with Maltose (40mM) for 6-24h, compared to sucrose, Maltose exhibited slower metabolic rates, lower ethanol accumulation, higher energy status, supported cell survival, and promoted embryogenesis [4]. Maltose (2.5-112mM) incubated with isolated pea thylakoids at -15°C for 20h protected the activity of the electron transport chain, with a protection rate of 93% at 112mM, significantly outperforming glucose [5]. Treatment of human intestinal epithelial Caco-2/TC7 cells with Maltose (12.5mM) for 24h upregulated the expression of the sucrase-isomaltase (SI) gene in a time-dependent manner [6].

In vivo, male C57BL/6J mice continuously fed a high-fat diet containing 7% Maltose (by weight) for 13 weeks showed more pronounced increases in fasting blood glucose, plasma total cholesterol, high-density lipoprotein (HDL) cholesterol, and non-HDL cholesterol levels compared to mice fed only a high-fat diet [7]. Normal C57BL/6J mice orally administered Maltose (2g/kg) after overnight fasting exhibited a significant postprandial blood glucose elevation, peaking at 30min, and produced a high area under the curve (AUC) for blood glucose [8].

References:

- [1] QUIGLEY G J, SARKO A, MARCHESSAULT R H. Crystal and molecular structure of maltose monohydrate[J]. Journal of the American Chemical Society, 1970, 92(20): 5834-5839.
- [2] KHAN R. The chemistry of maltose[M]//Advances in Carbohydrate Chemistry and Biochemistry. Academic Press, 1981, 39: 213-278.
- [3] CARLSEN M, NIELSEN J. Influence of carbon source on α -amylase production by *Aspergillus oryzae*[J]. Applied Microbiology and Biotechnology, 2001, 57(3): 346-349.
- [4] SCOTT P, LYNE R L, AP REES T. Metabolism of maltose and sucrose by microspores isolated from barley (*Hordeum vulgare* L.)[J]. Planta, 1995, 197(3): 435-441.
- [5] KAPLAN F, GUY C L. β -Amylase induction and the protective role of maltose during temperature shock[J]. Plant Physiology, 2004, 135(3): 1674-1684.

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- [6] CHENG M W, CHEGENI M, KIM K H, et al. Different sucrose-isomaltase response of Caco-2 cells to glucose and maltose suggests dietary maltose sensing[J]. Journal of Clinical Biochemistry and Nutrition, 2014, 54(1): 55-60.
- [7] SHIBAZAKI N, TANAKA W, SUZUKI Y, et al. Maltose consumption exacerbates high-fat diet-induced overweight and related parameters in mice[J]. Functional Foods in Health and Disease, 2022, 12(11): 680-692.
- [8] KIM J I, BAEK H J, HAN D W, et al. Autumn olive (*Elaeagnus umbellata* Thunb.) berry reduces fasting and postprandial glucose levels in mice[J]. Nutrition Research and Practice, 2019, 13(1): 11-16.

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