Product Information

β-Glucuronidase from *Escherichia coli*

Type IX-A, lyophilized powder, 1,000,000-5,000,000 units/g protein

G7396

Product Description

CAS Registry Number: 9001-45-0

Enzyme Commission (EC) Number: 3.2.1.31

Synonyms: β-D-Glucuronide glucuronosohydrolase

Molecular Weight: ~290 kDa (tetramer),[1] 68,259 Da (monomer)[2]

Glucuronidation, or conjugation with glucuronic acid, by the human UDP-glucuronosyltransferase (UGT) family of enzymes plays an important role in the metabolic fate of many drugs and other xenobiotics. This biosynthetic reaction also has a role in the conjugation and excretion of endogenous substrates, such as steroids, bilirubin, and bile acids.[3] UGT activity results in the conjugation of glucuronic acid to substrates that contain sulfhydryl, hydroxyl, aromatic amino, or carboxylic acid moieties. The resulting glucuronides are more polar (water-soluble) than the parent organic substrate and are generally excreted through the kidney.

β-glucuronidase catalyzes the general reaction:

β-D-glucuronoside + H_2O ↔
an alcohol + D-glucuronate

β-Glucuronidase from *E. coli* is used for the enzymatic hydrolysis of β-glucuronides in urine and other fluids. It does not hydrolyze α-glucuronides or β-glucosides.[4] β-Glucuronidase from *E. coli* has a high rate of hydrolytic activity, and retains this activity during hydrolysis better than similar enzymes that are more sensitive to changes in the concentration of β-glucuronide conjugates. β-Glucuronidase from *E. coli* has been shown to be useful for determining the presence of androsterone, 17-hydroxycorticosteroids, and estriol in urine.[5]

The optimal conditions for the enzymatic hydrolysis of α-hydroxytriazolam, a major triazolam metabolite in human urine, were determined using β-glucuronidase Type IX-A. It was found that a 90-minute incubation of 1 mL of urine with 100 units of the enzyme at 37 °C and pH 5.5-7.8, effectively hydrolyzed the α-hydroxytriazolam given at the clinical dose.[6]

Several references[7-12] have cited use of product G7396 in their protocols.

Precautions and Disclaimer

For R&D use only. Not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Product

β-Glucuronidase Type IX-A from *E. coli* is supplied as a powder lyophilized from 10 mM potassium phosphate, 1 mM ethylenediaminetetraacetic acid, and 1 mM dithiothreitol. Polyethylene glycol is added as a stabilizer.

Unlike the enzyme preparation from snail (*Helix pomatia*) that naturally contains β-glucuronidase and sulfatase activities in almost equal amounts, the preparation of β-glucuronidase from *E. coli* is essentially free of sulfatase activity.

Glucuronidase Activity:
1,000,000 - 5,000,000 units/g protein

Unit Definition: One Sigma or modified Fishman unit will liberate 1.0 µg of phenolphthalein from phenolphthalein glucuronide per hour at 37 °C at pH 5.0 (30-minute assay).

Optimal pH: 6-7

Substrates

- 5-Bromo-6-chloro-3-indolyl β-D-glucuronide (Cat. No. B4532)
- 6-Bromo-2-naphthyl β-D-glucuronide (Cat. No. B7877)
- 5-Bromo-4-chloro-3-indolyl β-D-glucuronide sodium salt tablet (Cat. No. B8174)
- 8-Hydroxyquinoline glucuronide sodium salt (Cat. No. 38153)
- 4-Methylumbelliferyl β-D-glucuronide (Cat. No. M9130)
- 4-Nitrophenyl β-D-glucuronide (Cat. Nos. N1627, 73677)

Inhibitors

- D-glucuronic acid (Cat. No. G5269)
- D-galacturonic acid (Cat. No. 48280)
- D-glucaro-1,4-lactone

Solubility

When reconstituted to 5 mg/mL in 75 mM phosphate buffer (pH 6.8), a clear to slightly hazy solution results. Regardless of the cloudiness, the enzyme is active and should be usable for metabolite hydrolysis.

Storage/Stability

The product, as supplied, should be stored at –20 °C.

A solution at ≥ 5 mg/mL in 75 mM phosphate buffer (pH 6.8) may be stored at –20 °C for up to 2 months with little or no loss of activity.

References

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