Product Information

5-Bromo-4-chloro-3-indolyl β-D-glucuronide, sodium salt, tablets

Catalog Number B8174
Storage Temperature –20 °C

CAS RN 129541-41-9
Synonyms: X-GlcA; BC-Indicator; X-glucuronide

Product Description
Molecular Formula: C_{14}H_{12}BrClNO_7⋅Na
Formula Weight: 444.59

The gus operon in *Escherichia coli* is composed of three genes. The first gene, *uidA* (gusA), encodes the enzyme β-glucuronidase (GUS). *GusB* encodes a glucuronide permease. The function of the *gusC* gene product is unknown. 5-bromo-4-chloro-3-indolyl β-D-glucuronide (X-GlcA, X-Gluc) has been shown to be a good substrate for GUS, yielding a dark-blue insoluble cleavage product. The reaction (see Figure 1) initially yields a monomeric intermediate, which rapidly oxidizes to form the dimer, dichlorodibromoindigo (ClBr-indigo).

Figure 1.
Hydrolysis of X-GlcA by β-Glucuronidase

If using a known strain of *E. coli* as a positive control for GUS activity, it is important to realize that K-12 strains of *E. coli* contain a defective permease. Even though X-GlcA is an excellent inducer of *uidA* in *E. coli*, K-12 strains require much higher levels of X-GlcA than wild-type strains. With a defective permease, high extracellular levels of X-GlcA are needed to develop sufficient intracellular levels so that *uidA* is adequately induced. In addition, once *uidA* is induced and GUS activity is high, high extracellular levels of X-GlcA are also needed to develop sufficient intracellular levels to react and to yield a dark coloration.

Each tablet is ~40 mg with 10 mg of substrate.

Precautions and Disclaimer
This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions
To prepare a concentrated stock solution, 1 tablet will dissolve in 100 μl of water with a final volume of ~125 μl (80 mg/ml final concentration). This can be frozen at –20 or –70 °C. The tablet may also be diluted to the final concentration for use by dissolving directly into a reaction buffer solution or bacteriological growth medium, depending on the desired application.

Storage/Stability
Store the tablets at –20 °C. When stored at –20 °C, the tablets are stable for at least one year. Tablets are good as long as color remains white.
Procedure
As an indicator for the presence of *E. coli* in natural materials
Sigma’s functional test procedure is as follows: Prepare LB Agar (Catalog Number L2897) or LB Agar EZMix™ Powder (Catalog Number L7533). Cool to 55 °C. Add one 10 mg tablet per 100 ml of LB Agar and mix gently to dissolve. The final concentration of X-GlcA in the medium will be 100 µg/ml. Pour plates and allow to cool for a few hours or overnight. Streak one plate with a *uidA*⁺ strain of *E. coli* (ATCC 11303) and a second plate with a *uidA*⁻ strain of *E. coli* (GMS407). Incubate the plates at 37 °C for 24 hours.

As a substrate for the GUS reporter system to study plant gene expression
Please refer to published procedures.¹

Results
The *uidA*⁺ cells produced dark-blue colonies indicating the expression of the β-glucuronidase gene and the *uidA*⁻ cells produced non-colored colonies indicating the absence of expression.

References

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