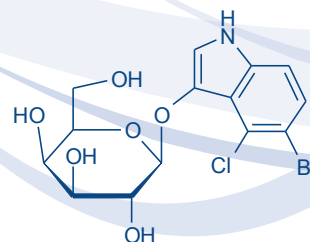


X-Gal

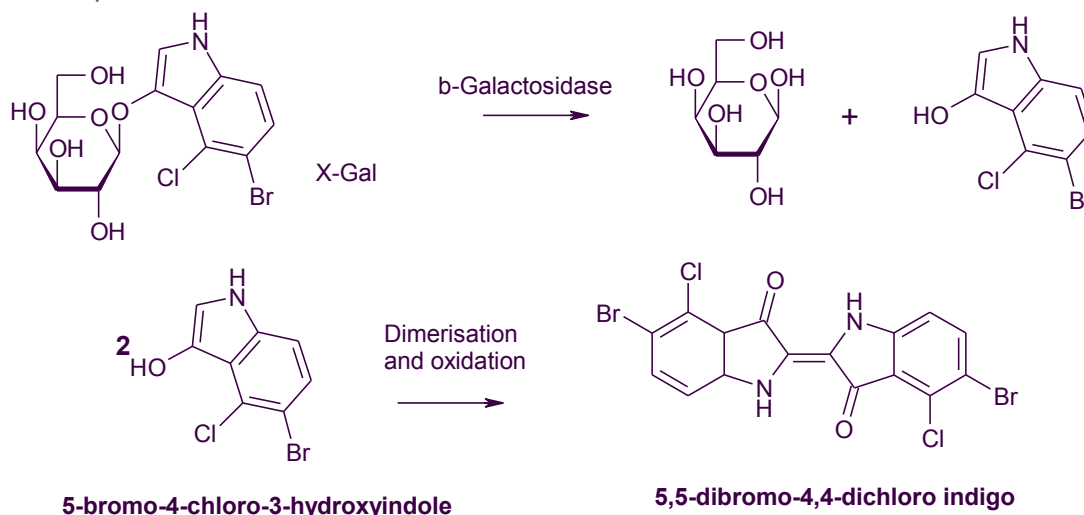
Product Code: **EB06680**
 CAS Number: **7240-90-6**
 Chemical Formula: **C₁₄H₁₅BrClNO₆**
 Molecular Weight: **408.63**

Synonyms: *X-b-D-Galactoside*



X-Gal is the normal abbreviation for 5-Bromo-4-chloro-3-indolyl β-D-galactopyranoside; less commonly the abbreviation BCIG is also used.

X-Gal is enzymatically hydrolysed by β-galactosidase to yield galactose and 5-bromo-4-chloro-3-hydroxyindole. The soluble, colourless, indole hydrolysis product is subsequently transformed into an insoluble blue compound, 5,5'-dibromo-4,4'-dichloro indigo, via a dimerisation and oxidation sequence.



X-Gal is frequently used in molecular biology applications to indicate the activity of β-galactosidase, an enzyme encoded by the *lacZ* gene. In gene cloning, a blue / white colony screening assay can be used to differentiate recombinant colonies which stain white from non-recombinant ones which stain blue.¹ The *lacZ* gene is a classical reporter gene, in yeast two-hybrid analysis allowing a distinction to be made between bacteria where a successful interaction resulting in binding of an activation domain to a promoter is made and bacteria in which such an interaction is not made. Linkage of the promoter to the *lacZ* gene will result in the production of the blue colour of 5,5'-dibromo-4,4'-dichloro indigo (by production of β-galactosidase and the subsequent hydrolysis, dimerisation and oxidation of X-Gal) by colonies hosting a successful interaction.²

References:

1. J Sambrook and DW Russell, *Molecular Cloning: A Laboratory Manual*, 3rd Edition, Cold Spring Harbor Laboratory Press, 2001.
2. JK Joung et al, *Proc. Natl. Acad. Sci. USA* 2000, 97, 7382.