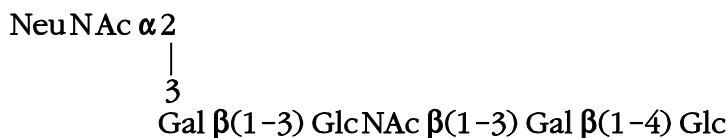


CERTIFICATE OF ANALYSIS

PRODUCT NAME: GLYKO® LS-TETRASACCHARIDE a, (LSTa)
 PRODUCT CODE: GKAD-01017
 LOT NUMBER: DP12J1601
 PACK SIZE: 1 mg (qualitative standard for glycan identification)
 PURITY: ≥90% of glycan by HPLC
 FORM: Dry solid
 STORAGE: Store at -20°C before and after reconstitution
 EXPIRATION: October 2017, may be used for 1 year after reconstitution
 STRUCTURE:



QUALITY CONTROL:

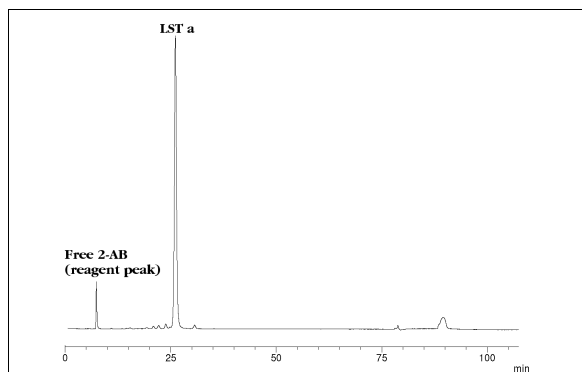


Figure 1 - HPLC results: LSTa labeled according to the Signal™ 2-AB Labeling Kit (GKK-404) and analyzed on a GlycoSep™ N column (GKI-4728) in ammonium formate/acetonitrile.

Molecular Weight: 998.9 (average)¹

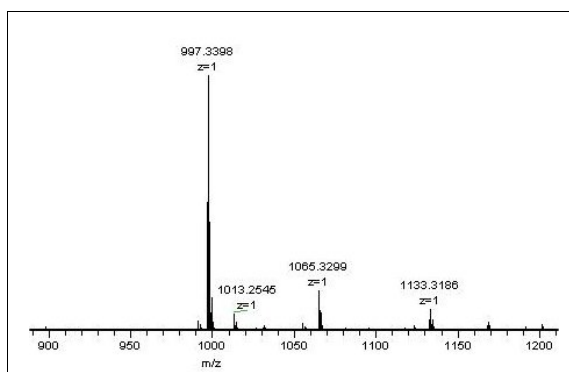


Figure 2 - ESI-MS of LSTa [M - H]⁻

Structural Analysis: The purity and structural integrity of the glycan is assessed by one or more of the following techniques: HPLC², mass spectrometry^{3,4}, FACE⁵, ¹H-NMR⁶ and HPAEC-PAD⁷.

Reconstitution: Use HPLC-grade water or an aqueous buffer to dissolve the glycan. Store the reconstituted glycan at -20°C in working aliquots. Avoid multiple freeze/thaw cycles.

Handling: The oligosaccharide is shipped as a dried solid. Allow the unopened vial to reach ambient temperature and tap on a solid surface to ensure that most of the material is at the bottom of the vial. Gently remove the cap, add the desired volume of water or buffer, re-cap and mix thoroughly to redissolve all the oligosaccharide. For maximal recovery, ensure that the cap lining is also rinsed, and centrifuge the reconstituted vial briefly before use.

Make sure that any glassware, plasticware, solvents or reagents which come into contact with the glycan are free of glycosidases and carbohydrate contaminants.

Minimize exposure to elevated temperatures or extremes of pH; high temperatures or low pH will cause desialylation.

Applications:

- qualitative standard for various analytical procedures
- establishing the specificity of lectins and monoclonal antibodies
- radio-labeling, fluorescent-labeling or formation of a variety of oligosaccharide derivatives
- substrate for glycosidase and glycosyl transferase assays

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<http://us.expasy.org/tools/glycomod/glycanmass.html>
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Authorized Signature