# LIQUID CRYSTAL BEHAVIOR OF AN ETHYL HEXANOYL GLUCOFURANOSE DERIVATIVE

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## Introduction

Amphiphilic carbohydrate derivatives exhibit liquid crystalline behavior as the carbohydrates can be substituted relatively easily with non polar alkyl chains. The alkyl chain can be linked directly to the carbohydrate via an ether, ester, amine or glyceryl linkage. In the present study, a carbohydrate liquid crystal was synthesized by the selective acylation of the 1,2 : 5,6-di-O-isopropylidene-D-glucofuranose with an acylating agent 2-ethylhexanoyl chloride to yield a product which formed thermotropic hexagonal columnar phase liquid crystals. The structure was characterized by FT-IR, $^{1}$H-NMR, $^{13}$C-NMR and GC-MS. The mesomorphic behavior was studied using polarized optical microscopy, differential scanning calorimetry and X-ray diffraction technique.

## Materials and Methods

All the reagents used were commercially available and the solvents were purified by distillation and dried with anhydrous magnesium sulphate before use. IR spectra were recorded on a FTIR spectrophotometer using KBr pellets. The structures of all the products were confirmed by NMR spectroscopy (300 MHz Varian VTR-300 spectroscopy. GC-MS values were recorded by Varian VA-5MS (Varian 3800 Gas chromatograph-detector-Varian Saturn GC/MS/MS 2000). Identification of optical texture was carried out using a polarizing optical microscope. Thermo microscopy was performed by connecting the polarizing microscope to a temperature control unit (CHINO). X ray diffractometer D-500 (SIEMENS) was used to determine the layer spacing; 2θ range from $2.0^0$ to $7.0^0$ at 1.5406 $A^0$ wavelength. Quantitative thermal analysis was performed using a Perkin Elmer PC Series DSC 7.

### *Synthesis of 1,2 : 5,6-di-O-isopropylidene-D-glucofuranoside (diacetone glucose)*

1,2:5,6-di-O-isopropylidene-D-glucofuranoside (diacetone glucose) was synthesized according to a previous study carried out by Widanapathirana, *et al.*,(2007). Yield; 3.07 %. mp; 103-107 $^0$C. (*Lit.* mp; 106-110 $^0$C). IR (KBr): $\nu_{max}$ 3433 cm$^{-1}$ (-OH).

### *Synthesis of 3-O-2-ethyl-hexanoyl-1,2:5,6-di-O-iso propylidene -D-glucofuranoside ( EHIG)(Figure 1(c) )*

Diacetone glucose (200.2 mg) was dissolved in dry pyridine (6 mL) and was cooled to 0 $^0$C. This was reacted with 2-ethylhexanoyl chloride (0.20 mL) at 0 $^0$C for 4 h and allowed to stand at room temperature overnight. A few pieces of ice were added and