Electronic Supplementary Material (ESI) for Green Chemistry

SULFOXIDES AND SULFONES AS SOLVENTS FOR THE MANUFACTURE OF ALKYL POLYGLYCOSIDES WITHOUT ADDED CATALYST

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HPLIC analysis of organic acids:

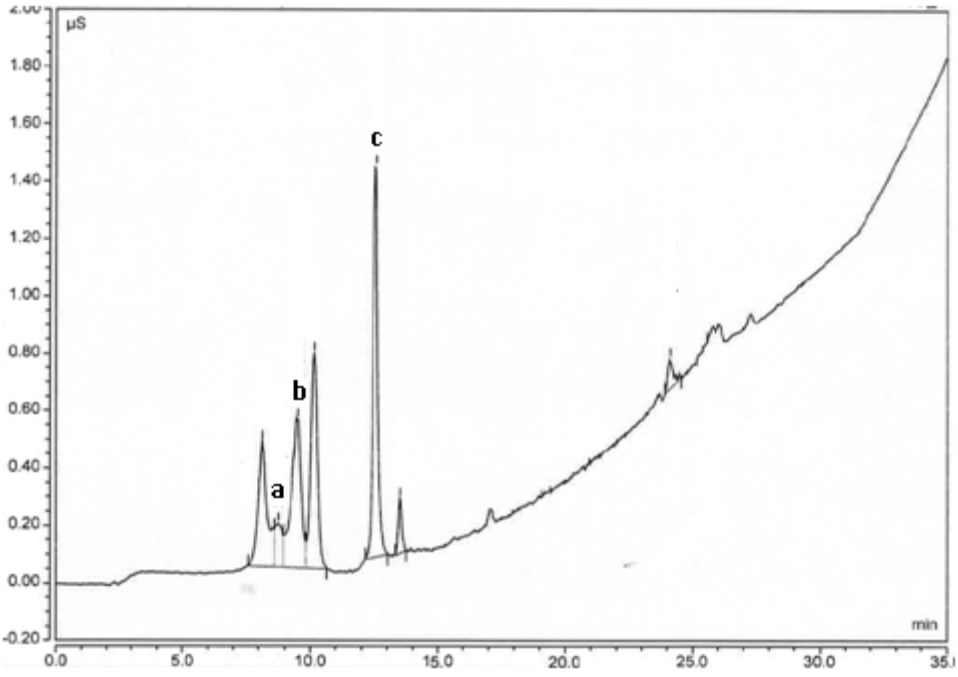
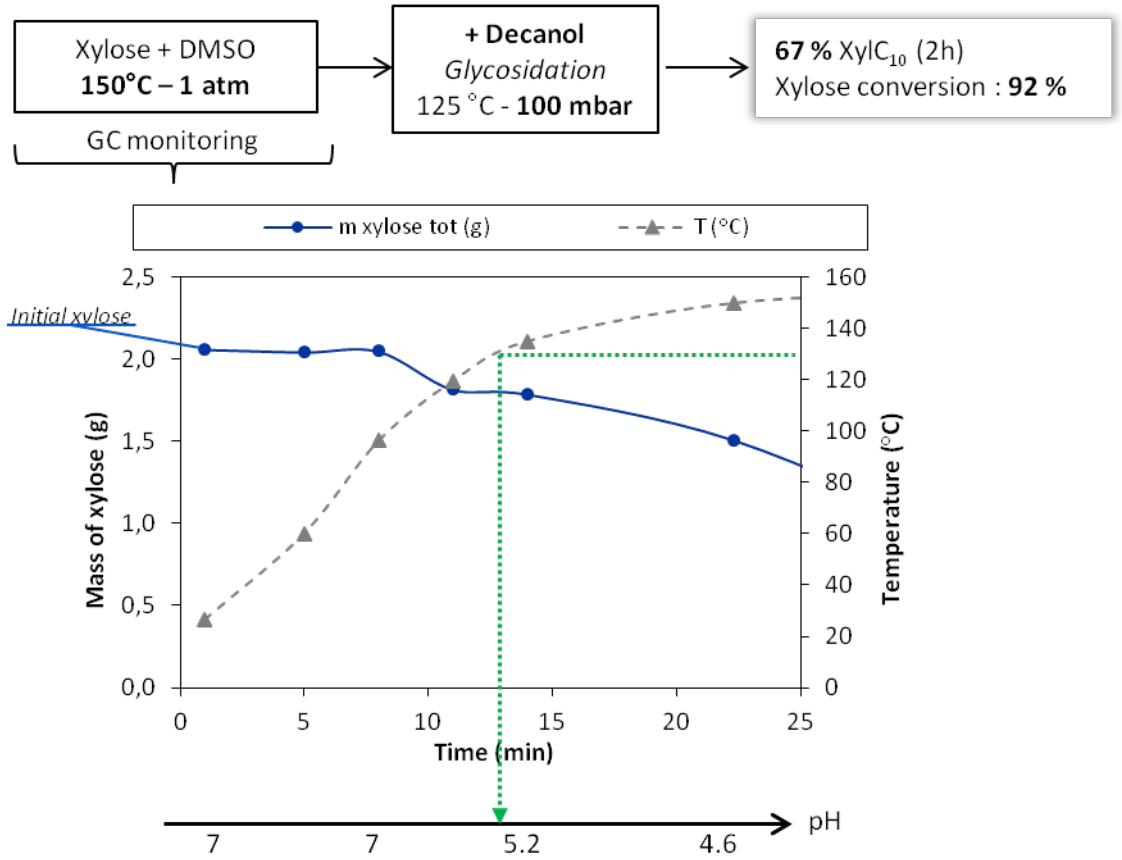


Figure 1. HPLIC chromatogram of the thermal degradation of D-xylose in DMSO (a, lactic acid; b, acetic acid; c, formic acid)

Scheme 1: Gas Chromatography monitoring and pH monitoring of the thermal degradation of D-xylose in DMSO



Recycling of $DMSO_2$:

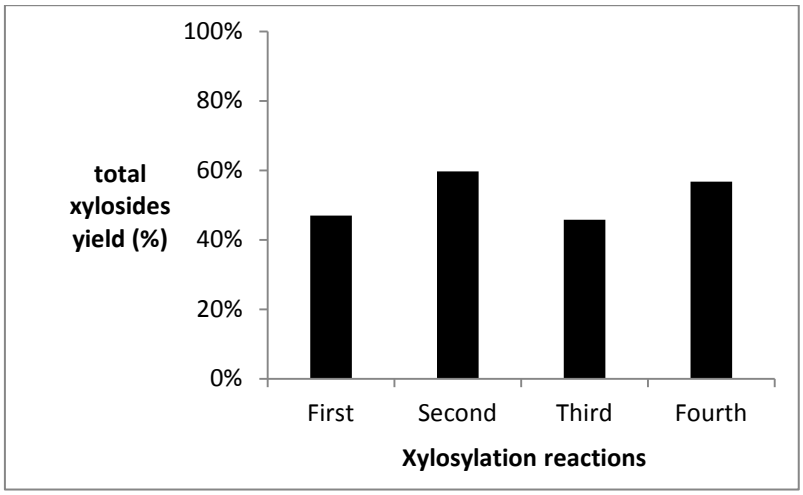


Figure 2. Successive xylosylation reactions in dimethylsulfone. Reaction conditions as described for Table 4

Effects of temperature and added catalyst on glycosidation reactions in sulfolane:

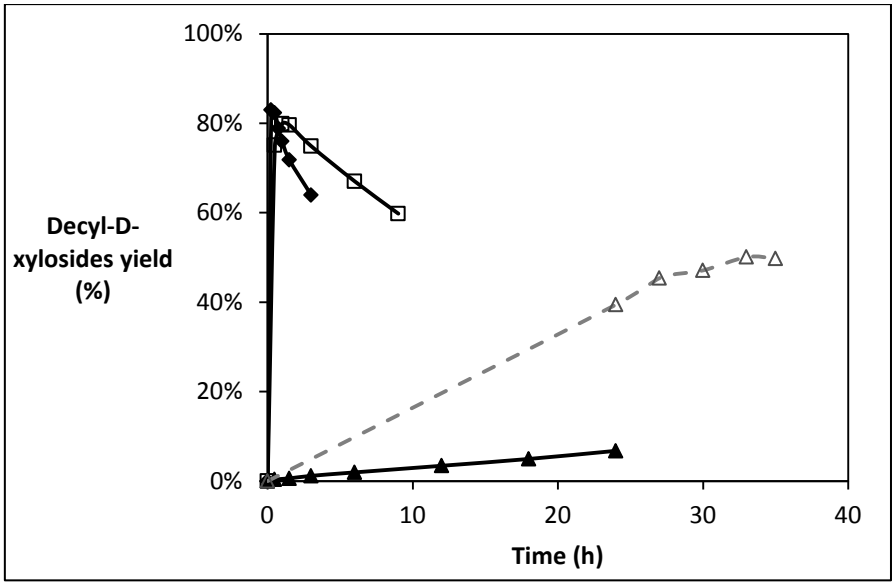


Figure 3. Yield of decyl-D-xylosides as a function of time

T = 150 °C (◆); 125 °C (□); 90 °C (▲) ; 90 °C in the presence of formic acid as catalyst (△)
Reaction condition: D-xylose (0.033 mol), Sulfolane (6 mol. equivalent based on D-xylose), Decanol (9 mol. equivalent based on D-xylose), air atmosphere

Characterization of decyl-D-xylosides produced by glycosidation of D-xylose with decanol in sulfolane (Table 4, Entry 5):

Biodegradation

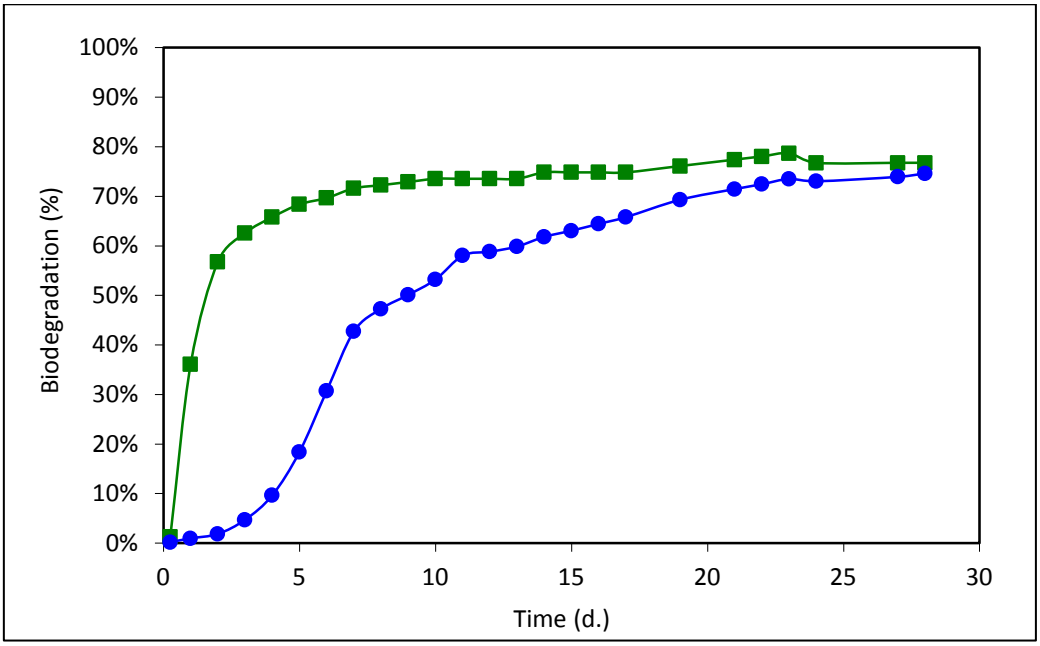


Figure 4. Evolution of the ultimate biodegradability of decyl D-xylosides over 30 days (■, NaOAc (standard); ●, decyl D-xylosides) (according to OCDE 301F standard)

Physico-chemical properties

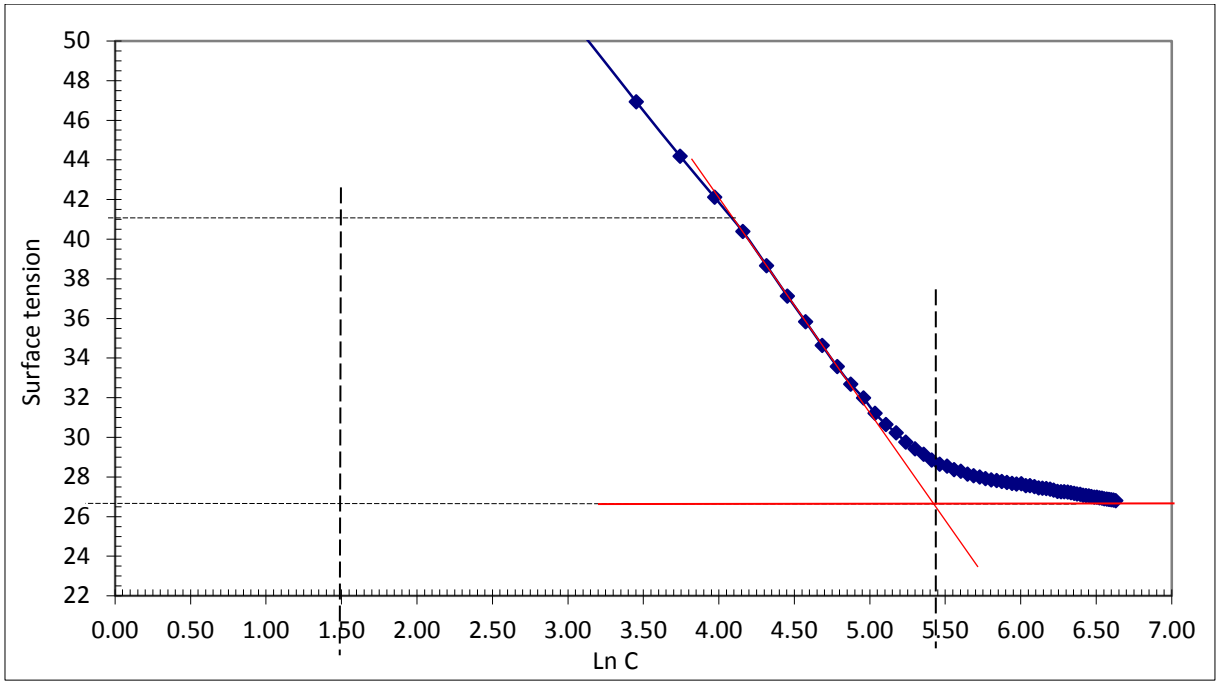


Figure 5. Determination of the surface tension versus decyl D-xylosides concentration[1]

[1] S. Marinkovic and B. Estrine, *Green Chem.*, 2010, **12**, 1929

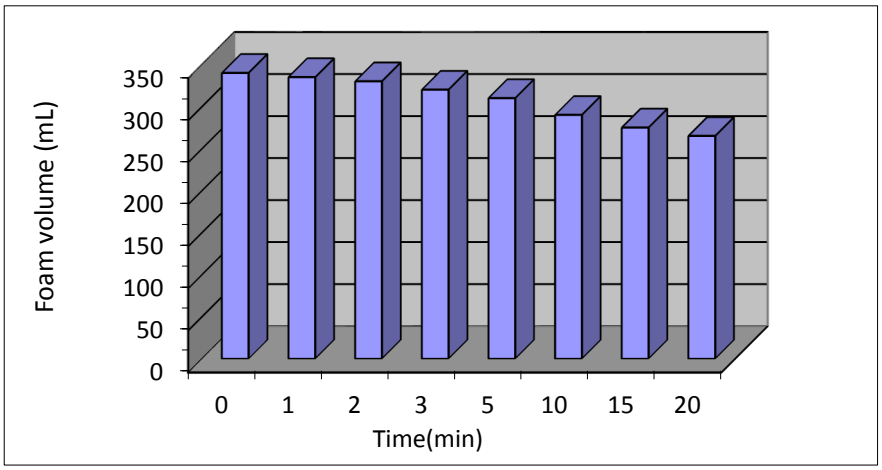


Figure 6.Determination of the foam power of decyl D-xylosides following Ross Miles tests[2]

Foam production versus time (50 °C) = 340 mL (stability at 20min = 77.9 %)

Wetting power following Draves tests: (25 °C) = 10 s ± 1 s

[2] S. Marinkovic and B. Estrine, *Green Chem.*, 2010, **12**, 1929

RMN analysis:

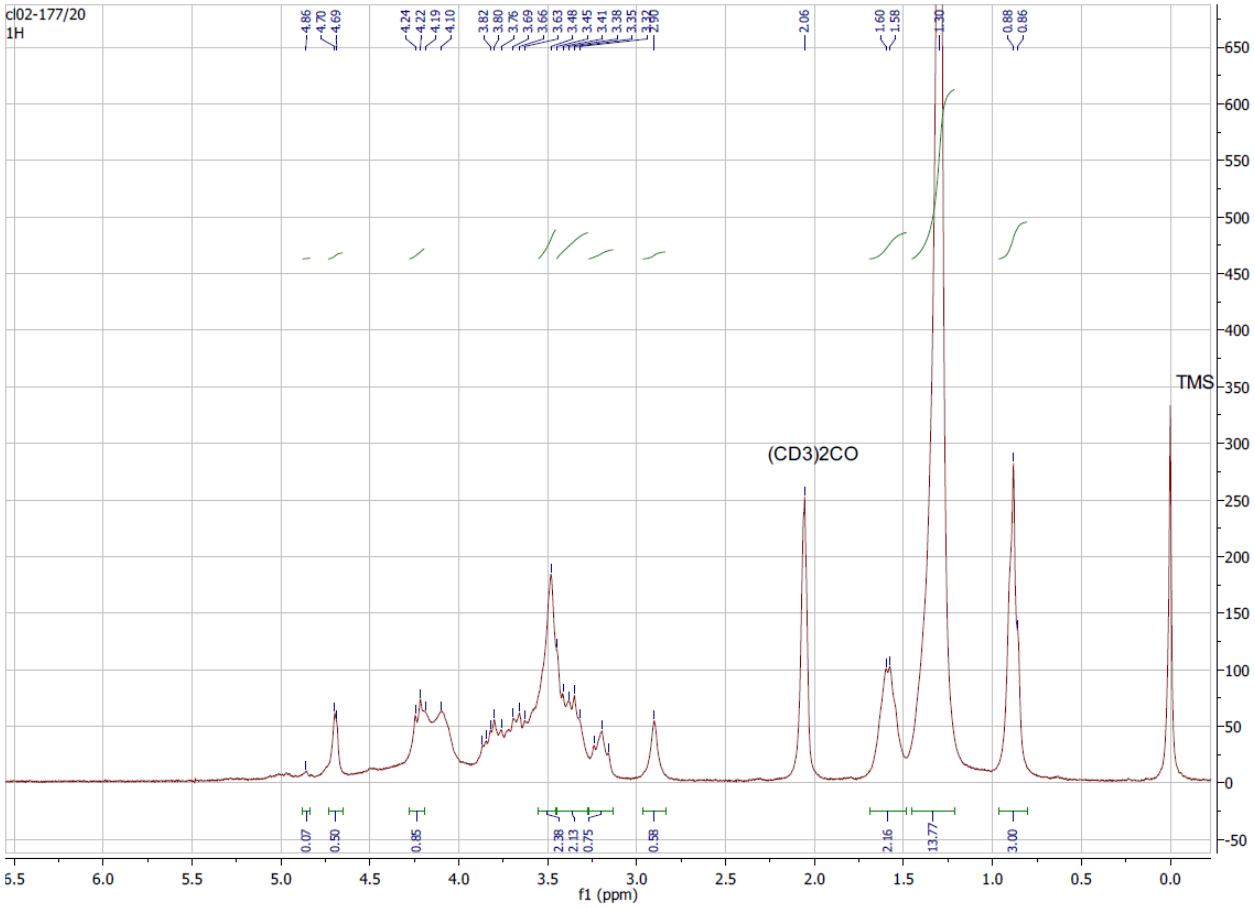


Figure 7. ^{1}H RMN spectra (solvent $(CD_3)_2CO$)[3]

[3] S. Marinkovic and B. Estrine, *Green Chem.*, 2010, **12**, 1929

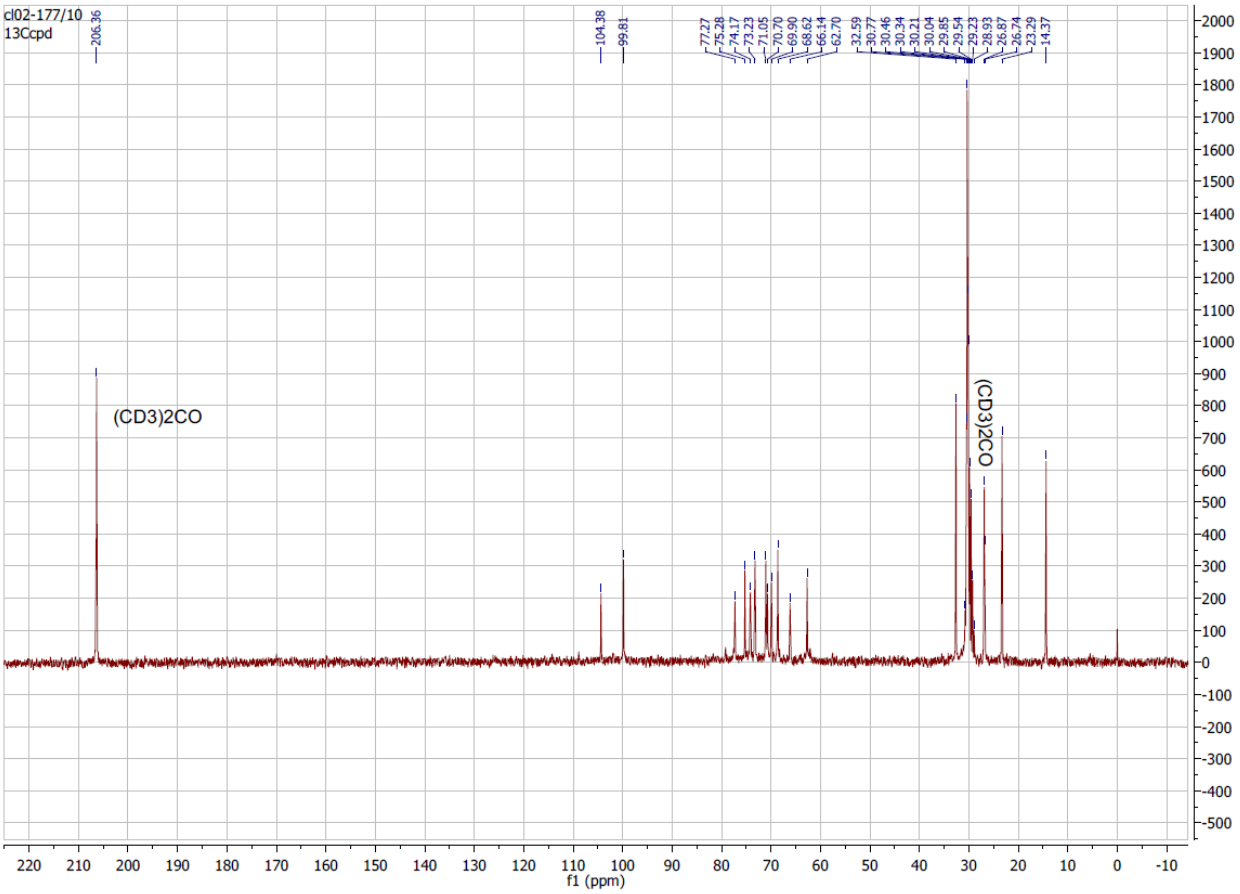


Figure 8. ^{13}C RMN spectra (solvent $(CD_3)_2CO$)[4]

[4] S. Marinkovic and B. Estrine, *Green Chem.*, 2010, **12**, 1929