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

![Diagram](attachment:image.png)

**Recycling of DMSO:**

![Bar chart](attachment:chart.png)

**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

\[ T = 150 \, ^\circ \text{C} (\bullet); \quad 125 \, ^\circ \text{C} (\square); \quad 90 \, ^\circ \text{C} (\triangle); \quad 90 \, ^\circ \text{C} \text{ in the presence of formic acid as catalyst (△).} \]

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)
Figure 5. Determination of the surface tension versus decyl D-xylosides concentration

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

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

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

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Figure 7. $^1$H RMN spectra (solvent (CD$_3$)$_2$CO)$^3$

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Figure 8. $^{13}$C RMN spectra (solvent (CD$_3$)$_2$CO)$^4$