Development of Bisphenol S-Free Syntans for Leather Manufacture

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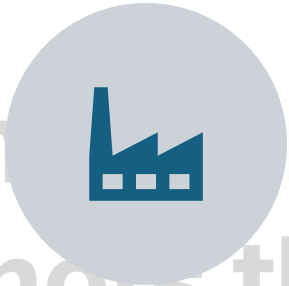
Can the leather industry get rid of bisphenols (from syntans)?

Can the Leather Industry Get Rid of BPS?



CHALLENGES IN ELIMINATING BPS FROM LEATHER PRODUCTION.

CURRENT RELIANCE ON BPS IN VARIOUS PROCESSES.

LEATHER INDUSTRY DISCUSSING POTENTIAL REACTIONS AND SOLUTIONS TO ANTICIPATE FUTURE REGULATIONS.

It depends...

What is being said about bisphenols (S, A, F…)?

- BPS is listed on REACH SVHC.
- Classified as Repr. 1B and recognized for endocrine-disrupting properties.
- Thresholds of 3000 ppm and 1000 ppm for "affecting" SDS of products (leather included).

Regulations

- Future limitations include detection limits of 500-ppm limit by mid-2025.
- Potential reduction to 10 ppm by 2030.
- Legislative proposal to **ban** bisphenols.

Chat

- Sulphone-based syntans are **essential** for retanning processes to enhance leather quality.
- Phenolic approach to syntans are part of different strategies to reduce BPS usage.
- **Paradox** of increased chemical usage for performance.

Chemistry

- Consumers have **prompted** more stringent requests for equal quality leather but without bisphenols.

Customers

It is a matter of...

- **Hazardness**
- Overview of BPS and its potential hazards on *Pubmed*
- **Addressing** BPS polymers in the leather industry? How?
- **Size**, conformation and flexibility matter
- Qu
- Mu

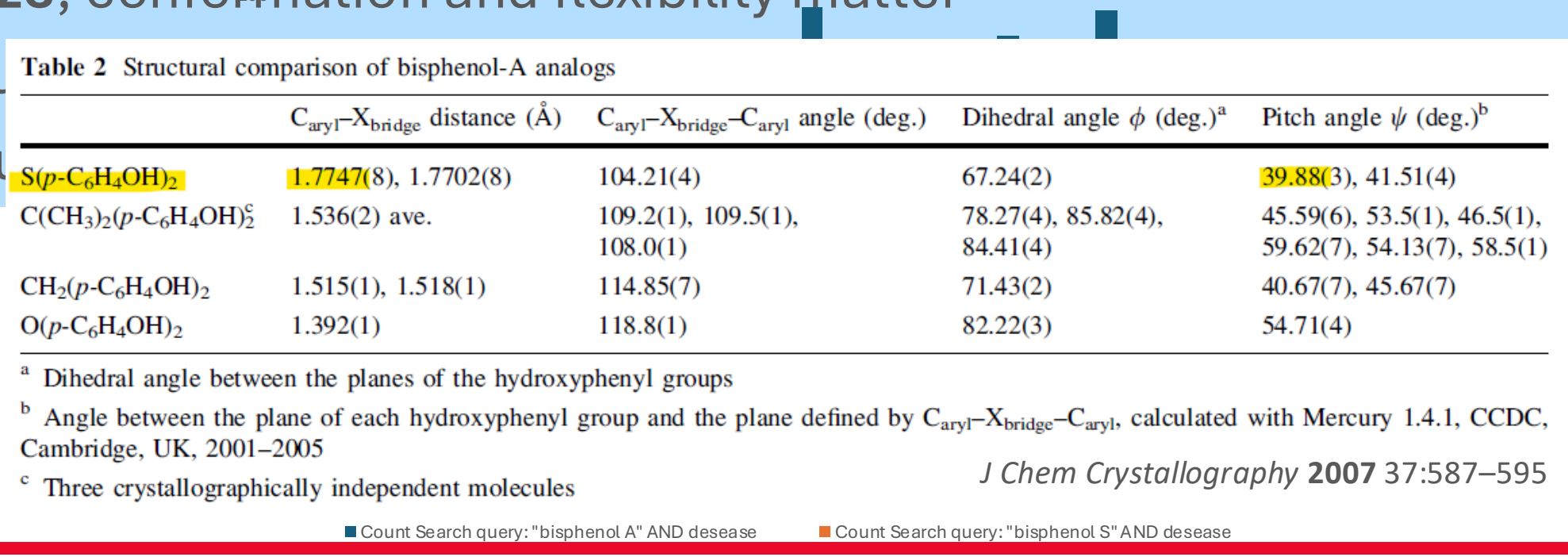


Table 2 Structural comparison of bisphenol-A analogs

	C_{aryl}–X_{bridge} distance (Å)	C_{aryl}–X_{bridge}–C_{aryl} angle (deg.)	Dihedral angle ϕ (deg.)[a]	Pitch angle ψ (deg.)[b]
$S(p\text{-}C_6H_4OH)_2$	1.7747(8), 1.7702(8)	104.21(4)	67.24(2)	39.88(3), 41.51(4)
$C(CH_3)_2(p\text{-}C_6H_4OH)_2$[c]	1.536(2) ave.	109.2(1), 109.5(1), 108.0(1)	78.27(4), 85.82(4), 84.41(4)	45.59(6), 53.5(1), 46.5(1), 59.62(7), 54.13(7), 58.5(1)
$CH_2(p\text{-}C_6H_4OH)_2$	1.515(1), 1.518(1)	114.85(7)	71.43(2)	40.67(7), 45.67(7)
$O(p\text{-}C_6H_4OH)_2$	1.392(1)	118.8(1)	82.22(3)	54.71(4)

[a] Dihedral angle between the planes of the hydroxyphenyl groups

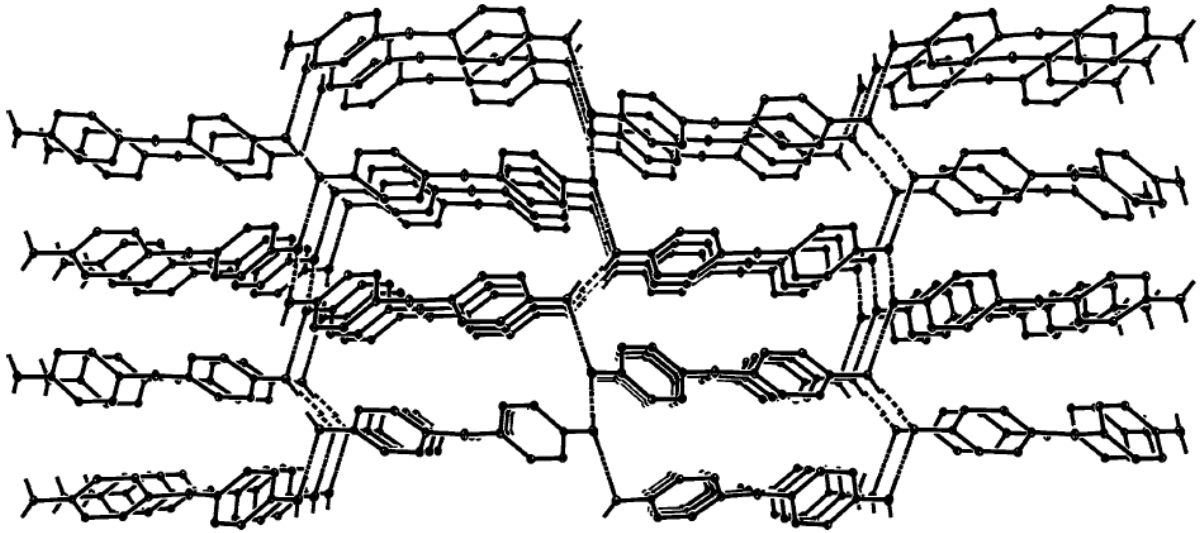
[b] Angle between the plane of each hydroxyphenyl group and the plane defined by C_{aryl}–X_{bridge}–C_{aryl}, calculated with Mercury 1.4.1, CCDC, Cambridge, UK, 2001–2005

[c] Three crystallographically independent molecules

J Chem Crystallography **2007** 37:587–595

Spatial conformation

Fig. 6 Depiction of the 3-D nature of the hydrogen bonding network of $CH_2(p\text{-}C_6H_4OH)_2$ viewed down the *a*-axis. Hydrogen atoms removed for clarity



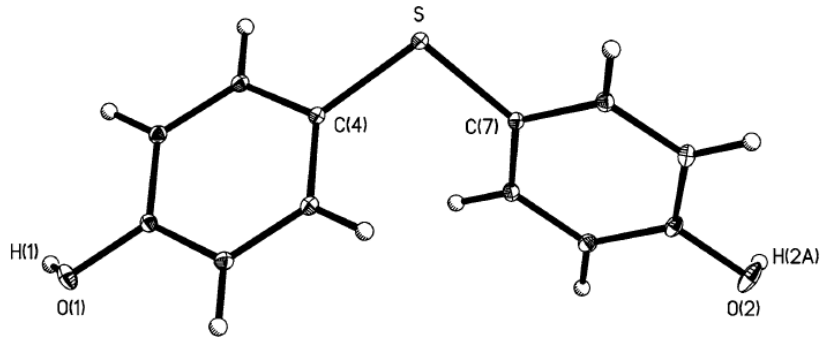
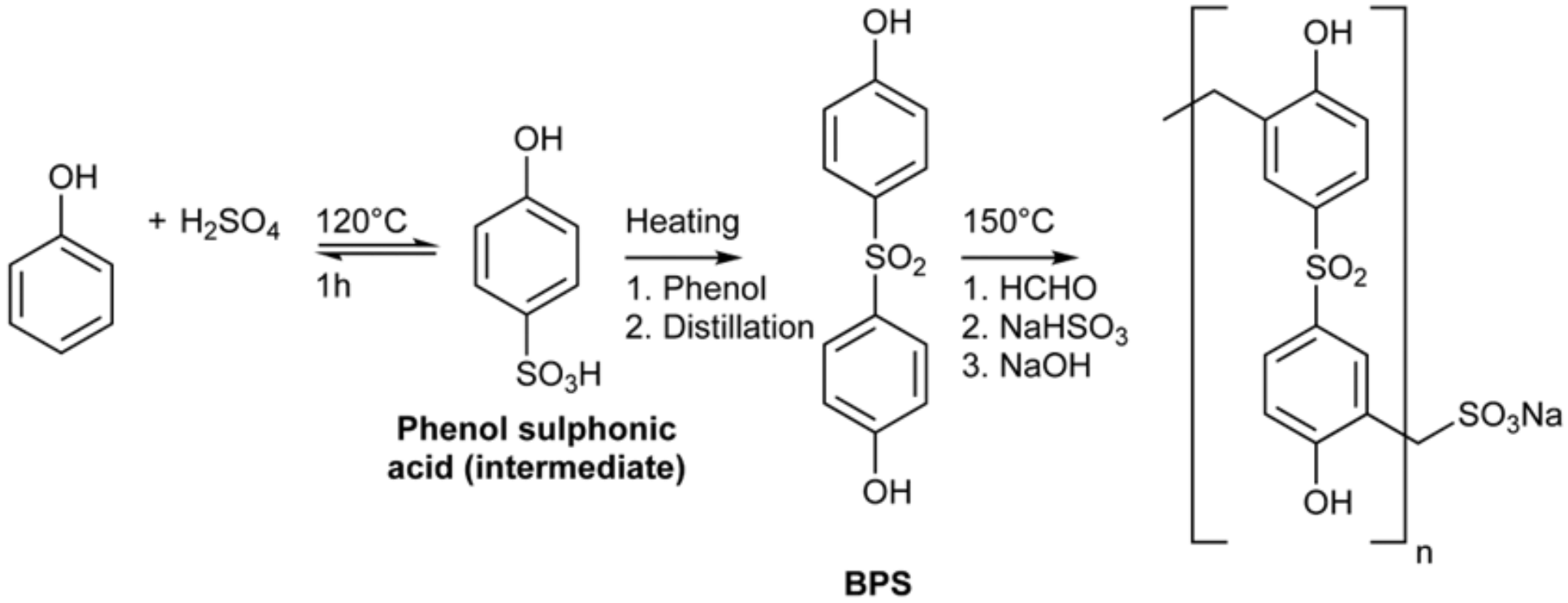


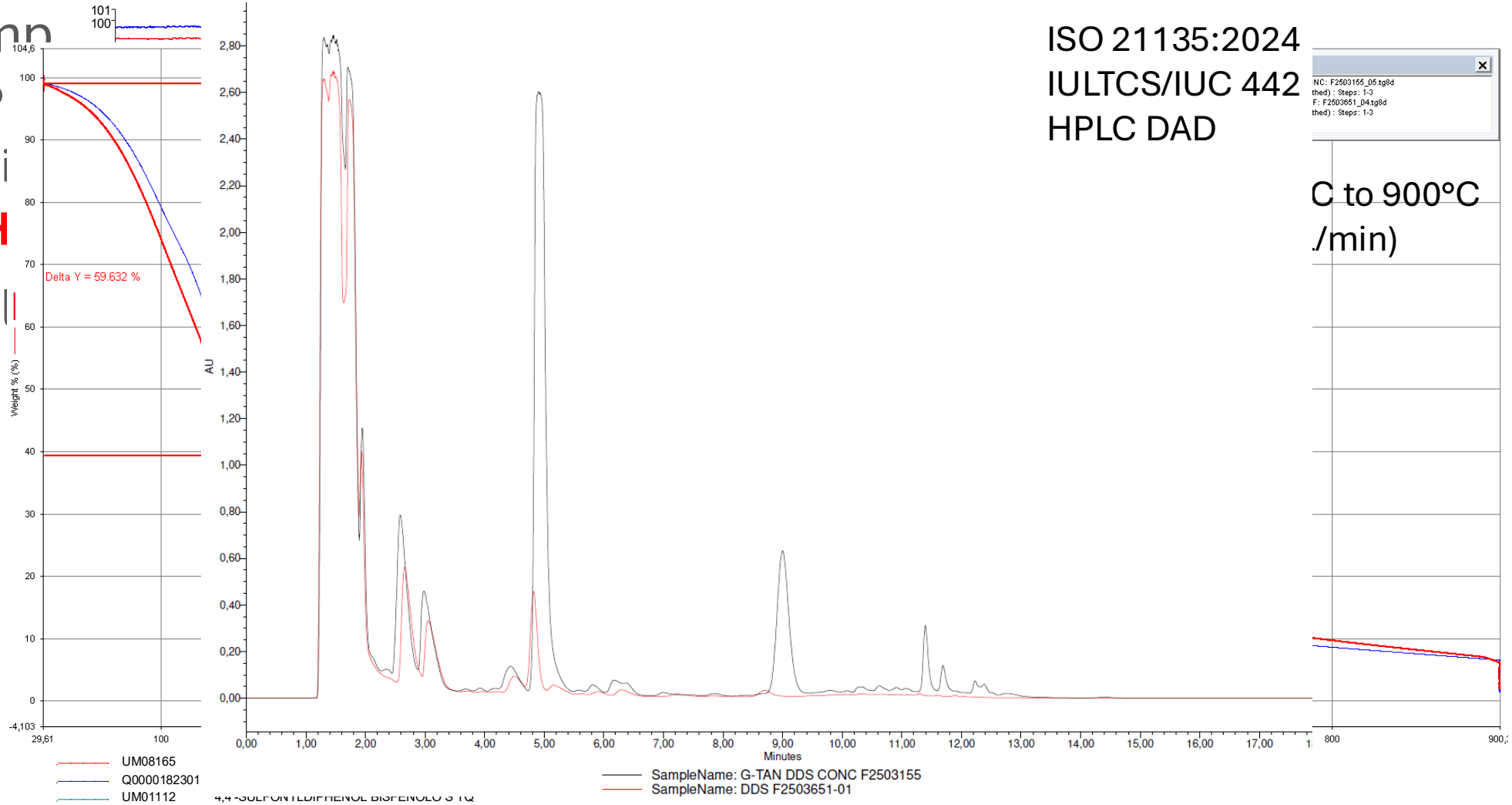
Fig. 4 Molecular structure of $S(p\text{-}C_6H_4OH)_2$ (20% ellipsoids). Selected bond lengths (Å) and angles (deg.): S–C(4) 1.7747(8), S–C(7) 1.7702(8), C(4)–S–C(7) 104.21(4)

GSC Group's strategy



Syntan comparison

- Comp
  - P
  - Li
  - **H**
- Appl



ISO 21135:2024
IULTCS/IUC 442
HPLC DAD

C to 900°C
./min)

Conclusions

- **Efficiency of the strategy**
  - Can We Move to Free-Bisphenol Syntans? Do we want to move?
- Effects on the **overall** leather process
- Cost analysis
- Need of a clearer perspective on BPS regulation

Thank you!