Determination of 2-ethylhexyl 4-(dimethylamino) benzoate using membrane-assisted liquid–liquid extraction and gas chromatography-mass spectrometric detection

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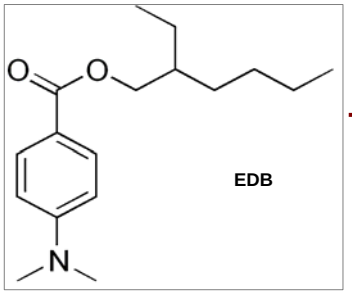
THE ANALYTE



Industrial uses

- UV protector in sunscreen creams (and other personal care products)
- Initiator of theradical polymerisation of acrylic inks used to print food packaging cartons

THE PROBLEMS

- Migration of EDB from the packaging to the foods (milk) has been reported
- Indirect DNA damages that this compound can cause

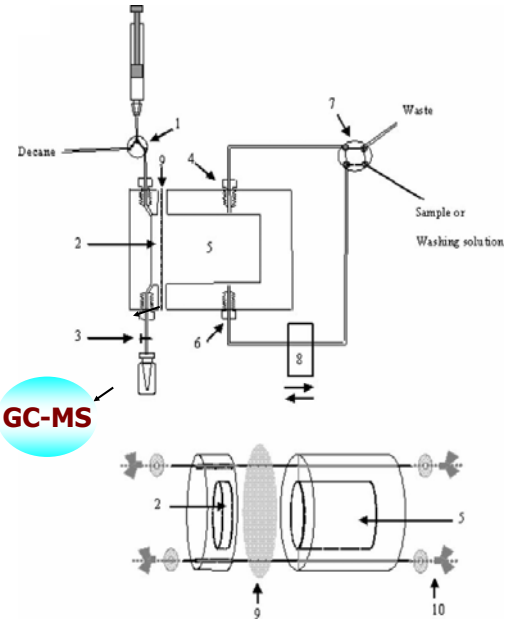
THE OBJECTIVE

Development of an extraction procedure for EDB from complex matrices

A flow-cell for membrane liquid–liquid extraction with a sheet membrane was used to extract EDB from:

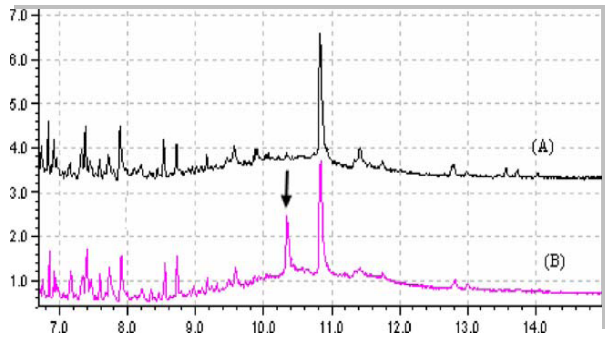
- urine of solar-cream users and
- spiked wine samples

The flow cell and manifold



(1)two-way valve (2) 0.2 mL acceptor chamber (3) open–close valve (4) upper entrance (5) 7.9 mL donor chamber (6) lower entrance (7)fourway valve (8) peristalticpump (9) 3.1 cm^2 PTFE membrane (10) thumbscrew and washer

The results



Typical chromatogram for urine samples (SIM at m/z 165). (A) Urine blank. (B) Urine spiked with 1 μg L^{-1} EDB

Sample	Calibration equation	LOD (μg L^{-1})	RSD(%)	Extraction efficiency
Standards	y=2,990 (±130) · x+0 (±4,000)	0.3	11	9
Urine	y=2,180 (±120) · x+0 (±4,000	0.3	11	6.7
wine	y=1,020 (±70) · x+0 (±2,000)	1.0	12	3.2

CONCLUSIONS

An efficient sample clean-up has been developed for EDB. Extracts obtained from urine and wine can be directly injected into a gas chromatograph with mass detector.

EDB has been found in urine of users of sunscreen cream containing EDB, thus providing evidence of its dermal absorption and excretion through the urinary tract.

EDB was not detected in the wine samples.

The method of standard additions have to be applied.