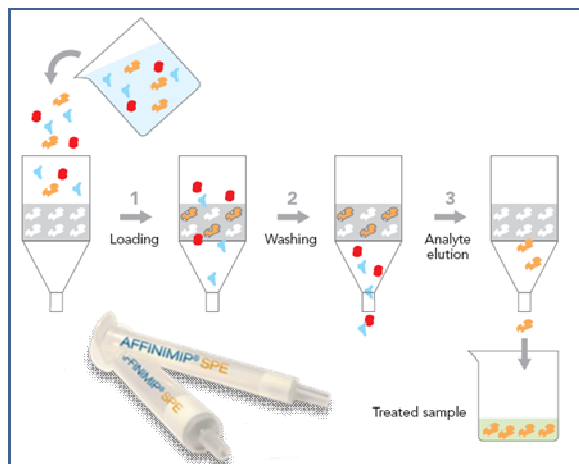


Selective Solid Phase Extraction of Bisphenol A from COLA drinks in Plastic Food Packaging at Low Concentrations using AFFINIMIP® SPE



Background

Bisphenol A (or BPA) is a molecule widely used in the food packaging industry. The migration of this endocrine disruptor compound from the packaging to food is the main source of consumers' exposure to BPA.

Progressively, countries become more and more restrictive on BPA use for food packaging. For instance, in October 2011, French parliament voted a law for banning BPA from canned foods and plastic boxes applicable in 2013 for infants and for all consumers on 1st January 2014.

So, BPA is a topical issue with a worldwide regulation going to still lower concentrations of BPA allowed in food. So, highly sensitive and reliable detection methods are required for routine analysis of BPA in food samples, particularly for baby food.

In previous application notes, we described protocols enabling the determination of very low concentration of BPA in several matrices (liquid and powdered infant formula, beer) or packaging (canned foods). This application note describes the analysis of very low concentration of BPA in cola drinks contained in plastic food packaging using AFFINIMIP® SPE Bisphenol A cartridge.

We demonstrate in this application note that a reliable quantification of Bisphenol A at low concentrations (5µg/kg) using fluorescence detector is possible. Therefore, the use of AFFINIMIP® SPE Bisphenols enables to eliminate the tedious derivatization step required by gas chromatography.

This method is also perfectly suitable for clean-up before

GC-MS/MS or LC-MS/MS.

Results

High analyte recovery

Matrice Spiked at 5µg/kg	Mean concentration (µg/kg)	Recoveries %	RSDr %
Cola drinks	4.54 (n=3)	90.8	1.0

Table 1. Recovery of Bisphenol A spiked at 5µg/kg after AFFINIMIP® SPE Bisphenols clean-up of 6mL of cola drinks.

Clean-up at very low concentrations

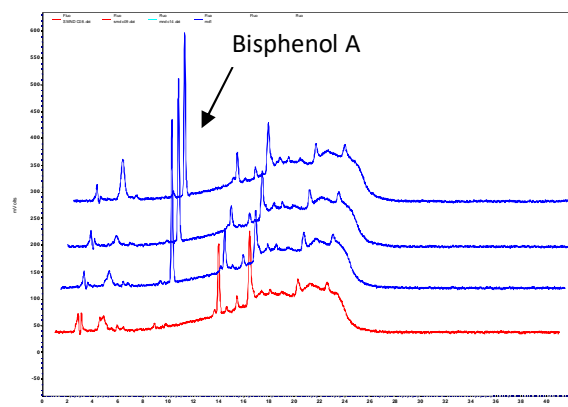


Figure 1. Chromatograms obtained after clean-up with AFFINIMIP® SPE Bisphenols of 6mL of cola drinks spiked with 5µg/kg Bisphenol A (tested three times, blue) or not spiked (red).



Figure 2. Comparison of the solution obtained before and after using AFFINIMIP® SPE Bisphenols

FS106-03B for 50 polypropylene cartridges 6mL

FS106-03G for 50 glass cartridges 6mL

Experimental conditions

Materials

All reagents and chemicals were ACS grade quality or better. Bisphenol A was obtained from Alfa Aesar. Cola drinks were purchased at a supermarket.

Solid phase extraction (SPE) protocol

The SPE procedure used a 3mL or a 6mL AFFINIMIP® SPE Bisphenols cartridge. The details of each step are as follow:

- Condition the SPE cartridge with 3mL of Methanol-2% Formic Acid, 3mL Acetonitrile (ACN), then with 3mL of Water
- Load up to 6mL of Cola drinks after 30min degassing with ultrasounds
- Wash the cartridge with 9mL of Water
- Wash the cartridge with 6mL of Water/ACN (60/40, v/v)
- Dry 3 minute
- Elute Bisphenol A with 3mL of Methanol

The elution fraction was then evaporated and dissolved in the mobile phase.

Analysis

HPLC was performed on a ThermoFinnigan Spectra System with a Thermo Hypersil Gold column (150mm x 4.6mm). Separation was carried out using a gradient at a flow rate of 1mL/min. The detection system was a Jasco FP-2020 with Fluorescence detector set to excitation/emission wavelengths of 230 and 315nm, respectively. The injection volume was 50µL.

	Time (min)	% Water	% ACN
Mobile Phase	0	65	35
	2	65	35
	12	50	50
	20	50	50
	20.5	65	35
	40	65	35

Product references

• AFFINIMIP® SPE Bisphenols

FS106-02 for 25 polypropylene cartridges 3mL

FS106-02B for 25 polypropylene cartridges 6mL

FS106-02G for 25 glass cartridges 6mL

FS106-03 for 50 polypropylene cartridges 3mL

Related matrices: canned foods, infant milk, beer, water, urine...