AFFINIMIP® SPE Cartridge VS ImmunoAffinity Column

Solid phase extraction is a simple tool to selectively extract analytes from complex matrices and quantify concentrations lower and lower. The major disadvantage of conventional SPE sorbents, such as C18 is a lack of selectivity and interference matrix components are co-extracted with the target analytes. To solve this problem, affinity-based SPE sorbents have been developed to be selective in extracting the target analytes like molecularly imprinted polymer (MIP) and immunoaffinity sorbent.

Immunoaffinity columns (IAC) are biological sorbents based on the use of antibodies that are specific to the target analytes.

Molecularly imprinted polymer is a synthetic material with artificially generated three-dimensional network able to specifically rebind a target molecule.

Based on molecularly imprinted polymers, POLYINTELL's AFFINIMIP® SPE cartridges have the advantages to be highly selective and specific. Contrary to IAC, AFFINIMIP® SPE cartridges are chemically and thermally stable, compatible with all solvents as well as cost effective.

Comparative Results

Properties of MIP and IAC

Feature	IAC	AFFINIMIP® SPE
Selectivity	High	High
Capacity	6µmol/g	**10-100µmol/g**
Analyte recognition in water	Good	Variable
Analyte recognition in Organics	Poor	**Good**
Stability	Poor	**Very High**
Reproducibility	Variable	**Good**
Cost	Expensive	**Inexpensive**

Protocol: Ochratoxin A (OTA) from wheat flour

Step	Vicam IAC	AFFINIMIP® SPE OTA
Extraction of target analyte	50g sample in 100mL 60/40 ACN/water Blender 1 minute + filtration	
Preparation loading solution	10mL extract + 40mL PBS	10mL extract + 10mL HCl 0.1M pH=1
Loading	10mL Loading solution	4mL Loading solution
Washing	10mL PBS 10mL Water	7mL 60/40 HCl 0.1M pH=1/ACN
Elution	1.5mL Methanol	2mL 98/2 Methanol/Acetic acid
Protocol time	**30min**	**20min**

Protocol: Zearalenone (ZON) from maize flour

Step	Vicam IAC	AFFINIMIP® SPE ZON
Extraction of target analyte	25g sample in 100mL 90/10 Methanol/water Blender 3 minutes + filtration	25g sample in 100mL 75/25 ACN/water Blender 3 minutes + filtration
Preparation loading solution	4mL extract + 96mL water	10mL extract + 10mL Water
Loading	100mL Loading solution	8mL Loading solution
Washing	20mL Water	4mL 2/58/40 Acetic acid / water / ACN
Elution	1.5mL Methanol	2mL 98/2 Methanol/Acetic acid
Protocol time	**55min**	**30min**

Compared to IAC, AFFINIMIP® SPE provides:

- **Easier and faster protocol**
- **Lower dilution**
- **Easier automatisation**

(Cf. Automated method for the selective SPE of Ochratoxin A from wheat Using Molecularly Imprinted Polymer; Gilson Application Notes Handbook 2011; volume 1 Issue 4)

POLYINTELL
Pharma Parc II | Voie de l'Innovation | Chaussée du Vexin | 27100 Val de Reuil | FRANCE
Phone: +33 (0)2 32 09 32 70 | Fax: +33 (0)2 32 59 61 01
E-mail: contact@polyintell.com | Website : www.polyintell.com

Chromatograms

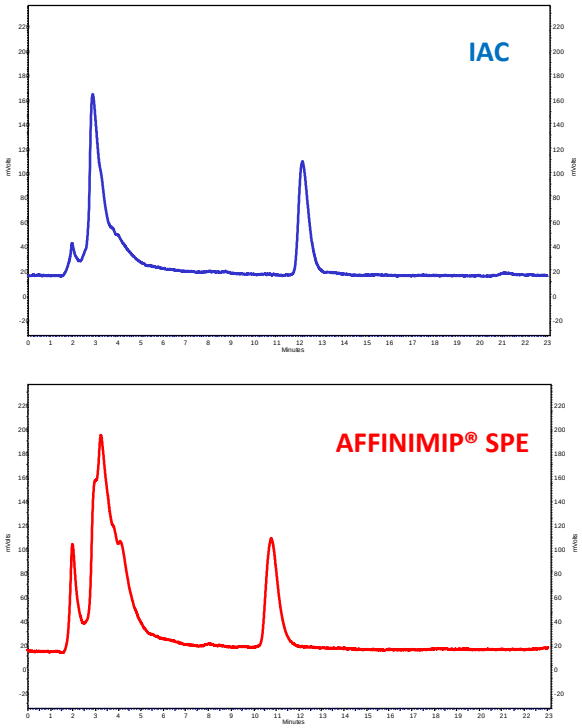

Figure 1. Chromatogram of Maize sample spiked with Zearalenone at 85 µg/kg obtained after cleanup by AFFINIMIP®SPE Zearalenone (red) or Vicam IAC (blue).

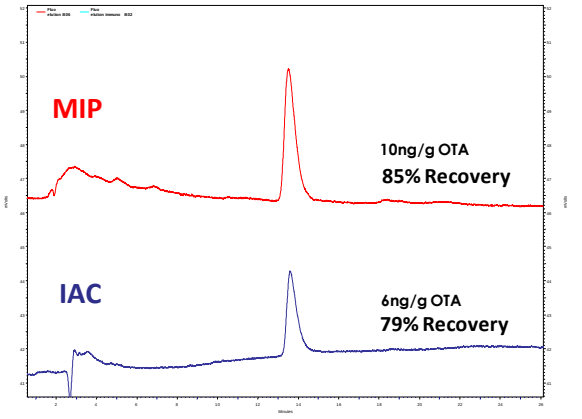

Figure 2. Chromatogram of wheat sample spiked with Ochratoxin A obtained after cleanup by AFFINIMIP®SPE Zearalenone (red, spiked at 10ng/g) or Vicam IAC (blue, spiked at 6ng/g).

Equivalent chromatograms

Recoveries

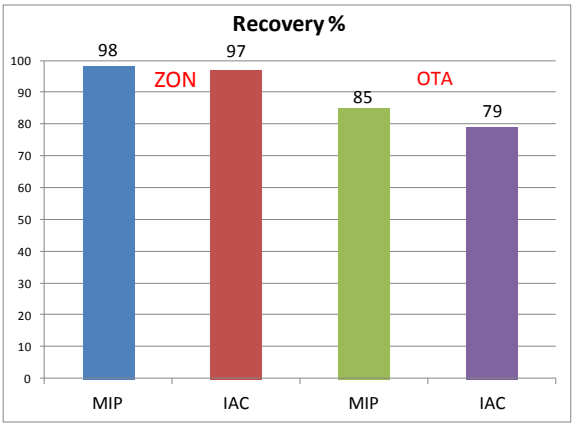

Figure 3. Recovery of Ochratoxin A or Zearalenone obtained after cleanup by AFFINIMIP®SPE or Vicam IAC.

Higher Recoveries obtained with AFFINIMIP® SPE

Capacity

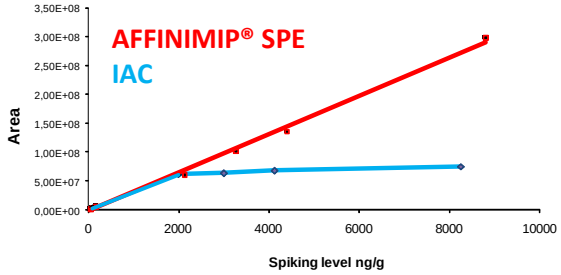

Figure 4. Comparison of capacity between AFFINIMIP®SPE Zearalenone (red) and Vicam IAC (blue).

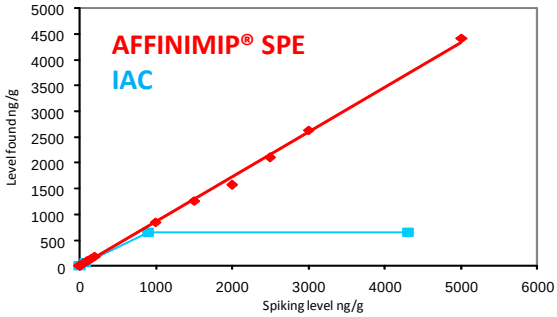

Figure 5. Comparison of capacity between AFFINIMIP®SPE OTA (red) and Vicam IAC (blue).

Capacity MIP > Capacity IAC

POLYINTELL
Pharma Parc II | Voie de l'Innovation | Chaussée du Vexin | 27100 Val de Reuil | FRANCE
Phone: +33 (0)2 32 09 32 70 | Fax: +33 (0)2 32 59 61 01
E-mail: contact@polyintell.com | Website : www.polyintell.com

Conclusion

Cleanup with **AFFINIMIP®SPE** provides chromatograms similar to Immunoaffinity column, proving the specificity and selectivity of the sorbent.

However, the use of **AFFINIMIP®SPE** is faster and simpler, providing a superior capacity and better reproducibility than IAC.

Experimental conditions

Materials

All reagents and chemicals were ACS grade quality or better. Zearalenone and Ochratoxin A used to spike the samples comes from POLYINTELL's mycotoxins standards portfolio. Matrices were purchased in a local supermarket.

Analysis

For ZON: HPLC was performed on a ThermoFinnigan Spectra System with a Thermo Hypersil Gold C18 column (150mm x 4.6mm). Separation was carried out using a mobile phase of deionized water/MeOH (40/60, v/v) at a flow rate of 1mL/min. The detection system was a Jasco Model FP-2020 Fluorescence detector set to excitation/emission wavelengths of 275 and 450nm, respectively. The injection volume was 100µL.

For OTA: HPLC was performed on a ThermoFinnigan Spectra System with a Thermo Hypersil Gold C18 column (150mm x 2.1mm). Separation was carried out using a mobile phase of acetic acid/deionized water/MeOH (1/39/60, v/v) at a flow rate of 0.2mL/min. The detection system was a Jasco Model FP-2020 Fluorescence detector set to excitation/emission wavelengths of 333 and 460nm, respectively. The injection volume was 20µL.

About POLYINTELL

Founded in 2004, POLYINTELL develops, manufactures and markets innovative products based on intelligent polymers for sample preparation, selective extraction, purification and detection of specific target analytes.

POLYINTELL maintains cutting-edge R&D activities in analytical and diagnostic fields. The company has fully integrated technology platform with specialized teams in:

- Organic chemistry
- Polymer chemistry
- Analytical and bioanalytical chemistry

Quality policy

To develop a long term and durable partnership with its customers, POLYINTELL ensures the best quality of its products and services.

As an ISO9001:2008 certified company, POLYINTELL has implemented Quality management system requirements to show its commitment to quality, customers, and a willingness to work towards improving efficiency.

In addition, to ensure the best quality of its products, the performance is checked by following several QC tests according to each product's quality control procedure. After passing all these tests, the products receive a certificate of analysis which proves the compliance with the defined criterion.

To evaluate its products in the same condition than its customers, POLYINTELL participates to inter-laboratories proficiency testing as well.

For more information or ordering:
contact@polyintell.com

Website: www.polyintell.com

POLYINTELL
Pharma Parc II | Voie de l'Innovation | Chaussée du Vexin | 27100 Val de Reuil | FRANCE
Phone: +33 (0)2 32 09 32 70 | Fax: +33 (0)2 32 59 61 01
E-mail: contact@polyintell.com | Website : www.polyintell.com