

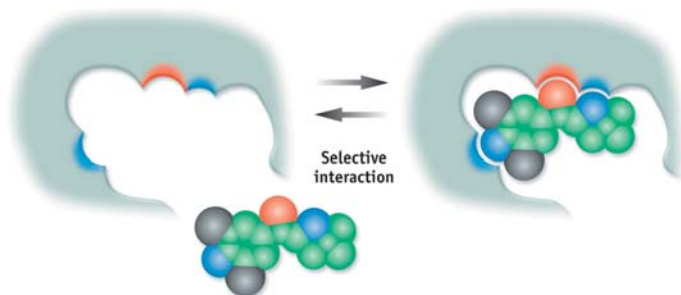
## Highly Selective SPE for Trace Analysis in Complex Matrixes

- Lower detection limits
- Significant time and cost savings
- Improved MS-compatibility

Sample preparation with specificity tailor-made to your analyte is now possible using molecular imprinted polymer (MIP) technology. New SupelMIP™ SPE cartridges provide lower detection limits, significant time and cost savings and enhanced MS-compatibility. These improvements make SupelMIP especially valuable for trace analyses in difficult sample matrixes such as biological fluids.

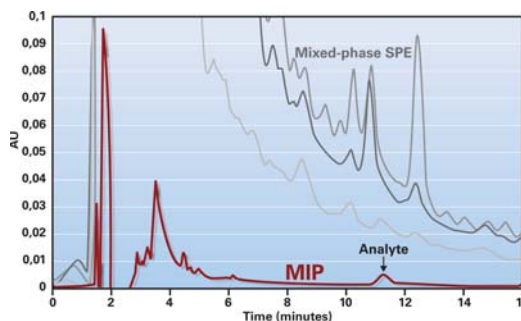
### How MIP technology works

Unlike most SPE particles that exhibit only non-specific interactions, SupelMIP particles have a selective synthetic recognition site (or imprint), which is sterically and chemically complementary to a particular analyte or class of analytes. The interactions mimicking antibody or receptor binding are stronger than interactions obtained in conventional SPE.



### Example: Extraction of the beta-agonist clenbuterol from urine using Clenbuterol SupelMIP

MIP particles synthesized to be specific for clenbuterol show greater specificity for clenbuterol than conventional SPE particles. The chromatograms show the SPE extraction of clenbuterol from a 5 mL urine sample on Clenbuterol SupelMIP vs. conventional, mixed-mode SPE particles, which gave high background and misleading responses.

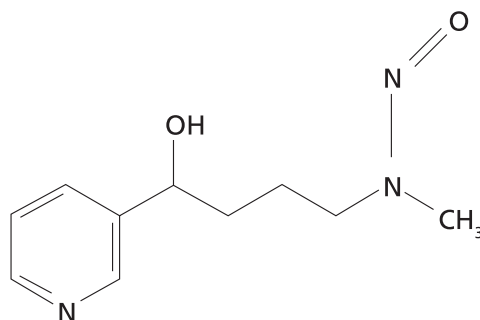


#### Benefits of Clenbuterol SupelMIP

- Lower detection limits (<0.5 ng/mL by UV detection)
- Minimized or eliminated ion suppression
- Less false negatives in screening programs (Van Hoof, et al 2005)

### Example: Extraction of tobacco-specific nitrosamine NNAL from human urine using NNAL SupelMIP

MIP particles successfully extracted picogram levels of the tobacco-specific nitrosamine NNAL from human urine. The tobacco-specific nitrosamine NNAL is present in the urine of tobacco users and, at lower concentrations, in the urine of non-smokers exposed to second hand smoke. Utilising MIP particles, total urinary NNAL became a valuable biomarker for monitoring exposure to carcinogenic tobacco specific nitrosamines in the complex urine matrix with a streamlined method described by Xia et al 2005.



#### Benefits of NNAL SupelMIP

- Sample prep time reduced from 3 days to 30 minutes
- Sample handling reduced and simplified from 29 laborious step to 10 simple steps
- Detection limit < 2 ppt

SupelMIP SPE Cartridges formerly sold as MIP[4]SPE from MIP Technologies AB	Sorbent mass mass	Cartridge volume	Cartridges /box	Part No.
Clenbuterol	25 mg	10 ml	50	53201-U
Beta-agonists (class selective)	25 mg	10 ml	50	53202-U
Beta-agonists (class selective)	25 mg	3 ml	50	53225-U
Beta blockers (class selective)	25 mg	10 ml	50	53218-U
Beta blockers (class selective)	25 mg	3 ml	50	53213-U
Full beta receptor (beta agonists and beta blockers)	25 mg	10 ml	50	53223-U
Full beta receptor (beta agonists and beta blockers)	25 mg	3 ml	50	53224-U
Chloramphenicol	25 mg	10 ml	50	53210-U
Chloramphenicol	25 mg	3 ml	50	53209-U
NNAL (4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol)	25 mg	10 ml	50	53206-U
NNAL (4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol)	25 mg	3 ml	50	53203-U
TSNAs (4 different Tobacco specific Nitrosamines: NNK, NNN, NAB, NAT)	25 mg	10 ml	50	53221-U
TSNAs (4 different Tobacco specific Nitrosamines: NNK, NNN, NAB, NAT)	25 mg	3 ml	50	53222-U
Riboflavin (vitamin B2)	25 mg	10 ml	50	53207-U
Triazines (class selective)	25 mg	10 ml	50	53208-U

## Peer reviewed published trace analysis using SupelMIP cartridges:

### Clenbuterol

- Extraction of clenbuterol from calf urine using a molecularly imprinted polymer followed by quantification by high-performance liquid chromatography with UV detection. Blomgren A, Berggren C, Holmberg A, Larsson F, Sellergren B, Ensing K J Chromatogr A. 2002 Oct 25; 975(1): 157-64

### Beta-agonist

- Evaluation of MISPE for the multi-residue extraction of beta-agonists from calves urine. Widstrand C, Larsson F, Fiori M, Civitareale C, Mirante S, Brambilla G. J Chromatogr B Analyt Technol Biomed Life Sci. 2004 May 5; 804(1): 85-91
- The analysis of beta-agonists in bovine muscle using molecular imprinted polymers with ion trap LCMS screening, Kootstra PR, Kuijpers CJPF, Wubs KL, Doorn D van, Sterk SS, van Ginkel LA and Stephany RW, 2005, Anal. Chim. Acta, 529:75-81
- Multi-residue liquid chromatography/tandem mass spectrometric analysis of beta-agonists in urine using molecular imprinted polymers. Van Hoof N, Courtheyn D, Antignac JP, Van de Wiele M, Poelmans S, Noppe H, De Brabander H, Rapid Communications in Mass Spectrometry Volume 19, 2005 2801-2808
- Evaluation of two different clean-up steps, to minimise ion suppression phenomena in ion trap liquid chromatography-tandem mass spectrometry for the multi-residue analysis of beta agonists in calves urine, Fiori M, Civitareale C, Mirante S., Magarò E, and Brambilla G, Anal. Chim. Acta, 529 (2005) 207-210



### NNAL

- Analysis of the Tobacco-Specific Nitrosamine 4-(Methylnitrosamino)-1-(3-pyridyl)-1-butanol in Urine by Extraction on a Molecularly Imprinted Polymer Column and Liquid Chromatography/Atmospheric Pressure Ionization Tandem Mass Spectrometry, Xia Y, McGuffey JE, Bhattacharyya S, Sellergren B, Yilmaz E, Wang L, and Bernert JT, Anal. Chem. 77 (2005) 7639-7645

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