

Review of the SupelMIP product line

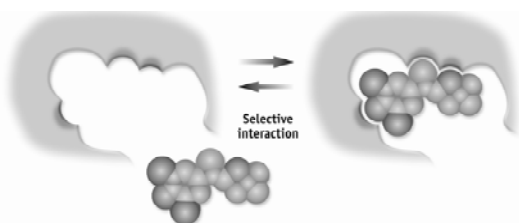
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Background

For the analysis and control of trace residues (pesticides, toxins, antibiotics, etc) in food and the environment, reliable and sensitive analytical methods are a necessity. However, due to the complexity of the sample matrices in food and environmental monitoring, LC-MS/MS alone does not provide the sensitivity and accuracy often required by regulatory and food safety agencies.



MIP sorbents contain cavities, complementary both in shape and chemical properties to desired target analytes. A

In this article we give you a short overview to each of the SupelMIP materials available today. If you have specific questions regarding a SupelMIP product you may find useful information in our **FAQ section** (see list of content, www.miptechnologies.com/newsletter/newsletter9.htm) or you can fill out **Technical Support Request Form** (www.sigmaaldrich.com/analytical-chromatography/sample-preparation/spe/supelmip-spe-technical.html) and you may of course also send us an email info@miptechnologies.com. If you are looking for selective phase that are not included in the current product line you can submit a **SupelMIP SPE Application Request Form** (www.sigmaaldrich.com/analytical-chromatography/sample-preparation/spe/supelmip-application.html).

series of SPE phases based on MIPs are available, called SupelMIPs. Each SupelMIP material is specifically developed for the intended analyte or analytes and the SupelMIPs are highly selective SPE phases. This makes it possible to extract the analyte and to get rid of matrix components during the sample preparation. The result of this is significant benefits in terms of reduced matrix effects during LC-MS analysis, allowing lower detection limits to be achieved. Since the interactions with the analytes are specific but dependent on the solvent used, SPE methods that guide you to the optimal performance of the material are always attached to the product. The SPE methods for SupelMIP phases are easy and robust and reduce the total sample handling time thereby significantly lowering the overall analytical costs.

Currently available SupelMIP SPE phases:

- | | |
|--|-------------------|
| * Clenbuterol | * Beta agonists |
| * NNAL | * Riboflavin |
| * Triazine | * Chloramphenicol |
| * Beta blockers | * TSNAs |
| * Amphetamines | * Nitroimidazoles |
| * Fluoroquinolones | * NSAIDs |
| * Beta agonists and Beta blockers ("Full Beta Receptor") | |

SupelMIP Review – An overview of the current SupelMIP SPE product line

SupelMIP™ Clenbuterol

A specific SPE sorbent optimised for extraction of clenbuterol from biological samples

Clenbuterol is extracted with a high recovery. Due to the selectivity this extraction method enables determination at a limit of quantitation of 0.5 ng/ml using the economically favorable detection system; HPLC-UV.

➔ <http://www.miptechnologies.com/clenbuterol.asp>

SupelMIP™ Beta agonist

A class selective SPE sorbent for multi-residue extraction of Beta-agonists in urine or tissue samples

A broad spectrum of Beta-agonists in biological samples can be extracted with the SupelMIP™ Beta-agonist product e.g. brombuterol, clenbuterol, formoterol, isoxuprine, mapenterol, ractopamine, ritodrine, salbutamol, salmeterol, terbutaline, tulobuterol, zilpaterol and others.

Detection limits are consistent with a reliable survey of drugs of abuse. The MIP columns have a superior loading capacity compared to immuno-affinity columns. It is recommended to use MS detection for results with forensic validity. It is also possible to use the SupelMIP™ Beta-agonist columns in automated solid-phase extraction systems.

➔ <http://www.miptechnologies.com/betaagonist.asp>

SupelMIP™ NNAL

A specific SPE sorbent for extraction of the tobacco-specific nitrosamine metabolite NNAL, in biological samples

With this sorbent NNAL can be selectively extracted from biological samples with high recoveries. Compared to current analytical methods for accurate NNAL detection, which are elaborate and time-consuming, SupelMIP™ NNAL gives reliable and accurate results and reduces the sample handling significantly. It allows extremely low limits of quantitation and has been shown to be highly reproducible. It can also be used for quantitation of NNAL where nicotine is present.

➔ <http://www.miptechnologies.com/nnal.asp>

SupelMIP™ Riboflavin (Vitamin B2)

A specific SPE sorbent for extraction of Riboflavin from aqueous samples

This sorbent allows Riboflavin to be selectively extracted from solution with high recoveries (up to 85%) and without co-extracting other vitamins.

➔ <http://www.miptechnologies.com/riboflavin.asp>

SupelMIP™ Triazine10

A SPE sorbent for multi-residue extraction of triazines and triazine metabolites in water, soil and food products

The SupelMIP™ Triazine10 shows excellent selectivity towards the following triazines and triazine metabolites: atrazine, simazine, propazine, cyanazine, sebutylazine, deisopropylatrazine, deethylatrazine, deethylterbutylazine, prometon and hydroxyterbutylazine. Extraction recoveries are reproducible and in the range 80-95%.

➔ <http://www.miptechnologies.com/triazine.asp>

SupelMIP™ Chloramphenicol

A specific SPE sorbent for extraction of the banned (European Union) antibiotic Chloramphenicol from biological matrices

By using this SPE phase, residues of Chloramphenicol can be extracted efficiently and rapidly, improving considerably on existing extraction methods.

Furthermore, detection limits well below the minimum required performance limit (MRPL) for Chloramphenicol are achieved, enhancing the reliability of the detection and ensuring improved food safety and quality. Furthermore the sample handling time is reduced significantly compared with conventional methods.

➔ <http://www.miptechnologies.com/chloramphenicol.asp>

SupelMIP™ Beta Blocker

A class selective SPE sorbent for multi-residue extraction of Beta blockers in water and biological samples

A broad spectrum of Beta-blockers in biological samples can be extracted with the SupelMIP™ Beta Blocker product e.g. atenolol, betaxolol, carazolol, pindolol, propranolol, sotalolol, timolol, metoprolol and others.

Detection limits are consistent with a reliable survey of drugs of abuse. The MIP columns have a superior loading capacity compared to immuno-affinity columns. It is recommended to use MS detection for results with forensic validity. It is also possible to use the SupelMIP™ Beta blocker columns in automated solid-phase extraction systems.

➔ <http://www.miptechnologies.com/betablocker.asp>

SupelMIP™ NSAID

A Class-selective SPE sorbent for extraction of NSAIDs from biological samples

Pharmaceutical compounds such as NSAIDs are used extensively and these compounds may reach wastewater treatment plants and the groundwater. Using the SupelMIP SPE for NSAIDs the quantifications are facilitated in complex matrices like waste water etc. ➔ <http://www.miptechnologies.com/nsaids.asp>

SupelMIP™ TSNAs

A class selective SPE sorbent for multi-residue extraction of 4 different Tobacco specific Nitrosamines: NNK, NNN, NAB and NAT

With this sorbent the 4 different Tobacco specific Nitrosamines can be selectively extracted from biological samples with high recoveries. Compared to current analytical methods for accurate TSNA detection, which are elaborate and time-consuming, SupelMIP™ TSNA's gives reliable and accurate results and reduces the sample handling significantly. It allows low limits of quantitation and has been shown to be highly reproducible.

➔ <http://www.miptechnologies.com/tsna.asp>

SupelMIP™ Full Beta Receptor (beta agonists and beta blockers)

A class selective SPE sorbent for simultaneous multi-residue extraction of beta agonists and beta blockers in water and biological samples

A broad spectrum of beta agonists and beta blockers in biological samples can be extracted with the SupelMIP™ Full Beta Receptor product.

Detection limits are consistent with a reliable survey of drugs of abuse. The MIP columns have a superior loading capacity compared to immuno-affinity columns. It is recommended to use MS detection for results with forensic validity. It is also possible to use the SupelMIP™ Full Beta Receptor cartridges in automated solid-phase extraction systems.

➔ <http://www.miptechnologies.com/betareceptor.asp>

SupelMIP™ Amphetamines

A Class-selective SPE sorbent for extraction of amphetamine related drugs (Amphetamine, Methamphetamine, Phentermine, MDA, MDMA and MDEA) from biological samples e.g. urine and saliva

Amphetamine related drugs are currently among the most well-known psychotropic drugs of abuse and are used in sport, in the workplace and by recreational users. For, clinical and doping control SupelMIP™ SPE-Amphetamine drugs provide a simple, fast and class selective solid-phase extraction (SPE) procedure. The high sensitivity of the SPE method using this product makes it particularly useful in forensic applications

where low level detection may be required.

➔ <http://www.miptechnologies.com/amphetamines.asp>

SupelMIP™ Fluoroquinolones

A Class-selective SPE sorbent for extraction of fluoroquinolones (FQLs) from food samples e.g. kidney, milk and honey

FQL's comprise a group of broad-spectrum antibacterial agents which are widely used in human medicine and to treat infections in farmed fish, shrimp, turkeys, pigs, calves and poultry. The presence of this antibiotic class in the environment at sub-therapeutic levels can lead to multiple FQL-resistant bacterial strains. When used to treat animals, FQLs may end up in the human food chain causing allergic reactions while at the same time encouraging development of resistant bacteria. Monitoring these substance residues at trace levels is therefore regulated by law. The EU has set strict Maximum Residue Limits (MRL's), the values of which depend on the particular compound and matrix, e.g. the MRL for enrofloxacin in bovine kidney is set at 200µg/kg. The US, Canada and Japan have also set MRL's but for a more limited range of quinolones.

➔ <http://www.miptechnologies.com/fluoroquinolones.asp>

SupelMIP™ Nitroimidazole

A Class-selective SPE sorbent for extraction of nitroimidazoles from food samples e.g. milk and egg samples

Nitroimidazoles are antibacterial and anticoccidial drugs used for treatment of cattle, poultry, pigs and farmed fish. These compounds and their metabolites are suspected to be carcinogens and mutagens. Consequently, several Nitroimidazoles are classified in the European Union (EU) list of pharmacologically active substances for which no maximum residue limit can be fixed, meaning that their use is forbidden in food-producing animals. Some compounds in the class have never been authorized as a veterinary drug and therefore is also considered as a forbidden. Monitoring these substance residues at trace levels is therefore regulated by law.

➔ <http://www.miptechnologies.com/nitroimidazoles.asp>