

Novel silica based substrate (SBA-15) for efficient small molecules analysis in mass spectrometry

EXECUTIVE SUMMARY

Mesoporous silica (SBA-15) based substrate that enables efficient and selective analysis of small molecules from a complex mixture that contains both small and large molecules, using mass spectrometry.

BACKGROUND

Analysis of small molecules (less than 700 Da) such as metabolites, pesticides, food contaminants using mass spectrometry is a challenge. To achieve this, several sample preparation protocols and chromatography techniques are used – decreasing the throughput and efficiency. Although methods such as MALDI MS provide the throughput desired, they suffer from interference due to the organic matrix in the spectral range of interest. There is a need for alternative methods that provide a combination of “matrix-free” analysis, minimal sample preparation and high throughput platform.

TECHNOLOGY DESCRIPTION

Scientists from NCL and JNU have developed a platform which utilizes mesoporous silica (SBA-15) for use in laser desorption ionization mass spectrometry (LDI MS). This platform selectively excludes the detection of peptides, proteins and similar larger entities, allowing only the detection of small molecules quantitatively. This has been demonstrated on numerous classes of small molecules and from sample sources such as food, microbial cultures, biofluids from humans and synthetic molecules.

MARKET POTENTIAL

- The MS market is expected to grow at a CAGR of 7.83% over the period of 2011-2015.

- Increasingly, MS is being adapted for various applications in clinical diagnostics, mandatory testing requirements of various regulatory agencies** - indicating a robust growth potential for MS and related reagents and consumables market.

[Ref1](#) [Ref2](#) [Ref3](#)

VALUE/ADVANTAGES

- Selective detection of small molecules without any chromatographic separation from a complex sample source.
- Can be used for detection and quantitative analysis of multiple trace components.
- Negligible sample preparation required – thus reducing analysis time and cost.
- This method can be adapted for high throughput analysis workflows.
- Additional features could be incorporated by manipulating the substrate chemistry – opening up new applications.
- Uses easily available raw materials – leading to viable process scalability

APPLICATIONS

- Pharmaceutical quality control
- Food & beverage testing (for contaminants and pesticide residues)
- Diagnostics, forensics, narcotics, environmental analysis
- Biotechnology R&D

TECHNOLOGY STATUS

- Demonstrated at the lab scale for various sample classes
- On the lookout for potential partners for spin-off and licensing
- PCT application filed: WO [2012111028](#) A3

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