

## Expert Opinion - Dr Gopal Vaidyanathan

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### MASS SPECTROMETRY

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## Mass spectrometry market growing at 17%

The demand for mass spectrometers in the major industries catering to life sciences is primarily responsible for the growth of MS business in India

Mass spectrometry (MS) has evolved from being a primarily research tool utilized for measuring the molecular weight of synthetic compounds and natural products to one that can be used in various industrial segments such as pharmaceuticals, biotech, food safety, chemical analysis and clinical applications.

The first few tandem quadrupole liquid chromatography with Tandem Mass Spectrometry Detection (LCMSMS) systems came during mid 1990's into the R&D divisions of pharmaceutical companies. The potential of the triple quadrupoles was quickly recognized in bioanalytical studies and a number of CROs set up their regulated bioanalytical laboratories with LCMSMS systems for conducting bioequivalence studies to support the generic pharmaceutical market from India as well as Europe and US.

From 2000 onwards, European Union strictly implemented the monitoring of toxic chemical residual levels such as pesticides, antibiotics in food stuffs and dyes and other chemicals in textile, leather with MRL and MRPL limits. To meet the EU norms, many testing laboratories including government labs in India had to equip with modern technologies such as gas chromatography-mass spectrometry (GC-MS), LCMSMS and

inductively coupled plasma mass spectrometry (ICP-MS) which also increased the adoption of tandem quadrupole MS technologies. There are several hundred tandem quadrupoles in the country at present in most of the academic and industrial institutes catering to a wide variety of applications.

The past decade has seen a rapid increase in the number of high resolution mass spectrometers (HRMS) for both small molecule and biological applications in the research institutes as well as in the pharmaceutical industry. The environmental and food safety industry is also using the HRMS instruments for non-targeted screening for pollutants, contaminants and pesticides at trace levels. The generic Indian pharmaceutical has adopted the high resolution mass spectrometers for impurity profiling, leachables and extractables studies in the past few years.

The mass spectrometry market is currently projected to be \$45-50 million on an annual basis. The market for mass spectrometry has grown at about 17 percent over the past five years according to SDI reports. The fastest growth was in the tandem quadrupole business at about 27 percent. The high HRMS instruments (mainly QToF) have also shown good growth from 2006 to 2011. The single quad market has almost doubled during this period. The pharmaceutical industry and the CROs are the major drivers for this growth.

As per SDI report, the demand for mass spectrometers in the major industries catering to life sciences is primarily responsible for the growth of MS business in India. As the demand for instrumentation in life sciences is high, academia, pharmaceutical and biotech sector combined for the major functional demand.

The tandem quads market is driven by quantitative applications in pharmaceutical, CROs and food testing agencies.

We are adding around 100 tandem quadrupoles every year and about 25 to 30 HRMS instruments. The quadrupole and the high resolution MS markets are expected to grow in the coming years. The ability of the QToF technology to combine well with ultra high performance chromatography and conduct qualitative and quantitative analysis in the single run has made a significant contribution to enhance the productivity and is gaining increased acceptance in various application segments.

Most of the leading mass spectrometer companies have also established applications laboratories in India for conducting demos, training and applications development. The current projections indicate that mass spectrometry will show a double digit growth in the coming years. MS technology has made significant contributions to the characterization of biological and its role is going to become even more important in the future.

#### List of industries using MS

Industry	Demand (%)
Academia	32
Pharmaceuticals	24
Biotechnology	15
Contract Research Organisation	9
Government Research	9
Hospital	4
Government Research	2
Agricultural / Food	1
General / Environmental	1
Chemicals & Others	3

#### MS market is projected at \$45-50 million

- **Dr Gopal Vaidyanathan**, Vice President – Mass Spectrometry Operations, Waters India

*Dr Gopal Vaidyanathan has worked with Ranbaxy Research Laboratories, Lambda Therapeutic Research, Dr. Reddy's Research Laboratories and Advinus Therapeutics before joining Waters in January 2008. In addition to chromatography and mass spectrometry, his research interests include structural characterization, solid state characterisation and bioanalysis.*

