

## Editorial on Mass Spectrometry

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### EDITORIAL

Mass spectrometry or mass spectroscopy is a powerful analytical technique used to quantify known materials, to identify unknown compounds within a sample, and to elucidate the structure and chemical properties of different molecules. The chemical substances are identified by the sorting of gaseous ions in electric and magnetic fields according to their mass-to-charge ratios. The instruments used are known as mass spectrometers and mass spectrographs, and they operate on the principle that moving ions may be deflected by electric and magnetic fields.

Mass spectrometers produce multiple ions from the sample under investigation; it then separates them according to their specific mass-to-charge ratio ( $m/z$ ), and then records the relative abundance of each ion type. Ion Source, Analyzer and Detector System are the three major components of MS.

It should always perform the following processes:

**Ion Source:** Produce ions from the sample in the ionization source: Molecules in a sample are vaporized (converted to the gas phase by heating). Then, an electron beam bombards the vapors, which converts the vapors to ions.

**Analyzer:** Separate these ions according to their mass-to-charge ratio in the mass analyzer, eventually, fragment the selected ions and analyze the fragments in a second analyzer.

**Detector System:** Detect the ions emerging from the last analyzer and measure their abundance with the detector that converts the ions into electrical signals. Then, process the signals from the detector that are transmitted to the computer and control the instrument using feedback.

### DIFFERENT TYPES of MS:

- Tandem Mass Spectrometry

- Liquid Chromatography-tandem Mass Spectrometry
- Liquid Chromatography-mass Spectrometry
- MALDI-TOF Mass Spectrometry
- ESI Mass Spectrometry
- MALDI Mass Spectrometry
- Multiple Reaction Monitoring (MRM)
- SRM
- Time-of-flight Mass Spectrometry

### APPLICATIONS

1. Give a good estimate on the purity of the sample.
2. Monitor reactions, sequence amino acids, and oligonucleotides as well as give information on protein structure
3. Identify and quantify samples
4. Drug companies and researchers are using the technique for drug discovery, drug metabolism and for pharmacokinetic studies.
5. The technique has also found medical uses, such as neonatal screening, blood analysis, and drug testing.
6. A powerful tool in forensic analysis.
7. Analysis of Biomolecules, Glycans, Lipids, Proteins and Peptides, Oligonucleotides.

### REFERENCES

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