

## Mass Spectrometry (Importance and Uses)

**Bassam Abdul Rasool Hassan\***

*Clinical Pharmacy Discipline, School of Pharmaceutical Sciences, University of Sains Malaysia, 11800, Minden, Penang, Malaysia*

### Definition

It is a technique used to measure the characteristic of a sample or molecule i.e., chemical composition and structure. This will be happened by converting the material to charged molecules to measure their mass to charge ratio.

### History of Mass Spectrometry

The English scientist J.J. Thomson was the first one who improve the work of Wilhelm Wien i.e., canal rays to create the first mass spectrometry. The first time in which mass spectrometry used in analyzing amino acid was in 1958. Moreover, Carl-Ove Andersson was the first who highlight the main fragment ions observed in the ionization of methyl esters.

Some of the new models of mass spectrometry were developed by Arthur Jeffrey Dempster and F.W. Aston in 1918 and 1919 respectively. Besides that as a result of the great efforts of Hans Dehmelt and Wolfgang Paul who developed the ion trap technique in the 1950s and 1960s, half of the Nobel Prize in Physics in 1989 was given to them. Moreover, in 2002 the Nobel Prize in Chemistry was awarded to John Bennett and Koichi Tanaka for their efforts in developing a novel method for mass spectrometric analyses of biological macromolecules.

### Mass Spectrometry Mechanisms of Action (How it Works)

All mass spectrometry techniques have a similar component, but these components sometimes differ in their nature from one mass spectrometry to another one depend on the type of mass spectrometry.

But all the mass spectrometry machines work with a similar way, the following three steps show how this technique works:

- Ionization of the small sample by losing an electron (this called the ionizer).
- The ions will be sorted and separated according to their mass and charge (this called the analyzer).
- Then the separated ions then measured and the data will be displayed on a chart (this called the detector).

### Areas in which Mass Spectrometry is used

This technique is used in industrial and academic fields for both routine and research purposes. The following list will clarify the major mass spectrometric applications:

- Pharmaceutical: drug discovery, combinatorial chemistry, pharmacokinetics, drug metabolism,
- Clinical: neonatal screening, haemoglobin analysis, drug testing,
- Environmental: PAHs, PCBs, water quality, food contamination,
- Geological: oil composition,
- Biotechnology: the analysis of proteins, peptides.

### Conclusion

Therefore it is a very important point for the open access journals to encourage researchers to work hard in this field in order to clarify the main importance and to develop of mass spectrometry technique.

**\*Corresponding author:** Bassam Abdul Rasool Hassan, Clinical Pharmacy Discipline, School of Pharmaceutical Sciences, University of Sains Malaysia, 11800, Minden, Penang, Malaysia, Tel: (+6)016-423-0950; E-mail: [bassamsunny@yahoo.com](mailto:bassamsunny@yahoo.com)

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