



Molecular Science - Spectrometry

Mass Spectrometry

This is an MS-MS Mass Spectrometer complete with an auto-sampler and the Liquid Chromatography system. Now mass spectrometers create ions of molecules. These are introduced into the ionisation chamber via injection or probe. Turbo pumps are used to remove air molecules from the instrument as these would interfere with the ionization process and that accounts for all the noise.

Here, samples of mixtures are positioned into the auto-sampler and injected into a liquid chromatography column where the components can be separated. As the mixture emerges, a splitter ensures that a portion of the mixture goes to a UV detector to check how many components have been separated. And the rest of the sample goes to the mass spectrometer probe. The probe protrudes into the ion source where the components of the mixture experience high voltages which cause the molecules to become ionized. These ions then pass through the instrument and are detected at different points on a detector at the back of the instrument.

The mass spectrum is displayed almost instantaneously on the monitor screen. Some experience is needed to identify the signal due to the molecular ion, but it's often the peak corresponding to the highest significant molecular mass of the spectrum. Some mass spectrometers can measure the mass of a molecule so accurately that it can even give us a molecular formula for our unknown compound.

The connection of a chromatography system to the front end of the instrument means that the mass spectrum of each emerging fraction can be measured in turn. And this alone may be enough to identify the components in the mixture. And this makes mass spectrometry a very powerful tool.