

An important part of any HPLC system is the detector. The HPLC detector is designed to be able to identify and quantify the individual components of the sample as it is carried through the system by the mobile phase.

There are a variety of detectors that can be used in an **HPLC system**, and the decision of which one to use will be determined either by the nature of the sample and its individual compounds or by the bulk properties of the mobile phase and sample as their composition changes while passing through the HPLC system.

Desired HPLC detector features

There are certain features that should be present in any HPLC detector. These include:

- The presence of a response to compounds in the mixture that is either specific or general
- Sensitivity and response that are geared toward the solute, rather than the mobile phase
- Low cell volume to minimize dispersion of the analyte band

- A linear response to the solute concentration
- Variations in temperature and flow rate should not influence detector response

Specific HPLC detectors

The following are specific HPLC detectors:

- **Mass spectroscopic detectors** - This type of detector provides high sensitivity and selectivity. Analytes are first ionised in the source, these ions are then separated on the basis of their mass/charge ratio before being detected.
- **UV-VIS HPLC detectors** - The types of UV-VIS HPLC detectors are fixed wavelength, variable wavelength, and diode array. They are used specifically for compounds that absorb light.
- **Photo diode array (PDA) HPLC detectors** - The use of multiple diodes allows for the monitoring of more than one absorbing compound at different wavelengths at the same time.

- **Fluorescence HPLC detectors** - This is the most sensitive and specific. Types include single wavelength, multi-wavelength, and laser-induced detectors. This type relies on compounds naturally fluorescing or derivatization to add a fluorescent tag to target analytes allowing for detection to occur.

Bulk property HPLC detectors

The following are bulk property HPLC detectors:

- **Electrical conductivity HPLC detectors** - These detectors work by measuring mobile phase conductivity using sensors made up of a flow-through cell that contains two electrodes that are made of platinum, steel, or a noble metal.
- **Refractive index HPLC detectors** - Detection relies on changes in the refractive index of the mobile phase due to the presence of eluting compounds. RI detectors have the lowest sensitivity but are generally accepted as being universal detectors.
- **Electrochemical HPLC detectors** - This includes equilibrium and dynamic detectors that are sensitive to changes in the composition or flow rate of the

mobile phase and sensitive to substances that are reducible or oxidizable.

- **Light-scattering HPLC detectors** - There are two types, including low-angle laser light scattering and multiple-angle laser light scattering detectors. They measure the scattered light, which is ideal for detecting molecules with a high molecular weight as the eluent passes through a sensor cell based on molecular size.

Reach out to our team if you have questions about the different types of HPLC detectors or if you need technical assistance with your work. Phenomenex offers a free, 24/7, online Technical Support service - **Chat Now**.

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