Report on Chromatography and its Applications

Yury V. Timchenko

Department of Chemistry, Lomonosov Moscow State University, Leninskie Gory, Moscow, Russia

EDITORIAL

*For Correspondence

Yury V. Timchenko, Department of Chemistry, Lomonosov Moscow State University, Leninskie Gory, Moscow, Russia

E-mail: iurii.timchenko112@gmail.com

PERSPECTIVE

Chromatography is an important biophysical technique for separating, identifying and purifying components in a mixture. Size and shape, total charge, hydrophobic groups on the surface and binding ability with the stationary phase are all factors that may be used to purify proteins. Ion exchange, surface adsorption, partition and size exclusion are four separation strategies based on molecule properties and interaction type. Column, thin layer and paper chromatography are examples of chromatography procedures that use a stationary bed.

Apart from separation, the goal of using chromatography as a technique of quantitative analysis is to achieve a sufficient separation in a reasonable amount of time. To that purpose, many chromatographic techniques have been developed. Column chromatography, Thin-Layer Chromatography (TLC), gas chromatography and high-pressure liquid chromatography are a few examples.

- Column chromatography
- Thin-layer chromatography
- High-pressure liquid chromatography
- Gas chromatography

Column chromatography

In chemistry, column chromatography is a chromatographic method for isolating a single chemical component from a mixture. Chromatography uses differential adsorption of chemicals to the adsorbent to separate substances; compounds travel along the column at various speeds, allowing them to be separated into fractions. Because many different adsorbents may be employed with a wide range of solvents, the method is extensively useful. The method may be applied on scales ranging from micrograms to kilograms. One of the major benefits of column chromatography is that the stationary phase used in the process is relatively inexpensive and easily disposed of. Cross-contamination and stationary phase deterioration owing to recycling are avoided with the latter. Using gravity to drive the solvent through the column or pressurized gas to push the solvent through the column are two options for column chromatography.

Thin-layer chromatography

A thin-layer chromatograph can be used to demonstrate how a combination of chemicals would behave after being purified by column chromatography. Thin-layer chromatography is used to fine-tune the separation before moving on to column chromatography.

High-pressure liquid chromatography

In analytical chemistry, HPLC is a separation, identification and quantification procedure for each component in a mixture. Pumps are used to push a pressurised liquid solvent containing the sample combination through a solid adsorbent material-filled column. The adsorbent material interacts differently with each component in the sample, resulting in variable flow rates and separation of the components as they depart the column.

Gas chromatography

Gas Chromatography (GC) is a form of analytical chemistry chromatography that is used to separate and analyse substances

that may be vaporised without breakdown. GC is commonly used to determine the purity of a chemical or to separate the various components of a combination. GC may be used to separate pure chemicals from a mixture in preparative chromatography.

As with natural pigments, chromatographic methods were first employed to isolate compounds based on their hue. Its application field has grown significantly over time. Chromatography is now well recognised as a very sensitive and efficient separation technique. One of the most useful separation and determination procedures is column chromatography.