

Analysis for the Purification of Trace Elements by Chromatography

Oliver Hansang*

Department of Chemistry, University of Ludwig Maximilian, Munich, Germany

Description

The most common analytical technique in chemical laboratories which is used for separating and analyzing a mixture of chemical substances is known as chromatography. It is used in biochemical research for the separation and identification of chemical compounds of biological origin. In petroleum industry, this technique is employed to analyze complex mixtures of hydrocarbons.

It is also known as biophysical technique which separates, identifies, and purifies the components of a mixture for quantitative and qualitative analysis. It allows food companies to identify the components and products for the nutrients such as proteins, vitamins, preservatives, and more. By this test the products are determined by their nutritional quality.

Types of Chromatography

Depending on the varying requirements for molecular separation, several types of chromatography are employed for various purposes in laboratories across the world today. It includes Paper, Liquid, Thin layer, Column, Gas, High-performance liquid, Ion-exchange chromatography, etc. There are many other types of chromatography based upon the kind of phase used for separating and analyzing.

Techniques

The chromatographic techniques also enable studies on waste generated in research laboratories and factories producing pharmaceuticals and para-pharmaceuticals. The first chromatographic technique used in pharmaceutical analysis was Capillary analysis. It determines the pollutants in water and testing of antibiotics. For components of mixture, the paper chromatography has been used for the purification and isolation technique.

Thus making the method a for tracing analytical technique extensively used in the detection of chlorinated pesticides in biological materials and the environment, in forensic science, and in the detection of both therapeutic and abused drugs. Its resolving power is unequal to those of separation methods. It utilizes ion exchange, gel filtration and affinity resins to separate proteins for the effective method of purifying blood components for therapeutic use.

Applications

In Pharmaceutical And Chemical Industry

The use chromatography techniques for various purposes for identifying and analyzing samples in the presence of chemicals or trace elements, for preparing huge quantities of extremely pure materials, separating chiral compounds, detecting the purity of mixture and the unknown compounds present, and also in drug development.

In the chemical industry, the chromatography is used in environmental testing laboratories in order to testing water samples, drinking water, and also to check and monitor air quality. It is used in identifying very small quantities of contaminants in waste oil, and pesticides, where the High-performance and Gas chromatography are very much used for detecting various contaminants.

In Food Industry

Chromatography is used widely in the food industry for detecting contaminants and toxins in food, separation and analysis of amino acids, proteins, vitamins, and preservatives, for detecting the additives, in spoilage detection, and for determining nutritional value. For example, using column chromatography, the vitamin C content of foods and beverages is closely monitored during all stages of food processing, such as in fresh and frozen fruits and vegetables, powdered drinks, and in juices.

In Forensics

It plays a crucial role in forensics where it is used in pathology and for the testing like analyzing blood and hair samples found in the crime scene area. That evidence can be tested using the gas chromatography (GC) technique for crime scene which allows investigators to understand the crime better and used in the detection of criminals.

Conclusion

The environmental research laboratories make extensive use of chromatographic techniques while searching for trace amounts such as Phytocannabinoid (PCBs). Apart from these applications, it is widely used in the fuel industry, the field of biotechnology, and also in certain biochemical processes. Currently, high performance liquid chromatography is the most popular and fastest growing chromatographic technique in the field of pharmaceutical analysis.

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*Corresponding author: Oliver Hansang, Kankate, Department of Chemistry, University of Ludwig Maximilian, Munich, Germany; E-mail: oliver.hansang@unichen.de

Received: 07-Jul-2022, Manuscript No. jabt-22-68158; Editor assigned: 09-Jul-2022, PreQC No. jabt-22-68158 (PQ); Reviewed: 23-Jul-2022, QC No. jabt-22-68158; Revised: 26-Jul-2022, Manuscript No. jabt-22-68158 (R); Published: 02-Aug-2022, DOI: 10.4172/2155-9872.1000467

Citation: Hansang O (2022) Analysis for the Purification of Trace Elements by Chromatography. *J Anal Bioanal Tech* 10: 467.

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