



# **Ion chromatography is used to identify common cations and ammonium in water samples**

**Victor Moore\***

Department of Chemical and process Engineering Sales Engineer, Metrohm, Malaysia, Sdn. Bhd

\*Corresponding Author's E-mail: [moorev@yahoo.com](mailto:moorev@yahoo.com)

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## **Abstract**

In this work, common cations were identified using IC techniques. In order to validate the precision and accuracy of this approach, the best values of the instrumental parameters were found for the relative standard deviation (RSD), correlation coefficient ( $r^2$ ), method detection limits (MDLs), and other parameters. When evaluating the IC signals, peak height (PH) and peak area (PA) were also employed. Ultra-pure water was used to create all standards and samples. In general, the cation peaks were distinct, had acceptable resolution, and showed no interactivity. We calculated that the overall analysis time for cations was around 15.5 minutes.

**Keywords:** Chromatography, ammonium, water samples.

## **INTRODUCTION**

Fish and other aquatic life are poisoned by a wide range of industrial chemicals, including metals and solvents as well as compounds created by the breakdown of natural wastes (such as ammonia).

Another class of harmful chemical is weed and agricultural pesticides. Some of toxins may build up in fish and shellfish and harm anyone that consume them, including humans, animals, and birds. In addition to being poisonous and floating, detergents and oils can ruin the look of water bodies. Many chemical pollutants also have disagreeable scents (Nollet LM et al., 2000). Due to the release of combustible chemical wastes into the water, the Niagara River, which separates the US and Canada, has even caught fire in the past. Chemicals can infiltrate waterways from both point and diffuse sources. Pollution from a single source, such as an industrial site, is referred to as point source pollution (Weiss J, 2004). Nonpoint-source pollution is the result of several tiny sources working together to produce large-scale contamination (Omar MA, 2000). For instance, contaminants like fertilizer's, herbicides, and insecticides are picked up by rain or irrigation water moving over land and carried into rivers, lakes, reservoirs, coastal waterways, or groundwater (Haddad PR, et al 2008). Storm water runoff

from highways that eventually makes its way to rivers or other waterways is another non-point source.

Paper and pulp mills use a lot of water, and they also release solid and liquid pollution into the environment (Amin M, et al 2008). The biological oxygen requirement, suspended particles, and chlorinated organic substances like dioxins are often high in liquid waste.

## **CONCLUSION**

Surface waterways may get contaminated during the storage and transportation of the resultant solid waste (wastewater treatment sludge, lime sludge, and ash). Biological oxygen demand, suspended particles, and a high ammonium concentration are all connected with the effluent from sugar mills. Additionally, pesticide residues could be present in the sugarcane rinse solutions. Solid waste from leather tanneries, such as sludge, hair, and hide, is produced in enormous amounts. Acids, sulphides, chlorides, and chromium are all present in the effluent. A liquid effluent that comprises harmful leftovers from equipment cleaning is released by the textile and dye industries. Waste from petrochemical production facilities includes benzene, phenols, oils and grease, suspended particles, and grease. Waste caustic and other dangerous compounds linked to cancer are found in solid waste produced by petrochemical

operations (Dionex Co, 2004)

To destroy pests in the soil or on the ground, certain insecticides are sprayed directly on the soil. This method may cause runoff into surface waterways or seepage into the groundwater.

Some pesticides are sprayed on plants from a distance, sometimes even from aircraft. When the materials are carried by the wind to neighbouring waterways, this approach may result in spray drift. The use of the most dangerous and persistent pesticides has been reduced to a significant extent in industrialized nations, but there may be laxer restrictions on their use or no enforcement of the laws governing their use in developing nations.

As a result, these nations have increased health risks associated with pesticide water contamination.

Chromatography is a method of separation that relies on the difference in affinities between stationary and mobile phases of two different phases. A sample is injected into a column, packed or coated with the stationary phase, and then separated by the mobile phase depending on the differences in how the chemicals interact with the stationary phase (via distribution or adsorption). Low affinity compounds travel more swiftly through the column and elute earlier than those with a higher affinity. A proper detector determines the substances that elute from the column's end. The stationary phase in ion chromatography is an ion exchanger, and the eluent used to determine anions is commonly a diluted solution of sodium hydrogen carbonate and sodium carbonate.

Individual anions can be identified using titrimetric, electrometric, or colorimetric detectors. Anions are

transformed into their highly conductive acid forms in suppressed ion chromatography, but in the carbonate-bicarbonate eluent, anions are transformed into carbonic acid, which is only moderately conductive. By measuring conductivity and comparing retention times to respective standards, the separated acid forms are identified.

In order to investigate all environmental factors affecting water pollution, it was determined that the study of chemical pollutants in various types of city water was necessary. Accordingly, the current study sought to establish an ion chromatographic method for monitoring the quality of drinking and raw water.

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