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Editor's Note: Journal of Chromatography and Separation Techniques

Eduard Rogatsky*

Department of Medicine, Albert Einstein Medical College, NY, USA

***Corresponding author:** Eduard Rogatsky, Research Associate Professor, Department of Medicine, Albert Einstein Medical College, NY, USA, Tel: 718430-3391; E-mail: rogatsky.eduard@gmail.com

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Editor's Note

Chromatographic technique was the brain-child of Russian scientist Mikhail Tsvet, who used the technique to separate different techniques like Chlorophyll, Carotenes, Xanthophills etc., in the year 1900. However, substantial work development and improvement in the succeeding years influenced the technique for multipurpose use and as a result Archer John Porter Martin and Richard Laurence Millington Synge received Nobel Prize for their exclusive work in the respective field. Now-a-days, use of chromatographic technique is practiced widely for the desired active ingredients separation in pharmaceutical sectors. Outcome of which meets the growing demand for new drug and chemicals. Present 'Journal of Chromatography and Separation Techniques' is devoted to accumulate all the relevant information on chromatographic separation techniques in the form of research, review and case report articles.

In the present issue i.e., volume 8, issue 2, the contributing authors have presented several timely works and some of them have been discussed herewith.

Related compounds or the impurities are cause for serious concern when coming to the raw materials and the intermediaries used for the production of Active Pharmaceutical Ingredients (API). Detection and quantification of regioisomer impurities is very challenging and appropriate analytical methods must be developed to ensure that, these impurities are controlled when the ingredients are used as raw materials, intermediaries or pharmaceutical ingredients. Most of these impurities are controlled at the process level itself and the left over if any are eliminated further at consequent stages. Denton et al. [1], explored the possibilities of detection and quantification of regioisomer impurities associated with 3-chloro-5-fluorophenol along with other related impurities using the entire gas chromatography area % method. The study discussed several other alternative strategies to control the impurities elated to 3-chloro-5-fluorophenol.

Liquid Chromatography (LC) is widely applied analytical method in the biomedical industry, particularly for the purification of drug components, recombinant proteins and antibodies. Zhu's [2] study aims to review the origin and the development of this analytical tool from a historical perspective by highlighting its application in life sciences. The study discussed the role of Liquid chromatography in isolating and purifying therapeutic drugs that benefit the humanity. Liquid chromatography as a single effective component can separate and purify drugs from a biological system involving great complexity and abundance under extreme purity requirements.

Esomeprazole magnesium dihydrate1 (ESO) is a compound that inhibits gastric acid secretion. It is widely applied as a cost-effective drug to treat gastric oesophageal reflux diseases. ESO is the S-isomer of omeprazole and it is the first single optical isomer proton pump inhibitor that generally provides better acid control than the current racemic proton pump inhibitors. It has a favorable pharmacokinetic profile relative to omeprazole. Several methods have been employed for the estimation of ESO in isolation and in combination with the other drugs like UV and RP-HPLC methods. Although methods based on mass spectrometry methods, based on the bioanalytical estimation of esomeprazole were used, they resulted in less sensitive and very noisy in the base line, indicating a need to develop a more efficient, sensitive, simple and rapid method in human plasma. Gosavi et al. [3], developed a simple, sensitive, rapid and cost effective chromatographic method known for its high performance to determine the role of Esomeprazole magnesium in human plasma by liquid-liquid extraction. Plasma sample was extracted using chloroform and Esomeprazole magnesium concentration ranging from 200-700 ng/spot was used for calibration curve. Recovery of Esomeprazole magnesium was 101.61% and the mobile phase constitute of ethyl acetate: methanol: ammonia. The study could establish the stability of Esomeprazole magnesium in human plasma during freeze thaw cycles at -30°C, 24 h on bench top at room temperature and 48 h for post preparative. The proposed method was validated statistically by performing recovery study for determination of Esomeprazole magnesium in human plasma by liquid-liquid extraction.

Water is the most precious natural source for human and animal for survival and it is equally important for the industrial and economic development. At a time when the clean water availability is threatened, water purification techniques attain great significance. This is inevitable for the areas worst hit by the natural disasters or chemical and oil spill. Water is a combination of organic and inorganic substances. While the naturally present Na^+, K^+, Ca^{2+}, Mg^{2+}, H^+, Cl^-, HCO_3^-, PO_4^{3-}, and OH^-, organic substances in our drinking water are essential for the sustainable life on the earth, non-essential ions like lead (Pb), aluminum (Al), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), gold (Au), lithium (Li), mercury (Hg), nickel (Ni), silver (Ag), and strontium (Sr) are harmful for the life on the earth.

Varden et al. [4], explored the potentiality of the Capillary Zoneas Electrophoresis (CZE) as a sensitive and rapid technique to traces the inorganic and organic anions in potable, natural, and wastewaters. CZE with indirect UV-diode array detection (CZEDAD) was employed with a background electrolyte system comprising of an Agilent Technologies proprietary basic anion buffer at pH 12.0 and a forensic anion detection method. The study showed that capillary zone electrophoresis (CZE) with indirect UV detection is a sensitive, reliable, and suitable method for the determination of many inorganic and organic anions. The simple, fast and cheap sample preparation method makes CZE an attractive tool for the detection and quantification of several anions present in wastewaters, natural waters, and potable waters including tap and well waters.

The study checked the presence of 14 different anions including bromide, chloride, thiosulfate, nitrate, nitrite, sulfate, azide, carbonate,

fluoride, arsenate, phosphate, acetate, lactate, and silicate in the water samples drawn from Northern New York towns and the Raquette River water system, and the largest watershed of the central and western Adirondacks. The study proved Capillary Zone Electrophoresis (CZE) with indirect UV detection as sensitive, reliable, and suitable method for the determination of many inorganic and organic anions.

Pyrethrins are natural pesticides present in the oil extracts of Chrysanthemum flowers. They are potent ion-channel neurotoxins with high toxicity rate for insects compared to mammals. These phytochemicals have an exceptionally safe environmental profile and are natural alternative to organophosphate insecticides currently used in agriculture. Six pyrethrins compounds are present in the oil extract that are structurally related esters. Isolation of reference standards for pyrethrins and their derivatives in multi-gram quantities is a prerequisite for studying toxicity and soil degradation for these natural pyrethrins. Wong et al. [5], has developed a two-step purification process, in which they have separated it into two groups by normal phase liquid chromatography on silica gel. The separation of pyrethrin, cinerin, and jasmolin within each group was achieved by Centrifugal Partition Chromatography (CPC). The study could successfully explore an optimized solvent system that can be subsequently applied to achieve multi-gram scale separation. The study could produce gram quantities of pyrethrins purity exceeding 99%.

References

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