

1972nd Conference

HPLC & Analytical Chem 2018



18th International Conference on

World Analytical Chemistry & Mass Spectrometry

&

World HPLC, Separation Techniques & Pharmacovigilance

August 29-30, 2018 | Toronto, Canada

Scientific Tracks & Abstracts

Day 1

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Combinatorial model of chromatography applied on optimizing operational conditions in SEC

Milos Netopilik

Institute of Macromolecular Chemistry, Czech Republic

The shape of the elution curves depends strongly on experimental conditions, in the first place on polymer molecular weight, upon this, on concentration and flow-rate. The effect of concentration is weak for polymers in theta solvents up to the concentrations of overloading. On the other hand, in good solvents, the concentration effect is important. The effective hydrodynamic volume of dissolved macromolecules decreases with increasing concentration. The decrease in the hydrodynamic volume of solvated molecules with increasing concentration is an established experimental factor which theoretical explanation. The spatial distribution of the analyte with respect to the longitudinal axis of the separation system, developing in time, can be expressed by the binomial distribution. However, further treatments of this physical situation were approximative. The exact solution to the problem is obtained as the observation at a fixed point (the detector) of this binomial distribution developing in time after reaching the exclusion limit. This can be done numerically. The description of the concentration effect on SEC elution curves is possible on the basis of the displacement-equilibrium model. This is based on the concept of a theoretical plate on which the equilibrium is formed between molecules of the analyte moving together with mobile phase (MP) and those anchored on the or penetrated into the pores of the stationary phase (SP). The simulation of the concentration effect is possible with partition coefficient calculated numerically for each plate at each displacement.

Biography

Milos Netopilik has completed his Ph.D. at the age of 30 years from Institute of Macromolecular Chemistry and postdoctoral studies from Virginia Polytechnic Institute and Technical University. He has published more than 65 papers in reputed journals.

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Determination of the concentration of benzoic acid and sorbic acid in ready to serve products using High Performance Liquid Chromatography (HPLC)

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Sodium benzoate and potassium sorbate are two major chemical preservatives which are used in ready to serve products. In this study, a total of 50 commercial brands of highly consumed ready to serve products were analyzed. The HPLC determination of the preservatives was performed using a reversed – phase C18 column and UV detection at 235 nm. Flow rate approximately 1.2 ml/min. Eluent for HPLC, mix 50 volume parts of ammonium acetate solution with 40 volume parts of methanol for HPLC and adjust to a pH of 4.5 to 4.6 with acetic acid. The preservative concentration in samples was using authentic external standard sodium benzoate and potassium sorbate. Among 50 samples, the minimum and maximum concentration of benzoate content in various brands were 80ppm and 874ppm and for sorbate was 60ppm to 562ppm respectively, 22% of samples do not compliance with standard regulations in Sri Lanka. Exposure to these chemical preservatives could be a risk factor for the human health, especially when their intake was being occurred by various foodstuffs simultaneously.

Biography

H W C Krishanthi Karunaratne has completed her MSc. in analytical chemistry, University of Peradeniya, Sri Lanka. She is the Assistant Government Analyst in Government Analyst Department in Sri Lanka. She has published more than 10 papers in some reputed journals.

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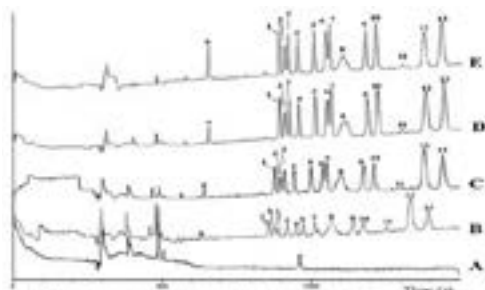
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Fabrication of a magnetic molecularly imprinted polymer for pre-concentration and cleanup of sarcosine, a prostate cancer metabolic biomarker, in urine prior to capillary electrophoresis determination

Zahra Ramezani, Mehdi Safdarian and Ata A Ghadiri
Ahvaz Jundishapur University, Iran

Sarcosine, a non-proteinogenic amino acid, is an intermediate product in the synthesis and degradation of amino acid glycine. Recently, it has been investigated as a prostate cancer (CaP) biomarker, a most common type of tumor disease in men. It is a candidate for diagnosis of early stages of CaP in the body fluid such as urine instead of prostate-specific antigen (PSA). PSA can only be detected in plasma when the disease progresses. Scientists have different opinion about its suitability as a biomarker in early diagnosis of CaP. This is due to false positive results because of interference from amino acid, aniline in the quantitation methods. Therefore, liquid chromatography or gas chromatography equipped with tandem mass detection is applied for its quantitation. For the accurate determination in biological matrixes such as urine, a good cleanup and pre-concentration technique is also required. Molecularly imprinted polymer as a synthetic antibody is a good approach. In the present survey, a new magnetic molecularly imprinted polymer (MMIP) using a chelate-Cu-sarcosine as the template, methacrylic amide as the monomer, ethylene glycol dimethacrylate as crosslinker and 2,2-azobis(butyronitril) as an initiator is introduced. Synthesis of the MMIP was optimized by two heating methods, microwave irradiation and conventional heating. On column derivitization capillary electrophoresis analysis was used to determine 13 amino acids including sarcosine. Fig. 1 shows electrophoregram for the mixture of amino acids determined by the proposed method. In the electrophoregram, aniline and sarcosine are appeared at different times. So, the interference of aniline is eliminated.



Biography

Zahra Ramezani is currently professor of analytical chemistry at Ahvaz Jundishapur University of Medical Sciences. She earns her BSc in pure chemistry, MSc and Ph.D. in analytical chemistry at Shiraz University, Iran. She is currently working on the synthesis of artificial antibodies for drug and diseases biomarker determinations in complicated matrixes such as urine, saliva and plasma as well as drug delivery.

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Area under the receiver–operating characteristics as a model for evaluating and predicting biomarkers of early renal tubular damage in subjects occupationally exposed to lead

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The incidence of kidney failure is on the increase, unfortunately, traditional renal function markers are equivocal especially at the early stage until end-stage renal disease when kidney transplant becomes inevitable. Hence, the need for an early and more sensitive marker of renal damage indicating the presence of covert renal damage in occupational lead toxicity is imperative. This work is proposing diagnostic methods that could predict the development of Chronic Renal Failure (CRF) especially in occupational lead-exposed subjects combining results of conventional and new biomarkers of kidney damage using a mathematical model based on Area under the Receiver Operating Characteristics (AUROC). Traditional Renal Function markers (TRF) (plasma creatinine, urea and uric acid) were determined in one hundred each of Lead-Exposed Subjects (LES) and non-exposed, non-nephrotic adults (control) along with sixty Chronic Renal Failure patients (CRF) (all age-matched) using standard spectrophotometric methods. Blood lead level (Pb) was determined in all participants using Atomic Absorption Spectrophotometry (AAS) while levels of novel urinary renal enzymes - Glutathione-S-transferase (GST) and N-acetyl- β -D-glucosaminidase (NAG)- activities were also evaluated using ELISA techniques. Pb was used as True Positive Indices (TPI) and TRF along with NAG and GST were used as False Negative Indices (FNI). Ratios of mean, Creatinine : GST (A) (0.01, 0.02 and 0.09), Creatinine:NAG (B) (0.03, 0.08 and 0.6), Uric acid : GST (C) (0.05, 0.08 and 0.08), Uric acid : NAG (D) (0.29, 0.3 and 0.55), Urea : GST (E) (0.17, 0.55 and 0.93), Lead : GST (F) (0.42, 0.59 and 0.88), Lead : NAG (G) (2.56, 2.28 and 6.09), Lead : Creatinine (H) (80.62, 30.37 and 10..22), Lead : Urea (I) (2.46, 1.07 and 0.95) and Lead : Uric acid (J) (8.66, 7.61 and 11.12) for LES, control and CRF groups respectively were computed and used to plot an ROC curve using the FNI values as the abscissa and the TPI values as the ordinate while their AUC were calculated. The AUC values for Lead : Creatinine, Lead Urea and Lead : Uric acid were 1.00, 0.917 and 0.833 respectively. We suggest that application of this model after proper standardization may be useful in early identification of covert kidney damage especially in occupationally vulnerable group.

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Effects of policosanol in the functional recovery of ischemic stroke hypertensive patients

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Introduction: Stroke is one of the leading causes of mortality and disability. Clinical studies results show that policosanol (20 mg/day) + standard aspirin (AS) therapy had benefits versus placebo + AS given for 6 and 12 months to patients with recent ischemic stroke.

Objective: To analysis, the policosanol treatment effects in the hypertensive patients included in two ischemic stroke recovery trials.

Methods: This report was analyzed the records of all hypertensive patients included in two ischemic stroke recovery studies. Hypertensive patients with a modified Rankin Scale score (mRSs) 2 to 4 were randomized, within 30 days of onset, to policosanol/AS or placebo/AS, for 6 months. The primary outcome was a mRSs reduction. Low-density Lipoprotein-cholesterol (LDL-C) reduction and High-Density Lipoprotein-Cholesterol (HDL-C) increase were secondary outcomes.

Results: One hundred forty-two hypertensive patients (mean age: 66 years) were included in the analysis. Policosanol/AS decreased significantly the mRSs mean from the first interim check-up (3 months) ($p < 0.0001$ vs. placebo/AS). The policosanol treatment effect did not wear off, on the contrary, even improved after 6 months therapy ($p < 0.0001$ versus placebo/AS). Moreover, policosanol/AS (57/71; 80.3%) treatment achieved significant results ($mRSs \leq 1$; $p < 0.0001$). Whereas the placebo/AS did not (6/71; 8.5%). Treatments were well tolerated. Two patients discontinued prematurely and four patients (2 from policosanol/AS group and 2 from placebo/AS) referred mild AE.

Conclusions: Six months administration of policosanol/AS given to hypertensive patients after suffering ischemic stroke demonstrated to be better than placebo/AS in improving functional outcomes at 3 and 6 months when used among hypertensive patients with ischemic stroke.

Biography

Julio Cesar Fernandez Travieso is a Senior Investigator in the Clinical Trials Unit, National Centre for Scientific Research, Havana, Cuba. He has completed his BSc in Pharmaceutical Sciences from Havana University, Cuba in 1996. He was awarded PhD in Pharmaceutical Sciences in 2003. He has published more than 130 publications and presented more than 100 papers in various scientific events. His research interest mainly focuses on clinical trials phase I-IV of different natural products: Policosanol, Abexol, Prevenox and Palmex.

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Biosensing approaches for lysozyme detection with graphene oxide-coated plasmonic interfaces

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Lysozyme is used as a model to study protein function and enzyme catalysis, is suggested as a biomarker in various diseases and also used as an antimicrobial agent in the food industry. Various methods have been reported for lysozyme detection based on its physicochemical properties, enzymatic activity or affinity for biological receptors. The aptasensors with detection by Surface Plasmon Resonance (SPR) developed by our group are versatile tools for the detection of residual lysozyme in wines or of lysozyme dimer in aggregated solutions. Advancing from these concepts relying on thiol coated plasmonic interfaces, we report the development of graphene oxide (GO) coated plasmonic interfaces via the layer-by-layer method, as robust and sensitive platforms with controlled thickness. Furthermore, the GO-coated interfaces were easily modified with whole cells of *Micrococcus lysodeikticus*- an enzymatic substrate for lysozyme. Detection of lysozyme in spiked serum samples was achieved on the principle of lysozyme's lytic action causing desorption of bacteria from the interfaces and consequently changes in the SPR signal. The analysis time was 3 minutes and the detection limit was 3.5 nM. A second sensing concept exploited the affinity of lysozyme for an aptamer, fixed covalently to the GO-coated interfaces. In this case, a detection limit of 0.71 nM and a linear range of 2-21 nM were observed. The two analytical strategies are based on different sensing mechanisms, nonetheless, both are sensitive and easy to implement with GO-coated interfaces suggesting a high potential and versatility of these interfaces for bioanalytical purposes.

Biography

Alina Vasilescu has completed joint Ph.D. studies from the University of Bucharest, Romania and University of Perpignan, France and postdoctoral studies from University of Toronto, Canada. She has worked in analytical development in the pharmaceutical industry and is currently a researcher at the International Centre of Biodynamics in Bucharest, Romania working on practical applications of biosensors. She has published more than 30 papers in the field of biosensors.

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Dusan Berek

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Retention mechanisms in liquid chromatography of synthetic polymers

At present, methods of liquid chromatography, (LC) provide the most important information on both average values and distributions of molecular characteristics – molar mass, chemical structure (composition) and physical architecture (topology) of synthetic macromolecules. Gel permeation (size exclusion) chromatography, GPC/SEC, is commonly employed for the determination of the molar mass of macromolecules. Its basic retention mechanism is steric exclusion based on the changes of conformational entropy of coiled macromolecules entering the pores of the column packing. However, GPC/SEC cannot give information about polymer molar mass in presence of the changing second or even third molecular characteristic. To simultaneously determine two molecular characteristics of a complex polymer such as copolymers or polymer blends, the entropy controlled retention mechanism is combined, coupled with the interaction retention mechanisms. The most common interaction retention mechanism employed in coupled LC methods is adsorption i.e. the distribution of a solute between a solid surface and a volume of its solution in a mobile phase. Adsorption usually results from the polar interactions among active sites on macromolecules and on the column packing surface, which are controlled by eluent polarity and less often by temperature. The appropriate stationary phase is bare silica gel. Another LC retention mechanism is absorption, (enthalpic partition), the distribution of a solute between the volumes of mobile and stationary phases. The practically applicable volume of LC stationary phase is produced by the chemical attachment, bonding of appropriate groups usually C18 alkyl groups onto a carrier, mainly silica gel. In practice, both adsorption and enthalpic partition retention mechanisms are applied either isocratically or applying mobile phase with the gradually changing composition. All enthalpy based processes in the LC columns are accompanied with the large changes of conformational entropy of macromolecules so that all coupled polymer LC procedures present a combination of enthalpy and entropy-based processes.

Biography

Dusan Berek is employed at Polymer Institute, Slovak Academy of Sciences in Bratislava. Served as elected member of the Presidium of the Slovak Academy of Sciences, President of the Slovak Chemical Society, Chairman of the Czecho-Slovak and Slovak National Committee of Chemistry for IUPAC. Corresponding member of the Central European Academy of Sciences and member of the Learned Society of the Slovak Academy of Sciences. Author or co-author of two monographs and 300+ scientific papers in extenso published in refereed periodicals, proceedings and chapters of books, as well as 60+ patents (four of them were licensed) - cited more than 3,000x. Presented over 130 invited plenary, key and main lectures, as well as over 900 regular lectures and poster contributions on symposia and conferences, as well as during lecturing tours to over forty countries. Elected "Slovak scientist of the year 1999" and "Slovak innovator of the year 2002".

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Maotian Xu & Yintang Zhang

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Advances in determination of Alzheimer's β -amyloid peptide

Alzheimer's disease (AD), the most common type of dementia in the elderly, is a progressive and devastating neurodegenerative disease causing memory loss, impaired thinking and other symptoms. β -amyloid peptide ($A\beta$) indicates a biomarker for an AD in cerebrospinal fluid, blood, plasma and serum. Therefore, it is important to determine the $A\beta$ concentration for early diagnosis and treatment of AD. In this study, micellar electrokinetic capillary chromatography (MEKC) combined with an on-line preconcentration method sweeping was established to determine $A\beta_{1-42}$. Electrophoresis was carried out at a constant voltage of 5 kV in an uncoated fused-silica capillary. The 15 mmol/L borate buffer containing 20 mmol/L sodium dodecyl sulfate (SDS) with pH 9.3 was used as the running buffer. The samples were injected into the capillary by applying a pressure of 50 mbar for 60s. Under the optimal conditions, the detection limit of $A\beta_{1-42}$ was as low as 0.08 $\mu\text{mol/L}$. The recoveries of the normal addition method in real human serum sample analysis were found to be between 89.2% and 98.5%. The relative standard deviation (RSD) of the determination was less than 6%.

Biography

Maotian Xu has completed his PhD at the age of 42 years from Northwest University and postdoctoral studies from Central South University. He is the director of Henan Key Laboratory of Biomolecular Recognition and Sensing. He has published more than 40 papers in reputed journals.

Yintang Zhang has completed his PhD at the age of 29 years from Central South University. He is the director of Henan Joint International Research Laboratory of Chemo/Biosensing and Early Diagnosis of Major Diseases. He has published more than 25 papers in reputed journals.

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Separation of parent homopolymers from block copolymers with advanced liquid chromatography methods

Dusan Berek

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Block copolymers present an important group of materials with numerous applications in science, medicine and technology. In a block copolymer, at least two chemically distinct polymer chains are connected with a chemical bond. Comprehensive molecular characterization of block copolymers is an analytical challenge. A special problem makes a determination of the amount and molar mass of parent homopolymers, which occur in most block copolymers and constitute highly undesired ballast. Gel permeation (size exclusion) chromatography GPC/SEC is commonly employed for the characterization of block copolymers. Molar mass of a precursor, the block polymerized as first, is determined by GPC/SEC and the same method serves for the approximate assessment of total molar mass of the block copolymer under study. Due to its low separation selectivity and detector sensitivity, GPC/SEC can hardly identify the presence of parent homopolymers and render their molar mass. We will discuss principles and applications of the new separation methods namely liquid chromatography under limiting conditions of enthalpic interactions, LC-LC and sequential two-dimensional polymer liquid chromatography, S2D LC to solve the above tasks. LC-LC methods are well robust and experimentally feasible. Their separation selectivity is very high and sample recovery is reasonable. LC-LC can efficiently separate both parent homopolymers from diblock copolymers in one single step. The separated sample constituents can be one-by-one forwarded into an on-line GPC/SEC column for determination of their molar mass average and distribution. Parent homopolymers present in the block copolymer at a very low concentration below 1% of can be tracked-down and characterized with help of the S2D LC.

Biography

Dusan Berek is employed at Polymer Institute, Slovak Academy of Sciences in Bratislava. Served as elected member of the Presidium of the Slovak Academy of Sciences, President of the Slovak Chemical Society, Chairman of the Czecho-Slovak and Slovak National Committee of Chemistry for IUPAC. Corresponding member of the Central European Academy of Sciences and member of the Learned Society of the Slovak Academy of Sciences. Author or co-author of two monographs and 300+ scientific papers in extenso published in refereed periodicals, proceedings and chapters of books, as well as 60+ patents (four of them were licensed) - cited more than 3,000x. Presented over 130 invited plenary, key and main lectures, as well as over 900 regular lectures and poster contributions on symposia and conferences, as well as during lecturing tours to over forty countries. Elected "Slovak scientist of the year 1999" and "Slovak innovator of the year 2002".

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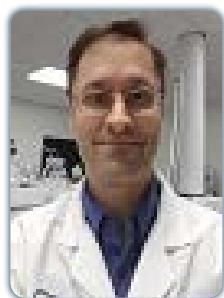
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Marc A Plante

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HPLC method development and troubleshooting

Separation technology is a critical tool for the determination of many aspects for the goods and products that we use every day: from the multiple aspects of pharmaceuticals we take for our health, the researching and evaluation of new biosimilars, the products that we buy and use and to the food and water we consume every day. It's being an honor of being invited to speak on some of this technology, where I will have experience with the development and promotion of one of the more recent detector technologies for HPLC: the Corona charged aerosol detector. During my eight years as an applications chemist at ESA Biosciences, Dionex and Thermo Fisher Scientifically its being able to create many novel applications encompassing lipids of all variety, biofuels, carbohydrates, foods, ions, pharmaceuticals, surfactants, proteins, industrial chemicals and pretty much everything else. Along with this work, it's a unique opportunity to provide ideas for improving the detector, some of which were incorporated. This detector is still relatively new for HPLC and here at this conference, we will be hearing about the newer technologies that are in development and their uses, including new solid-phase extraction techniques, column materials and other separation technologies and methods.

Biography

Marc Plante has been working in the field of analytical chemistry and chromatography for over 25 years, complete with a variety of publications, speeches, webinars and a wide range of experience. He first earned his BSc in Chemistry with two minors in engineering at Rensselaer Polytechnic Institute in Troy, New York and then a doctorate in Physical-Organic chemistry at Northeastern University. His first employment involved a novel semi-synthetic taxane process, for which he helped develop a now-patented chromatographic purification system. Over the course of his current career, he has largely worked with small-molecule chromatography, with much of his work involving the Corona Charged Aerosol Detector. At ESA, Dionex and Thermo Fisher Scientific, he created application notes and posters, gave many presentations and wrote two book chapters. He also provided some ideas for improving the detector's capabilities.

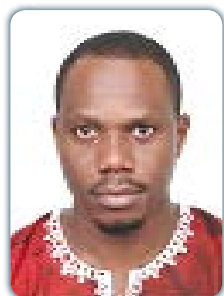
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Obi Uchenna

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An assessment of nurses' Knowledge Attitude and Practice (KAP) of pharmacovigilance

Purpose: The objective of the study is to assess nurses' Knowledge, Attitude and Practice (KAP) of pharmacovigilance.

Methods: This is a cross-sectional study that utilizes a questionnaire to evaluate nurses' KAP of pharmacovigilance at the University Hospital of the West Indies, Mona. A sample size of 234 nurses was selected using a 95% confidence level with the raosoft online sample size calculator. Data obtained from filled questionnaires were analyzed using the SPSS 20 using descriptive and inferential measures. The chi-square test was used to test the association between two attributes at a $P < 0.05$ significant level.

Results: 209 responses were received from 260 distributed questionnaires, giving an 80% response rate. 13.5% of the nurses had heard of the term pharmacovigilance prior to the study. 58.4% correctly stated the functions of pharmacovigilance. Results for attitude towards pharmacovigilance revealed 93.7% of the nurses felt it was a professional obligation to report Adverse Drug Reactions (ADR). 55.3% of nurses indicated they had reported an ADR. A χ^2 test of independence was performed to determine an association between nurses who noted ADRs in clinical practice and nurses who reported ADRs. Results showed a significant association between these two variables, $\chi^2 (1) = 86.642, p < 0.05$.

Conclusion: This study concludes that the registered nurses at UHWI had a good attitude towards pharmacovigilance, although their knowledge and practice was limited. Recommendation from the study includes instituting pharmacovigilance training programs that will improve nurses' knowledge and hopefully impact their practice.

Biography

Uchenna Obi was born in Lagos Nigeria, with a migration to Jamaica in 2007 for educational pursuits, Uchenna Obi holds a Bachelor of Science degree in Nursing from the Northern Caribbean University in Mandeville Jamaica. While working as a Registered Nurse at the University Hospital of the West Indies Jamaica, he went on to obtain a Post-graduate certificate in Critical Care Nursing, together with a Master of Science degree in Applied Pharmacology from the University of the West Indies, Jamaica. Uchenna is a Registered/Critical Care Nurse who is committed to applying quality research to clinical practice for the improvement of patient outcomes and over-all health safety of the public. His research article is published in the Journal of Clinical Review & Case Reports.

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New trends in sample miniaturization and its applications: On-chip devices

Maria Ramos-Payan
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Sample preparation miniaturization is one of the latest trends in analytical chemistry. The development of new sample preparation procedures is closely linked to the new on-chip microfluidic devices. These microchips have proven to offer new advantages over traditional methodologies, such as a decrease of the reagent volume, organic solvent and sample volume. It also reduces the analysis time and offers very high extraction efficiencies when working under double flow conditions or good enrichment factors when working under stationary conditions. These microchips systems have been employed using two different extraction techniques: liquid phase microextraction and electromembrane. The parameters that affect both extractions are the composition of the sample and the acceptor phase, the flow of the acceptor and donor phase, the organic solvent used as a liquid membrane supported and the extraction time. The voltage is one of the extra parameters to be determined in the case of the electromembrane. However, one of the most influential variables is related to the geometry of these microchips systems, since depending on their length, width and depth, different extraction and enrichment efficiencies will be obtained. In this work, new trends in the geometric study of microfluidic devices and their application to both environmental and biological samples are presented.

Biography

Maria Ramos Payan has completed her Ph.D. from University of Seville, Spain and postdoctoral studies from University of Copenhagen (Denmark), University of North Carolina (USA) and Microelectronic National Center of Barcelona (Spain). She is the leader of the microfluidic research line. She has published more than 30 papers in reputed journals and has been serving as an editorial board member of repute.

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Industrial roots of green chemistry and the history of the BHC Ibuprofen invention and its quality inspirations

Mark A Murphy

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Conventional wisdom and published histories of “Green Chemistry” describe its start as being a result of governmental and/or regulatory actions at the US “Environmental Protection Agency” (EPA) during the early 1990’s. But there were many Real World industrial examples of environmentally friendly commercial processes in the oil and commodity chemicals industries for decades prior to the 1990s. Some early examples of commercial “Green Chemistry” are briefly described in this article. The “Boots/Hoechst Celanese” (BHC) ibuprofen process was one of the earliest multiple-award-winning examples of industrial “Green Chemistry” in the fine chemical/pharmaceutical industry. The author, who conceived the BHC Ibuprofen synthetic strategy in 1984, reveals that the BHC ibuprofen process was not primarily a result of governmental or regulatory mandates or environmentalist or political motivations. The BHC ibuprofen process and probably many other early industrial “green” inventions evolved from and their development and commercialization motivated and guided by a long prior industrial culture of both scientific and technical evolution. The invention and commercialization of these early industrial commercialized processes and the BHC ibuprofen process were also guided by both competitive and economic market needs, personal human motivations and a low waste culture of “Quality” and “Continuous Improvement” that the commodity chemical industry internally promoted in the 1980’s. The author recommends that young green chemists and/or green engineers reconsider “Quality” approaches in order to genuinely lead Society toward a Greener future.

Biography

Mark A. Murphy, Ph.D., J.D. was born in Texas, earned a B.S. degree with Honors in Chemistry from Tulane University and a Ph.D. in Organometallic Chemistry from the University of Wisconsin-Madison in 1982. Mark worked at Celanese (later Hoechst Celanese) in Corpus Christi Texas from 1983 until 1993. Mark began Law School at the University of Texas-Austin in 1995 and graduated in 1998. Mark joined Needle & Rosenberg P.C. of Atlanta in 1998, where he practiced patent and IP law and was promoted to Partner in 2006. In 2007 Mark left to join Merchant & Gould’s Atlanta office as a Vice President. In 2008 Mark left Merchant & Gould to found UVLAW Patents LLC, where he practices the patent, IP and business law. Mark has a 2nd home in the mountains of North Carolina and engages in a variety of indoor and outdoor hobbies, including riding and maintaining a motorcycle.

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Potentiometry as a tool for monitoring of antioxidant activity

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The complexity of biological objects and the rapid change in their composition after sampling, the variety of compounds of different chemical nature, possessing oxidative and antioxidant properties, make the task of its estimating extremely important. The use of potentiometry in determining integral antioxidant/oxidant activity (AOA/OA) mainly of biological fluids and human skin is discussed. The source of information is the electrode potential shift that occurs when the analyzed sample is introduced into the solution of the mediator system or when the mediator system is brought into contact with the skin. Results of analysis of blood plasma of groups of patients with different pathologies and skin studies are presented. The decrease of AOA in patients with coronary heart disease, hypertension and malignancy, in particular, was shown. It is demonstrated an increase in skin AOA after taking ascorbic acid, enriched by vitamins juices, as well as the application of creams containing antioxidants. Zones of healthy people, risk and pathology are found. The findings open up new opportunities in expanding the use of analytical chemistry in such an important field as medicine. The trends include laboratory and on-site variants, the wearable, implementations on the way from the test tube to the smartphone.

Biography

Khiena Brainina holds a Ph.D. in chemical sciences (Ural State University, 1959), D.Sc. in chemical sciences (Moscow State University, 1967) and Professor in chemistry. More than 500 papers, abstracts and patents are published in Russian and international journals. 5 books in stripping analysis are published by Chemistry (Russia) and Willey & Sons (USA). Main research interests are: electrochemical sensors, stripping voltammetry, environmental monitoring, flow-through analysis, solid substance electrochemical characterization, sensors and antioxidants monitoring.

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A portable chip for microextraction and subsequent optical detection in a single step: Determination of norfloxacin in water samples

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In recent years, the miniaturization of new methodologies has become a dominant trend due to the advantages they present. On the one hand, microextraction techniques integrated into microfluidic devices on the chip have been able to be connected online to instrumental techniques for direct analysis. The development of new detection devices using optical fibers allows measuring new compounds more quickly and requiring less sample volume.

In this work, we present for the first time the coupling between two miniaturized systems: a microextraction microchip device bases liquid phase microextraction and an optical detection device using optical fibers (fluorescence), allowing on-line determination in a single portable device using a very low sample volume. The first step was a clean-up sample treatment and the extraction of the analyte (norfloxacin), whereas the second step was the direct determination of norfloxacin using optical fibers. The microextraction procedure was carried out at optimal extraction conditions (dihexilether as an organic solvent, pH 3 as the sample solution, pH 12 as acceptor solution and 1 μ L/min as flow rate for sample and acceptor solution). Finally, the device has been successfully applied to environmental samples.

Biography

Maria Ramos Payan has expertise in improving sample preparation techniques focused on microfluidic-chip devices as miniaturization. The novelty of her microfluidic devices offers more advantages than the existing methodologies. Maria has worked at different institutions (the University of Seville, University of Huelva, University of Lund, University of Copenhagen, University of North Carolina, USA, Microelectronic National Center of Barcelona and Universitat Autònoma de Barcelona). Currently, she works at the University of Seville with the aim of implementing optical detection into microfluidic devices for multiple different applications.

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