

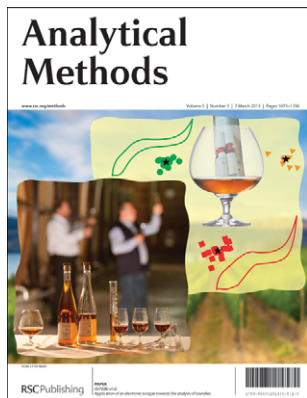
# Analytical Methods

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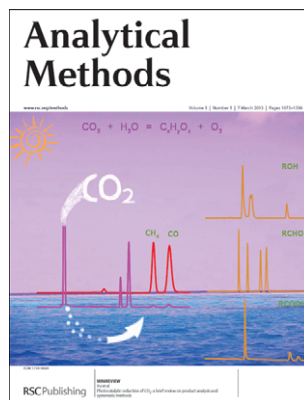
## IN THIS ISSUE

ISSN 1759-9660 CODEN AMNECT 5(5) 1073–1356 (2013)



### Cover

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pp. 1120–1129.  
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*Anal. Methods*, 2013, **5**, 1120.



### Inside cover

See Xu *et al.*,  
pp. 1086–1097.  
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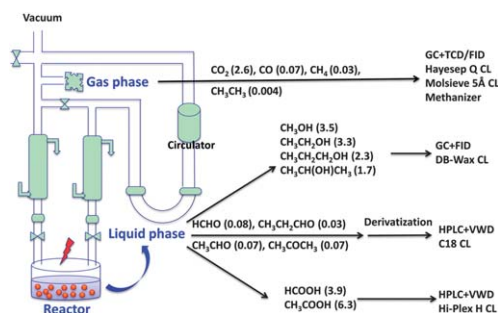
## MINIREVIEW

1086

### Photocatalytic reduction of CO<sub>2</sub>: a brief review on product analysis and systematic methods

Jindui Hong, Wei Zhang, Jia Ren and Rong Xu\*

Methods with low detection limits for screening CO<sub>2</sub> photoreduction products in both gas and liquid phases are reviewed and developed.



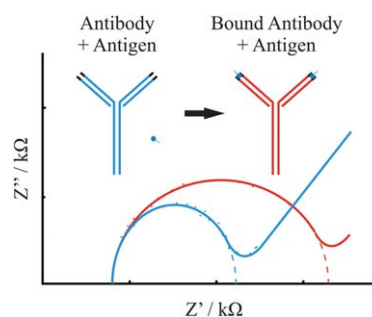
## CRITICAL REVIEW

1098

### Electrochemical impedance spectroscopy: an overview of bioanalytical applications

Edward P. Randviir and Craig E. Banks\*

Electrochemical Impedance Spectroscopy (EIS) is a technique which is increasingly utilised by the bioanalytical field as a means to detect specific target analytes within media such as blood, urine or saliva. This review discusses a wide range of applications of EIS with a major focus upon the biological uses.



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Analytical Methods (print: ISSN 1759-9660; electronic:  
ISSN 1759-9679) is published 24 times a year by the  
Royal Society of Chemistry, Thomas Graham House,  
Science Park, Milton Road, Cambridge, UK CB4 0WF.

All orders, with cheques made payable to the  
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2013 Annual (print + electronic) subscription price £2331;  
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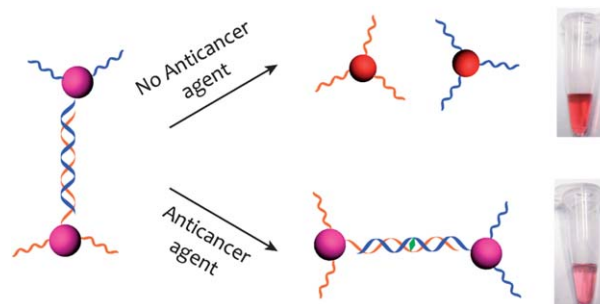


1116

### Colorimetric anticancer drug detection by gold nanoparticle-based DNA interstrand cross-linking

Xiaoji Xie, Renren Deng, Feng Liu, Wei Xu, Sam Fong Yau Li\* and Xiaogang Liu\*

A convenient approach, based on gold nanoparticles and DNA interstrand cross-linking, has been developed for colorimetric detection of anticancer drugs.



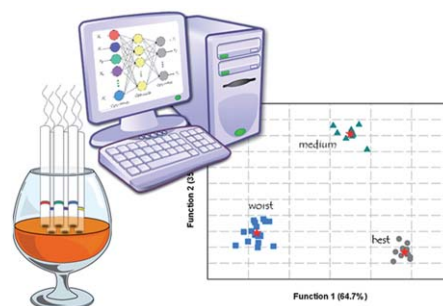
## PAPERS

1120

### Application of an electronic tongue towards the analysis of brandies

Xavier Cetó, Matias Llobet, Joan Marco and Manel del Valle\*

A voltammetric electronic tongue, with FFT pretreatment of data, applied to qualitatively classify brandies and to predict semi-quantitatively defect indicators.

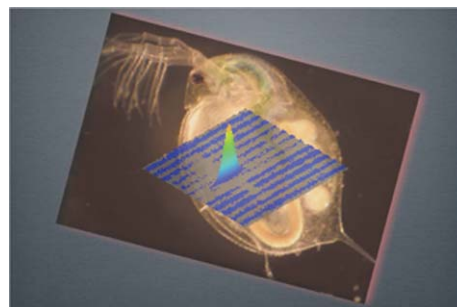


1130

### Potential of solid sampling high-resolution continuum source graphite furnace atomic absorption spectrometry to monitor the Ag body burden in individual *Daphnia magna* specimens exposed to Ag nanoparticles

Martín Resano,\* Ana C. Lapeña and Miguel A. Belarra

HR CS GFAAS permits the straightforward determination of the individual Ag body burden in small invertebrates, which may be of interest in ecotoxicological research.

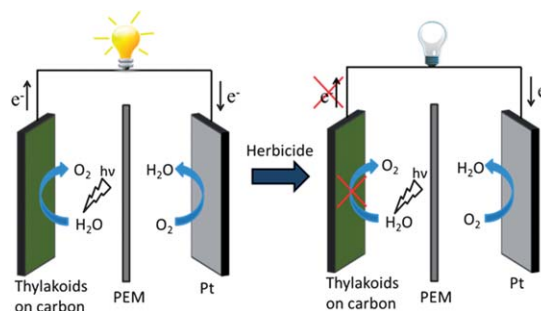


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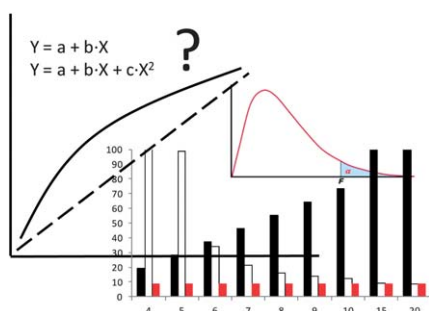
### Self-powered herbicide biosensor utilizing thylakoid membranes

Michelle Rasmussen and Shelley D. Minteer\*

Self-powered herbicide biosensors showing the biosolar cell before (left) and after (right) inhibition of thylakoid membrane by the addition of herbicide.



1145

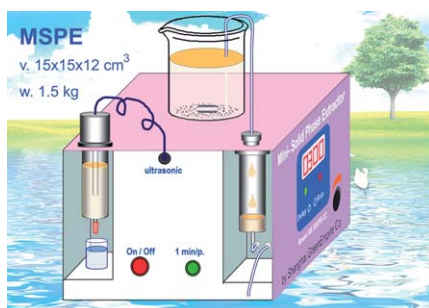


### Notes on the use of Mandel's test to check for nonlinearity in laboratory calibrations

J. M. Andrade\* and M. P. Gómez-Carracedo

The approach given by IUPAC to check calibration linearity by Mandel's test is shown to be incorrect.

1150

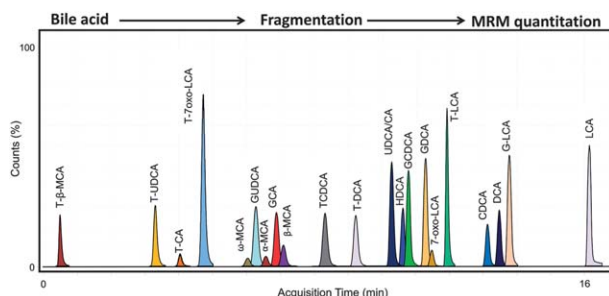


### On-site solid phase extraction and HPLC determination of chloramphenicol in surface water and sewage

Sheng Liu,\* Xian-Zheng Wu, Zi-Hui Gao and Fang Jiao

An on-site MSPE–HPLC method for chloramphenicol was established with a macroporous XAD-16 resin as sorbent.

1155

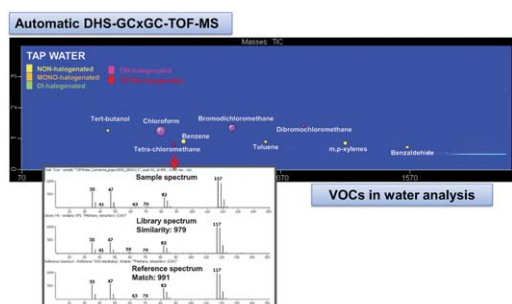


### Quantification of multiple bile acids in uninephrectomized rats using ultra-performance liquid chromatography-tandem mass spectrometry

Carlos A. Penno,\* Denis Arsenijevic, Thierry Da Cunha, Gerd A. Kullak-Ublick, Jean-Pierre Montani and Alex Odermatt\*

Development and validation of a sensitive UPLC-MS/MS method for the quantification of bile acids using specific fragmentation of unconjugated and conjugated metabolites.

1165



### Automated dynamic headspace followed by a comprehensive two-dimensional gas chromatography full scan time-of-flight mass spectrometry method for screening of volatile organic compounds (VOCs) in water

Sonia Herrera López, María José Gómez, María Dolores Hernando and Amadeo R. Fernández-Alba\*

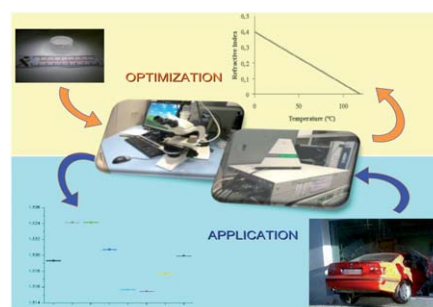
An analytical method for VOCs in water with a minimum sample preparation based on automatic DHS-GCxGC-TOF-MS. Simultaneous target and non-target screening.

1178

### Validation of an analytical method for the refractive index measurement of glass fragments. Application to a hit-and-run incident

Francisco Alamilla, Matias Calcerrada, Carmen Garcia-Ruiz and Mercedes Torre\*

This manuscript deals with the validation of an analytical method which allows the determination of the refractive index of glass fragments. It is applied to real casework in order to show the usefulness and the current role of the technique as well.

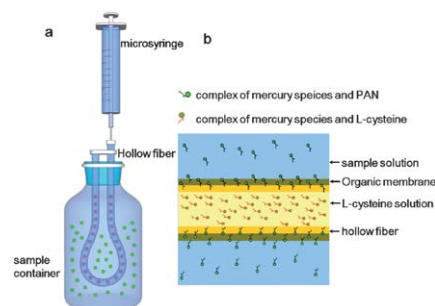


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### Improved hollow fiber supported liquid–liquid–liquid membrane microextraction for speciation of inorganic and organic mercury by capillary electrophoresis

Chen Chen, Mengting Peng, Xiandeng Hou, Chengbin Zheng\* and Zhou Long\*

Hollow fiber supported liquid–liquid–liquid membrane microextraction method for simultaneous speciation analysis of inorganic and organic mercury.

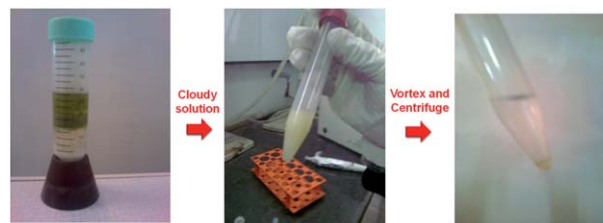


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### Optimization and validation of a new pesticide residue method for cucumber and tomato using acetonitrile-based extraction-dispersive liquid–liquid microextraction followed by liquid chromatography-tandem mass spectrometry

Zahra Dashtbozorgi,\* Mohammad Kazem Ramezani and Syed Waqif-Husain

A novel method based on dispersive liquid–liquid microextraction is developed for extraction and pre-concentration of pesticide residues from QuEChERS extracts.

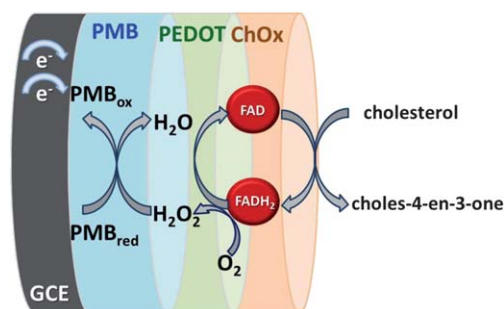


1199

### New redox and conducting polymer modified electrodes for cholesterol biosensing

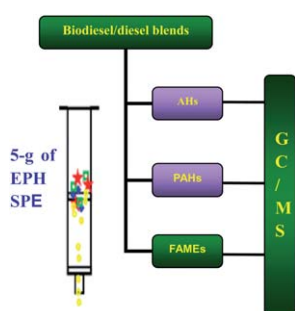
Somayeh Kakhki, Madalina M. Barsan, Esmaeil Shams and Christopher M. A. Brett\*

Poly(methylene blue) mediated cholesterol oxidase electrochemical biosensor for cholesterol biosensing and application to milk and eggs.





1205

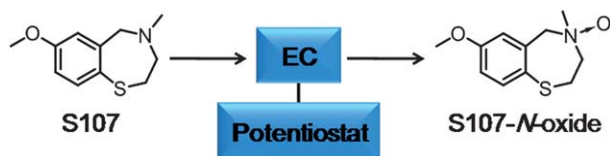


### Fast chemical fingerprinting analysis for biodiesel/diesel blends using commercial solid phase extraction (SPE) cartridge and gas chromatography–mass spectrometry (GC–MS)

Xinchao Ruan, Zeyu Yang,\* Hongqin Xie, Wei Xiong, Zengkai Pan and Liya Chen

A fast and simple method based on commercially available SPE cartridges was developed for chemical fingerprinting of biodiesel/diesel blends.

1214

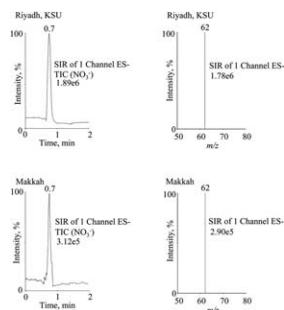


### Using electrochemistry for metabolite simulation and synthesis in preventive doping research: application to the Rycal S107 and the PPAR $\delta$ -agonist GW1516

Sandra Jahn, Simon Beuck, Ines Möller, Mario Thevis and Uwe Karst\*

Metabolism simulation of potential doping agents in an electrochemical cell enables fast and easy access to reference material (phase I metabolites) for analytical method development in preventive doping research.

1225

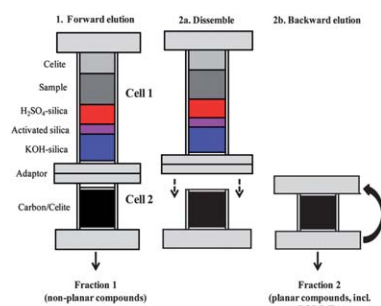


### An ultra performance liquid chromatography-electrospray ionization-mass spectrometry method for the rapid analysis of nitrate in drinking water

Mohammad Rizwan Khan,\* Zeid Abdullah Allothman, Moonis Ali Khan, Rosa Busquets and Ibrahim Hotan Alsohaimi

A fast, precise and sensitive UPLC-MS method for the determination of  $\text{NO}_3^-$  in drinking water has been developed.

1231



### Modular pressurized liquid extraction for simultaneous extraction, clean-up and fractionation of PCDD/Fs in soil, sediment and sludge samples

Lan Do,\* Thong H. Xuan, Staffan Lundstedt and Peter Haglund

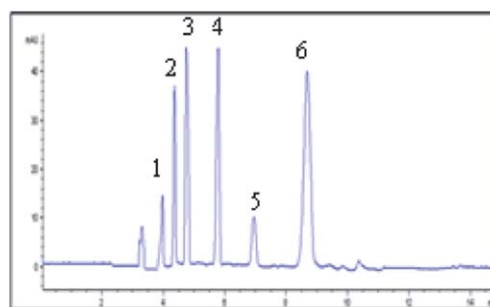
A novel method based on coupling two PLE extraction cells is reported with accurate, precise and reproducible results for several certified materials.

1238

### Micellar electrokinetic capillary chromatographic determination of a polypill combination containing, lisinopril, hydrochlorothiazide, aspirin, and atorvastatin

Nourah Z. Alzoman,\* Mona M. Alshehri, Maha A. Sultan, Hadir M. Maher, Ileana V. Olah and Ibrahim A. Darwish

A sensitive MEKC method was developed for the determination of lisinopril, hydrochlorothiazide, aspirin and atorvastatin in a cardiovascular polypill.

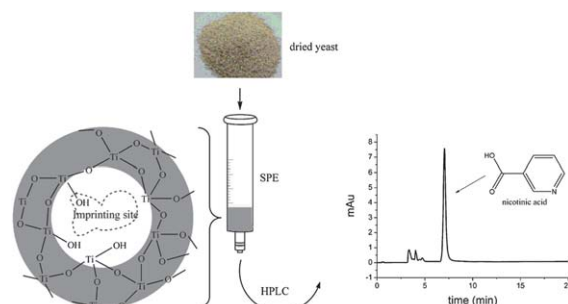


1245

### Functional monomer free synthesis of molecularly imprinted titania for solid-phase extraction of nicotinic acid

Jin Tan, Man Li, Rong Li and Zi-Tao Jiang\*

A titania based nicotinic acid imprinted material for solid-phase extraction was prepared without the use of traditional functional monomers.

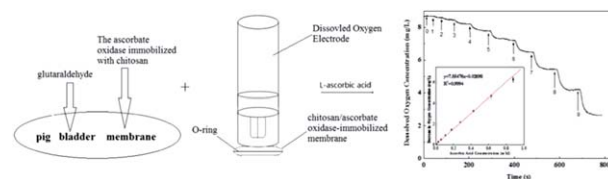


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### L-Ascorbic acid biosensing assay from enzyme-immobilized pig bladder membrane as a novel platform

Fengxia Li, Hongjuan Wu, Miao Cui, Yan Zhang, Chuan Dong, Junping Wang, Shaomin Shuang\* and Martin M. F. Choi

L-Ascorbic acid biosensor based on enzyme-immobilized pig bladder membrane with dissolved oxygen electrode.

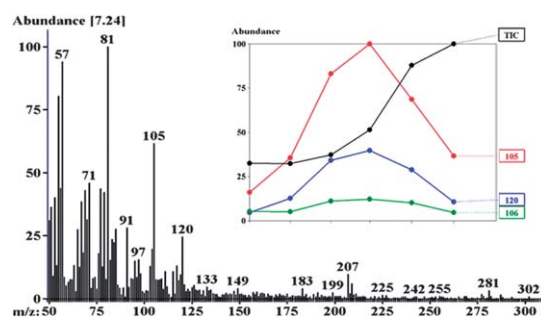


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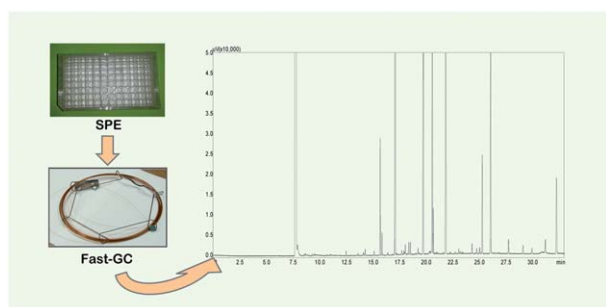
### Analysis of the aroma components in tobacco using combined GC-MS and AMDIS

Lijun Wu, Wei Liu, Jinli Cao, Qianqian Li, Yue Huang and Shungeng Min\*

AMDIS was used for identifying pure components from flue-cured tobacco, which possesses potential in the fast analysis of components in complicated matrices.



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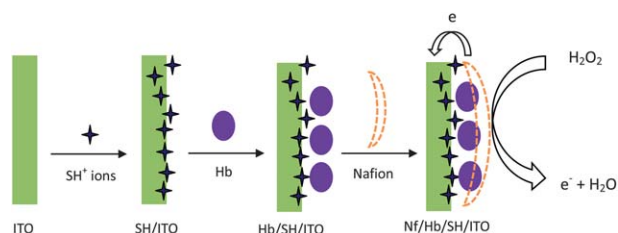


### Elaidic acid, vaccenic acid and rumenic acid (c9,t11-CLA) determination in human plasma phospholipids and human milk by fast gas chromatography

Aida Maribel Chisaguano, Blanca Lozano, Carolina Moltó-Puigmartí, Ana Isabel Castellote, Magdalena Rafecas and M. Carmen López-Sabater\*

The new fast gas chromatographic method permits faster separation of elaidic acid, vaccenic acid and rumenic acid within a complete fatty acid profile in human plasma and human milk.

1273

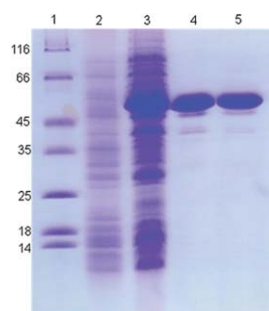


### Indium tin oxide electrode modified by a SH<sup>+</sup> ion implantation technique for direct electrocatalytic sensing of hydrogen peroxide

Mingxing Zhang and Jingbo Hu\*

A novel method to fabricate a hydrogen peroxide sensor was developed by immobilizing hemoglobin on ITO electrode modified by a SH<sup>+</sup> ion implantation technique.

1279

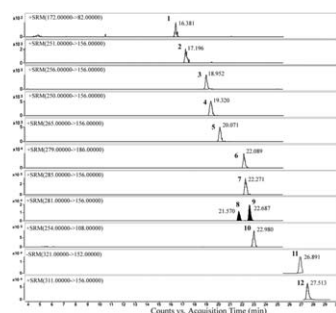


### A novel capillary electrophoresis-based assay method for coenzyme B<sub>6</sub>-dependent diaminopimelate decarboxylase from *Propionibacterium acnes*

Jui-Hsin Huang and Hao-Ping Chen\*

In bacteria, diaminopimelate decarboxylase is responsible for L-lysine biosynthesis, and may become a potential drug target for treatment of multidrug resistant bacteria.

1283



### Simultaneous determination of metronidazole, chloramphenicol and 10 sulfonamide residues in honey by LC-MS/MS

Wenli Tian, Lingyu Gao, Yazhou Zhao, Wenjun Peng\* and Zhongzhou Chen\*

An LC-MS/MS method combined with simple sample pretreatment was developed to simultaneously determine metronidazole, chloramphenicol and 10 sulfonamides in honey.

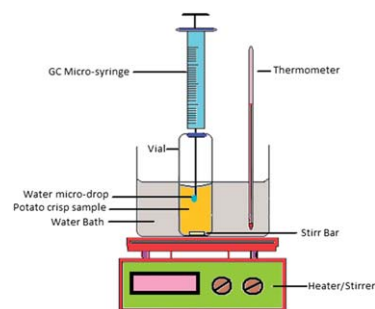


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### Rapid and sensitive determination of acrylamide in potato crisps using reversed-phase direct immersion single drop microextraction-gas chromatography

Massoud Kaykhaii\* and Ali Abdi

A simple and rapid approach using reversed-phase direct immersion single drop microextraction (RP-DISDME) is established for the determination of acrylamide at low levels in potato crisps.

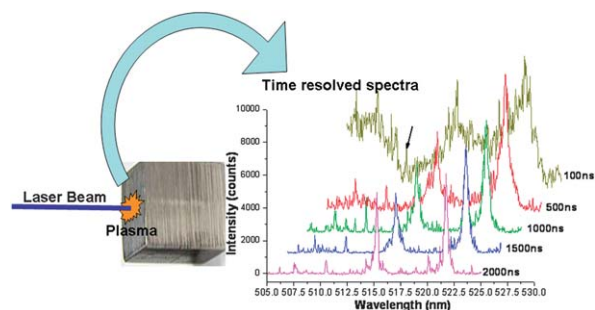


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### Analysis of trace elements in complex matrices (soil) by Laser Induced Breakdown Spectroscopy (LIBS)

V. K. Unnikrishnan, Rajesh Nayak, Kiran Aithal, V. B. Kartha, C. Santhosh,\* G. P. Gupta and B. M. Suri

We report the development of a LIBS system for analysis of ppm levels of trace elements in soil samples. We also show that the limits of detection can be further reduced by suitable data processing techniques.

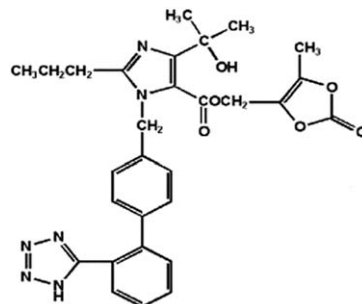


1301

### Validated voltammetric determination of olmesartan medoxomil: Method development and electrochemical behaviors investigation

Mustafa Çelebier, İncilay Süslü and Sacide Altınöz\*

Develops a voltammetric method based on square-wave voltammetry at a hanging mercury drop electrode for the direct determination of olmesartan medoxomil in its bulk form and pharmaceutical formulations.

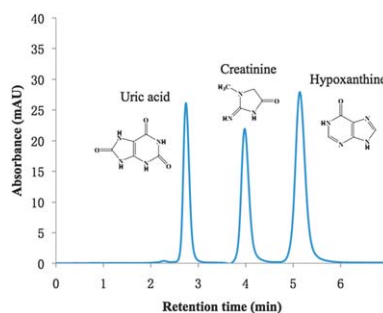


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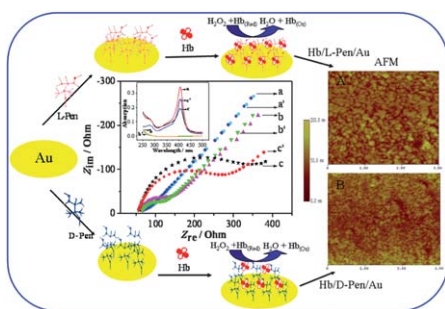
### An eco-friendly hydrophilic interaction HPLC method for the determination of renal function biomarkers, creatinine and uric acid, in human fluids

Si Zhou, Ruixiao Zuo, Zhuo Zhu, Di Wu, Kruti Vasa, Yiwei Deng and Yuegang Zuo\*

An environmentally friendly HILIC method was developed for the simultaneous determination of creatinine and uric acid in human urine and tear samples.



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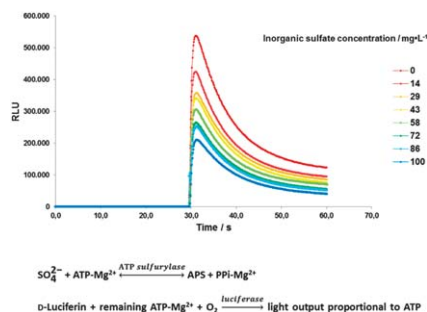


### Stereoselective interaction between hemoglobin and penicillamine enantiomers modified chiral surfaces

Qian Han, Yonghua Wang, Liju Guo, Yihan Huang, Qing Zhang and Yingzi Fu\*

Chiral surfaces were obtained based on self-assembled monolayers of penicillamine enantiomers onto gold electrodes, and the enantioselective behavior was investigated by adsorbing hemoglobin on the chiral surfaces.

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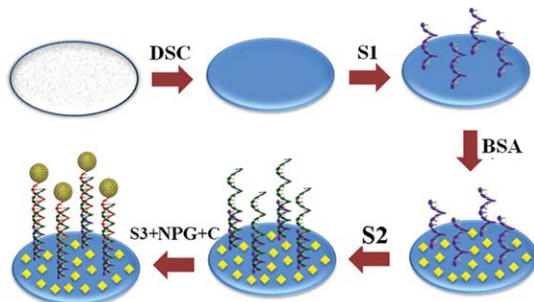


### An optimized bioluminescent assay for inorganic sulfate quantitation in freshwater

Simone M. Marques and Joaquim C. G. Esteves da Silva\*

A coupled bioluminescent assay for inorganic sulfate quantitation in freshwater was developed that is fast, simple to perform and robust.

1328

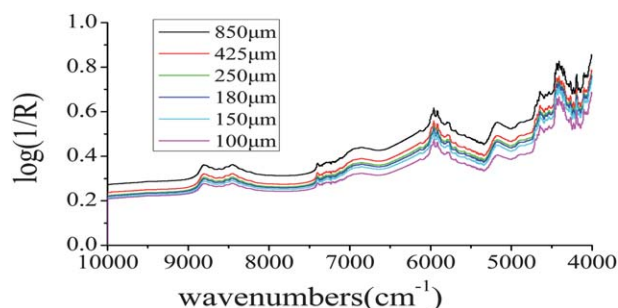


### Facile and sensitive paper-based chemiluminescence DNA biosensor using carbon dots dotted nanoporous gold signal amplification label

Yanhu Wang, Shoumei Wang, Shenguang Ge, Shaowei Wang, Mei Yan,\* Dejin Zang and Jinghua Yu

Chemiluminescence protocol for detection of DNA on a low-cost paper analytical device using a simple, rapid wax-screen-printing method combining covalent modification and signal amplification.

1337



### Near infrared spectroscopy combination with PLS to monitor the parameters of naproxen tablet preparation process

Wei Luo, Jia Wu, Xuekai Wang, Xia Lin and Hui Li\*

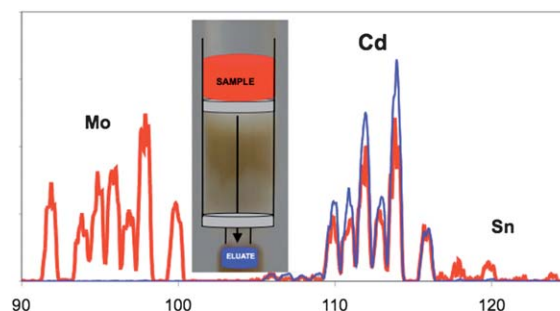
The multiple parameters of naproxen tablet preparation process, especially percentage particle size distribution, were determined by NIRs combination with PLS.

1346

### Novel separation for the determination of cadmium by isotope dilution ICP-MS in samples containing high concentrations of molybdenum and tin

Robert Q. Thompson\* and Steven J. Christopher

Molybdenum and tin were removed from samples by a multi-step SPE procedure to provide interference-free measurement of cadmium by ICP-MS.

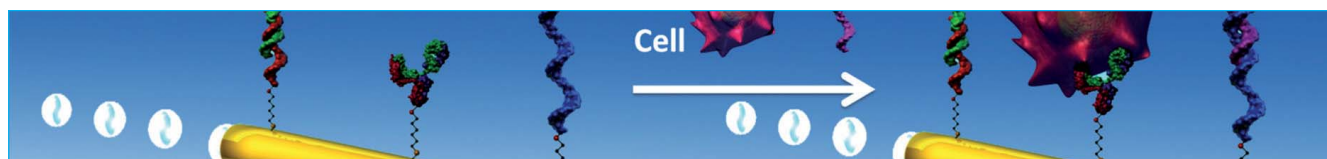
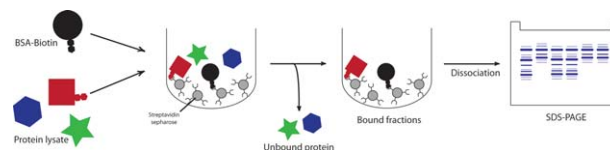


1352

### An internal standard for protein purification by affinity sorption

Ying Fu, Huanhuan L. Cui, Dmitri Sviridov\* and Nigora Mukhamedova

In this study we suggest a robust internal standard for protein purification by affinity sorption.



## Faraday Discussion 164

# Electroanalysis at the Nanoscale

1-3 July 2013, Durham University, UK

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