DAY 1 SESSIONS
NOVEMBER 20, 2019

Mass Spectrometry | Medicinal Chemistry

SESSION CHAIR

Claude Billeaud
CIC Pédiatrique 1401 CHU Pellegrin, France

SESSION INTRODUCTION

Title: Anti-cancer activity and immunoadjuvant properties of edible bird's nest extracts on human breast cancer cell line

Lee Ting Hun, Universiti Teknologi Malaysia, Malaysia

Title: Title: Mass accuracy of multi-reflecting TOFMS

Anatoly Verenchikov, Mass Spectrometry Consulting Ltd., Montenegro

Title: Mathematical modelling and experimental investigation of gas flow competitiveness in porous media for enhanced oil recovery processes

Ofasa Abunumah, The Robert Gordon University, United Kingdom

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ANTI-CANCER ACTIVITY AND IMMUNOADJUVANT PROPERTIES OF EDIBLE BIRD'S NEST EXTRACTS ON HUMAN BREAST CANCER CELL LINE

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Edible Bird's Nest (EBN) is well regarded as an immune enhancing nutraceutical food especially among the Chinese. Current cancer therapies bring adverse side effects, thus identification of a safe adjuvant medicine like EBN can provide a quality life for patients. The aim of this study is to evaluate the anti-cancer activity and immunoadjuvant properties of EBN extract on human breast cancer cell line (MCF-7). Primarily, three types of EBN extracts coded as HMG, EHMG and pHMG were prepared using the water extraction method. These EBN extracts were then tested on their cytotoxicity level against MCF-7 and human immune cells (CD8+ and CD14+). Production of the key pro-apoptotic and anti-apoptotic molecules released in MCF-7, CD8+ and CD14+ cells before and after EBN treatment were measured through mRNA expression level, ELISA and Multiplex assay. Among the three EBN extracts, HMG showed the highest cytotoxic effect towards MCF-7 cells with IC50 of 15µg/mL. However, HMG showed no harm towards CD8+ and CD14+ cells with cell viability of more than 90%. qRT-PCR results for activated CD8+ and CD14+ cells showed increased of pro-apoptotic gene expression after treated with HMG in co-culture. At the same time, supplementation of HMG increased the apoptosis through down regulation of anti-apoptotic genes and the up-regulation of pro-apoptotic genes in MCF-7 cells. Enhancement of pro-apoptotic and down regulation of anti-apoptotic soluble factors by non-activated and activated CD8+ and CD14+ cells in single and co-culture after treated with HMG also showed in ELISA and multiplex assay. In conclusion, the present study showed that HMG extract is a potential anti-cancer agent and causes no harm to human immune cells. qRT-PCR, ELISA and multiplex tests also verified that HMG acts as an immunoadjuvant by enhancing pro-apoptotic function in the human immune cells.

BIOGRAPHY

Lee Ting Hun is a senior lecturer and the Head of Edible Bird's Nest Unit in School of Chemical Engineering, Universiti Teknologi Malaysia. He is the pioneer in carrying out bird's nest and swiftlet ranching research in Malaysia. He has led 20 over numerous government and private sector projects amounting to more than RM2 million. He has also published 30 over-indexed journals papers, conferences and seminars papers, book and book chapter. For decades, he has invented numerous processes and innovate some noble products related to bird's nest, nutraceutical and cosmeceutical. His contribution to the industry has won him the Malaysian Scientist Award and the Geneva Invention and Innovation Award. He has also co-authored the Malaysian SIRIM standards for Edible Bird's Nest and Swiftlet Ranching Standards. Recently, he has also been appointed as Malaysia Bird's Nest Expert.

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2nd International Conference on
ANALYTICAL CHEMISTRY AND CHROMATOGRAPHY METHODS

November 20-21, 2019 | Berlin, Germany

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MASS ACCURACY OF MULTI-REFLECTING TOFMS

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Analytical chemistry becomes more and more alert of the importance of mass accuracy in mass spectral measurements. With development of new data processing algorithms, true specificity and the separation power of mass spectral measurements is primarily limited by mass accuracy rather than by the resolving power. Sub-ppm mass accuracy is desired in proteomics for reduced number of incorrect identifications (an increase in the confidence of hits) and it would extend the mass range and the elemental diversity of compound identification in other areas of mass spectral analyses. As demonstrated on GCxGC-MS case [1], the separation capacity of hybrid separation methods improves with mass accuracy. As been shown in [2], accurate mass defects, in-large, correlate with mobility shifts and in this sense precise mass measurements duplicate the mobility separations. Currently, commercial high-resolution instruments –time-of-flight MS, ICR FTMS and electrostatic traps – are just approaching a barrier of sub-ppm mass accuracy. Back in 2006, multi-reflecting time-of-flight mass spectrometers (MR-TOF) were demonstrated to reach 1 Million resolving power [3] for a narrow mass range. At full mass range, the resolving power R is limited by the instrument size with typical R=200,000 to 300,000 [4], meaning that mass spectral peaks are 3-5ppm wide. With detected ion fluxes up to 1E+8ion/s, ion statistics potentially allows reaching low 1ppb mass scatter at sub second spectral acquisition. However, the true mass accuracy with internal calibration still remains in the order of 0.1ppm (i.e. 100ppb). The presentation will discuss several already recognized limiting factors: In-spectra ion statistical limit, limiting mass accuracy at low intensity signals or at fast spectral acquisitions; diversity of not fully resolved isobars from chemical background systematic curvature and oscillations of mass calibration curve, produced by finite rise time and oscillations induced on accelerator electrodes: Slow drifts and higher frequency noise of power supplies; Mass and charge dependent parameters of ion beam in front of MRTOF; Effects of nanoampere currents within interfaces; Space charge effects within analyzers and Noise and saturation of the data system. Most of those factors can be avoided or at least accurately recognized for producing reliable measurement results.

References

1. Verenchikov et. al, IMSC 2014, MOS01-05
2. Kozlov ey.al, ASMS 2014
3. Verenchikov et.al, Technical Physics, Vol. 50, No. 1, 2005, pp. 82–86.
4. Verenchikov et.al, JASCM, 2017, 6, 1-22.

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BIOGRAPHY

Anatoly Verenchikov is currently the Director of "Mass Spectrometry Consulting Ltd." Bar, Montenegro and served as the Founder for the company from 2007-2016. In 2015, he received the golden medal from the Russian Society of Mass Spectrometry for outstanding achievements in mass spectrometry, Moscow, Russia. He also received the Golden award of Pittsburg Conference for Pegasus MRTOF, USA in 2011. He is the author of over 50 patents, more than 200 papers and conference presentations.

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MATHEMATICAL MODELLING AND EXPERIMENTAL INVESTIGATION OF GAS FLOW COMPETITIVENESS IN POROUS MEDIA FOR ENHANCED OIL RECOVERY PROCESSES

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A study to investigate the comparative displacement profile of gases injected in Enhanced Oil Recovery (EOR) has been conducted using ceramic porous material. Mathematical and experimental techniques were applied. Data clustering analysis of a global EOR database identify relative gas-oil mobility ratio as a critical parameter in evaluating displacement efficiency of gases. Series of experiments were subsequently conducted to determine the gas that could offer the optimal relative mobility profile. Seven gases and mixtures (CH_4, CO_2, N_2, Ar, He, 30%CO_2/CH_4 and 28%O_2/N_2) were investigated using characteristic ceramic membranes (Pore sizes: 15nm, 200nm and 6000nm) at temperature and gauge pressure range of 295K–675K and 1atm-3atm respectively. Data mining of the EOR database indicates that CO_2 gas is mostly applied to recover oil with low mobility (0.064D.cp-1) while CH_4 gas is applied to highly mobile oil (1.680 D.cp-1). Experimental analysis reveals that the performance of CO_2 in heavier oil could be explained by its comparatively low mobility factor (0.0602) as against N_2 (0.0674) and CH_4 (0.0878). Further analysis indicates that through 'mobility-control', N_2 and CH_4 gases could be optimized to achieve CO_2 performance. Reservoir engineers could therefore use this knowledge to effectively substitute the more expensive CO_2 with N_2 or CH_4 without compromising on oil recovery efficiency.

BIOGRAPHY

Ofasa Abunumah is a Senior Petroleum Engineer in the Ministry of Petroleum Resources, Nigeria. Currently he is leading a Doctoral research at the Centre for Process Integration and Membrane Technology in the Robert Gordon University. He has acquired qualifications in Chemical Engineering, Petroleum and Environmental Technology, Information Technology, Business and Accounting. He has over 10years experience working in the oil and gas industry. He has facilitated crucial petroleum data management projects, such as the Compendium of Petroleum Statistics. His recent research focus includes membrane technology, flow through porous media and Enhanced Oil Recovery. His strengths include experimental, mathematical and cost modelling.

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