ABSTRACTS OF LECTURES AND POSTERS

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P13: Extraction and analysis of neonicotinoid pesticides using QuEChERS approach

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Pesticide compounds of the neonicotinoid class have been used extensively in crop protection. The advent of the die-off of honey bees due to colony collapse disorder (CCD) has spawned investigation into pesticide exposure as the cause. Some studies have indicated that exposure of honey bees to neonicotinoids has detrimental effects on their behaviour. Recently, the European Union adopted a regulation restricting the use of three of these pesticides: clothianidin, thiamethoxam, and imidacloprid. Here, a Quick Easy Cheap Effective Rugged and Safe (QuEChERS) approach was used to develop a method for extraction of neonicotinoid pesticides from matrices with which honey bees come most in contact – flower blossoms. Seven neonicotinoids were extracted from cherry, apple, and dandelion blossoms and analysed via LC-MS/MS. A number of sorbent mixtures were tested for the clean-up method, and a mixture of PSA and C18 sorbents provided the best recoveries and matrix removal. At a spiking level of 50 ng/g, recoveries of >89% were achieved for all tested neonicotinoids. Good reproducibility was achieved with the method, as indicated by RSD values of less than 7% for spiked replicates.

P14: Analysis of multiple mycotoxins by LC-MS/MS: in-depth analysis of column selectivity

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Mycotoxins are toxic secondary metabolites produced by fungi, which can exist in food as a result of fungal infection of crops. Their strong resistance to decomposition and digestion cause mycotoxins to remain in the food chain. The analysis of mycotoxins in food and animal feed has been a challenge mainly due to the complexity of food matrices and desired low detection limits. In recent years, significant advances in the analytical techniques were applied to the detection of mycotoxins. There has been an increasing need for a method to detect multiple mycotoxins with a single sample preparation and analysis method. Previous research concentrated on an LC-MS/MS method for multi-mycotoxin analysis as mass spectrometry provides appropriate selectivity and sensitivity for detection. This study investigated the selectivity for over 15 common mycotoxins on a variety of solid-core HPLC columns with different stationary phase chemistries. The results of these analyses were evaluated for optimum resolution and selectivity. The separation of analytes from matrix was also important as often no sample clean-up is performed during analysis and matrix effects are highly probable. The choice of column chemistries will be presented with emphasis on overall method performance.

P15: Detection and quantification of ochratoxin A in food by aptasensor

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Governments and international instances are trying to improve the food safety system to prevent, reduce or avoid the increase of food borne diseases. This food risk is one of the major concerns for the humanity. The contamination by mycotoxins is a threat to the health and life of humans and animals. One of the most common mycotoxin contaminating feed and foodstuffs is ochratoxin A (OTA), which is a secondary metabolite, produced by *Aspergillus* and *Penicillium* strains. OTA has a chronic toxic effect and proved to be mutagenic, nephrotoxic, teratogenic, immunosuppressive, and carcinogenic. On the other side, because of their high stability, specificity, affinity, and their easy chemical synthesis, aptamer-based methods are applied to OTA biosensing as alternative to traditional analytical technique. In this

work, five aptamers have been tested to confirm qualitatively and quantitatively their binding with OTA. In the same time, three different analytical methods were tested and compared based on their ability to detect and quantify the OTA. The best protocol that was established to quantify free OTA from linked OTA involved an ultrafiltration method in green coffee solution with. OTA was quantified by HPLC-FLD to calculate the binding percentage of all five aptamers. One aptamer (The most effective with 87% binding with OTA) has been selected to be our biorecognition element to study its electrical response (variation of electrical properties) in the presence of OTA in order to be able to make a pairing with Radio Frequency Identification (RFID). This device, which is characterised by its low cost, speed and a simple wireless information transmission, will implement the knowledge on the mycotoxins molecular sensors (aptamers), an electronic device that will link the information, the quantification and make it available to operators.

P16: Simultaneous analysis of 30 synthetic water-soluble food colourings in glutinous rice products and chilli paste by liquid chromatography tandem mass spectrometry

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Despite increasing evidence on the plausible harmful effects of synthetic dyes, these chemicals are still widely added to food due to their low price, excellent stability and high colouring strength compared to their natural counterparts. Currently, the use of synthetic dyes in food is strictly regulated in many countries, with only a very select set of water-soluble dyes permitted with strict limits. While there have been many publications employing simple sample preparations and sensitive LC-MS/MS techniques to analyse synthetic oil soluble dyes in various complex food matrices, the corresponding application of similar strategies to synthetic water-soluble dyes have been scarce. Standard methods generally still rely on HPLC (with high salt mobile phases) coupled to diode-array detectors, or even rudimentary TLC techniques, both of which are less selective and sensitive than LC-MS/MS techniques. Methods analysing water soluble dyes in food using LC-MS/MS cover only a select set of dyes, such as tartrazine, sunset yellow, brilliant blue, amaranth, allura red, erythrosine, azorubine and indigo carmine; furthermore, these methods are limited to simple matrices such as beverages or employ specific SPE clean-up processes that are hardly generalisable to other kinds of food matrices. In this work, we developed a liquid chromatography tandem mass spectrometry method (LC-MS/MS) to unambiguously detect 30 water soluble colours in complex food matrices. Our method involved simple basic extraction of the dyes with simple clean-ups to remove interfering food matrices. Glutinous rice products and chilli paste – common delicacies in Singapore – were selected as the food matrix to challenge our method. Limits of detection, recoveries and matrix effect were studied.

P17: Fluorescence polarization immunoassay design for rapid screening of the pesticides triazophos, carbaryl, thiabendazole and tetraconazole in wheat

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Fluorescence polarisation immunoassays (FPIAs) for several pesticides were developed and optimised for parallel detection of several analytes using the same procedures for sample preparation and assay performance. Tracers for FPIAs of triazophos, carbaryl, thiabendazole and tetraconazole were synthesised and the tracers' structures were confirmed by HPLC-MS/MS. The influence of tracer cross-linking bridge length on the assay sensitivity was estimated. For triazophos and carbaryl analysis the use of EDF-labelled tracers allowed to achieve the best assay sensitivity and minimum reagent consumption in comparison with other alkyldiaminefluoresceinthiocarbamyl-labelled tracers and in comparison with 4-aminomethylfluorescein-labelled tracers. For thiabendazole and tetraconazole analysis 4-aminomethylfluorescein-labelled tracers allowed achieving the best assay sensitivity and minimum reagent consumption in comparison with aminofluorescein-labelled and alkyldiaminefluoresceinthiocarbamyl-labelled tracers. Measurements of fluorescence polarisation were performed using a portable device Sentry-200. Total time for sample preparation and detection of pesticides is lower than 1 h. The limits of detection of triazophos, carbaryl, thiabendazole and tetraconazole in wheat were 40, 20, 20 and 200 µg/kg, and the lower limits of quantification were 40,