

## **Presentation title: PFAS in market vegetables – a survey of 53 vegetable samples from Sydney and Newcastle**

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### **Abstract**

This study investigated 30 Poly - and Perfluorinated Alkyl Substances (PFAS) in 53 vegetable samples purchased from the Sydney Market and a local supermarket at Newcastle, NSW Australia. A Quick, Easy, Cheap, Effective, Rugged, and Safe (QuEChERS) method combined with isotope dilution technique was developed to extract and cleanup PFAS from various sample matrix, followed by quantitative analysis using Agilent 1260 liquid chromatography coupled with Agilent 6470A triple quadrupole mass spectrometry (LC-MS/MS).

The limit of quantitation (LOQ) for legacy perfluorocarboxylic acids (PFCAs) and perfluorosulfonic acids (C<sub>4</sub>-C<sub>8</sub> PFASs) ranged from 0.025 to 1.453 ng/g (by fresh weight, fw) with spike recoveries between 71% and 128% in various vegetables. PFOA was detected ( $\geq$ LOQ) in 7 out of the 53 samples, with the concentrations ranging from 0.038 to 1.996 ng/g (fw). PFOS was only detected in dill and garlic, at 0.132 and 0.911 ng/g (fw), respectively. While PFHxS was below its LOD at 0.008 ng/g (fw) in all samples in this study.

A potential risk estimation for consumption of these vegetables by human was calculated based on the recommended daily intake of vegetables and body weight of people according to age and gender (data obtained from Australian Bureau of Statistics) and compared with the health-based guidance values for PFOS, PFHxS and PFOA developed by Food Standards Australia New Zealand (FSANZ, TDI at 160ng/kg bw/d for PFOS + PFHxS and 20ng/kg bw/d for PFOA respectively). The most sensitive receptor for PFAS exposure via consumption of the vegetables is female child in the age group of 4 to 8 years old. The estimated exposure for PFOA and PFOS (at 2.03 ng/kg bw/d and 1.98ng/kg bw/d respectively) were only accounted for up to 1.3% and 9.9% of their corresponding tolerable daily intake values, indicating consumption of these vegetables has marginal risks to human health.

### **Education**

- 2018- Now Master of Environmental Risk Assessment and Remediation (MERAR), the University of Newcastle.
- 2013-2017 B.E. Environmental Engineering, Harbin University of Engineering.

Siyuan Liu is a final year master student of GCER's MERAR program (master of environmental risk assessment and remediation) at the University of Newcastle. This master research project aims to investigate potential health impacts due to dietary exposure to PFAS in the general food supply, with particular focus on vegetables, in the Sydney market and Newcastle region from where PFAS contamination has been reported occasionally. A practical sample processing, extraction and quantification method considering potential matrix effects from various vegetables was developed, evaluated and open for further improvement and validation. This method would be used for ongoing monitoring of PFAS in general food supply or quantification of PFAS concentration in samples affected by known PFAS contamination.