TRAINING SCHOOL ON THE UPTAKE OF MICROCONTAMINANTS BY CROP PLANTS AND ARB&ARGs TESTING IN WASTEWATER AND SOIL AND PLANT SAMPLES

WG2 TRAINING SCHOOL AGENDA, 29-31 May 2018, Cyprus

Co-organisers: **Nireas-International Water Research Center, University of Cyprus, Cyprus**
Agricultural Research Institute, Cyprus
Cyprus University of Technology, Cyprus

Tuesday, May 29, 2018 (School welcome and introduction, methods for CEC extraction and quantification in crops, plants and soils)

9h00 – 9h30	**Meeting point: University Campus, University of Cyprus (Nicosia)** **Registration**
9h30 – 10h00	**Welcome greetings and Introduction to the Summer School Objectives** Assoc. Prof. Despo Fatta-Kassinos, Nireas-IWRC, UCY
10h00 – 10h30	**Introduction to treated wastewater reuse** Ms. Popi Karaolia, Nireas-IWRC, UCY
10h30 – 11h00	**COFFEE BREAK**
11h00 – 11h30	**What do we know so far regarding CEC uptake by crops *via* treated wastewater reuse for irrigation?** Assoc. Prof. Despo Fatta-Kassinos, Nireas-IWRC
11h30 – 12h30	**Methods for the extraction of CEC from wastewater, soil and crops** • General methods (Accelerated Solvent Extraction, QuEChERS) • Methods for targeting CEC • Clean-up of extracts using solid phase extraction (SPE) Dr. Evroula Hapeshi, Nireas-IWRC, UCY
12h30 – 13h00	**Liquid Chromatography tandem mass spectrometry: indispensable tool for the measurement of CEC extracted from crops, soil matrices and wastewater** • General features of LC-MS/MS • Identification and quantitation mass ions Dr. Evroula Hapeshi, Nireas-IWRC, UCY
13h00 – 14h00	**LUNCH BREAK**

14h00 – 14h30 ***Transfer to UCY Main Campus (Nicosia)***

14h30 – 15h30 **Hands-on experience on the extraction, clean-up and SPE pre-concentration of pharmaceutical CEC in tomato fruits harvested from field irrigated with treated wastewater**
Dr. Evroula Hapeshi and Ms. Popi Karaolia, Laboratories of Nireas-IWRC, UCY

15h30 – 17h00 **Demonstration of the LC-MS/MS analysis of extracted pharmaceutical CEC**
- Basic LC-MS/MS analysis principles
- Identification and quantification of pharmaceutical CEC in crops

Dr. Evroula Hapeshi and Ms. Popi Karaolia, Laboratories of Nireas-IWRC, UCY

END OF DAY 1

Wednesday, May 30, 2018 (Urban wastewater treatment, uptake of CEC by crops irrigated with treated wastewater and alternative mitigation measures of CEC uptake by crops)

7h45 – 9h00 ***Transfer to Vathia Gonia WWTP (Nicosia)***
Meeting points: Nicosia city center and University Campus, University of Cyprus (Nicosia)

9h00 – 10h30 **Presentation of the treatment stages of a full-scale urban WWTP that combines treated wastewater irrigation schemes**
- Tour to Vathia Gonia WWTP that uses MBR treatment
- Field visit to Vathia Gonia and Potamia sites where treated wastewater is reused for irrigation in the long-term

Dr. Anastasis Christou, Agricultural Research Institute

10h30 –11h00 ***Transfer to Agricultural Research Institute (Nicosia)***

11h00 – 11h30 **COFFEE BREAK**

11h30 – 12h30 **Uptake and bioaccumulation of pharmaceuticals by crops grown in fields irrigated with treated wastewater: data based on field surveys and field experiments**
Dr. Anastasis Christou, Agricultural Research Institute

12h30 – 13h00 **Production and characterization of biochar from various feedstock materials**
Dr. Marinos Stylianou, Nireas-IWRC, UCY

13h00 – 14h00 **LUNCH BREAK**

14h00 – 15h00 **The potential use of biochar for the mitigation of CEC uptake by crop plants**
Dr. Panagiotis Dalias, Agricultural Research Institute

15h00 – 15h30 **Next generation sequencing approaches for ARB&ARGs screening in wastewater, soil and plant environments**
Dr. Sotirios Vasileiadis, University of Thessaly

15h30 – 17h00	**Study tour to long-term (more than 7 years) treated wastewater-irrigated experimental sites and to the greenhouse of the Agricultural Research Institute of Cyprus where plants are irrigated with treated wastewater** • Experimental treatments and designs • Hands on experience Dr. Anastasis Christou, Agricultural Research Institute
17h30 – 18h00	***Transfer to Nicosia town center***
18h00 – 20h00	**Tour in Nicosia city center**

END OF DAY 2

Thursday, May 31, 2018 (Plant stress physiology, Public health risk assessment and Toxicity assessment)

7h45 – 9h30	***Transfer to Cyprus University of Technology (CUT) (Limassol)*** **Meeting points: Nicosia city center and University Campus, University of Cyprus (Nicosia)**
9h30 – 10h00	**Tour to CUT laboratories** Assoc. Prof. Vassilis Fotopoulos, CUT
10h00 – 10h30	**Plant stress physiology linked to pharmaceutically active compounds (PhACs)** Assoc. Prof. Vassilis Fotopoulos, CUT
10h30 – 11h00	**COFFEE BREAK**
11h00 – 11h30	**Methodologies for public health risk assessment** Dr. Anastasis Christou, Agricultural Research Institute
11h30 – 14h00	**Hands-on experience in the evaluation of stress-related physiological markers of plants** • Quantification of photosynthetic pigments in plant tissues • Quantification of hydrogen peroxide (H_2O_2) in plant tissues • Quantification of malondialdehyde (MDA) content in plant tissues Assoc. Prof. Vassilis Fotopoulos, CUT
14h00 – 15h30	**LUNCH BREAK**
15h30 – 16h00	**An overview of bioassays to monitor environmental and human health effects of treated wastewater** Dr. Marlen I. Vasquez, CUT
16h00 – 17h00	**Hands-on experience on acute toxicity assessment on luminescent bacteria** • Experimental design and pre-treatment of samples • Acute toxicity testing experimentation • Introduction to data analysis and management Dr. Marlen I. Vasquez, CUT

17h30 – 19h30 **Tour in Limassol city center**

19h30 – 20h30 ***Transfer to Nicosia city center***

END OF DAY 3

Abbreviations:
ARB&ARGs: Antibiotic-resistant bacteria and antibiotic resistance genes
CEC: contaminants of emerging concern
CUT: Cyprus University of Technology
IWRC: International Water Research Center
LC: Liquid chromatography
MS: Mass spectrometry
PhACs: pharmaceutically active compounds
UCY: University of Cyprus
WWTP: wastewater treatment plant