

Analysis and Fate of Emerging Contaminants in soils, water and plants under water scarcity

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Track: 3. Environmental chemistry and exposure assessment: analysis, monitoring, fate and modeling.

Keywords: environmental monitoring, analytical chemistry, fate and exposure modelling, speciation, bioavailability, biodegradation, targeted and non-targeted pollutant screening

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Session motivation:

Wastewater and sludges (including their derived biosolids and/or biochards) accumulate emerging contaminants [human and veterinary pharmaceuticals, personal care products (PCPs), artificial sweeteners, polybrominated diphenyl ethers (PBDEs), perfluoroalkyl substances (PFASs), pesticides, PAH-derivatives, benzotriazoles, benzothiazoles, plasticizers, surfactants, disinfection by products, engineered nanomaterials (ENMs), etc.] that are, sooner or latter, released to the environment. Within the present-day context of global change, increased water scarcity and population growth, wastewater for irrigation and application of biosolids in soils have already become important and, in the near future, will become a pivotal source of nutrients and water all over the world as already are in arid regions, i.e, Mediterranean countries, California, Australia, Saudi Arabia, etc. However, there is still a lack of knowledge on the presence and accumulation of these emerging contaminants from wastewater and sludges into soil and the subsequent uptake by plants that poses some inherent risks when applied to agricultural crops for food production. Specifically, this session puts emphasis on the different sources of emerging contaminants, their incorporation into vegetables through irrigation and their metabolization, accumulation and translocation and linking with the ecological effects they produced by reacting in the environment during various applications of wastewater and biosolids in soils under the ongoing risk of water scarcity. We particularly welcome contributions within the following areas: i) development of new rapid analytical methods covering the widest possible range of emerging contaminants and their transformation products and/or metabolites, ii) application of high resolution mass spectrometry to address significant challenges associated with the transformation and metabolism of emerging contaminants within the plant. ii) deep understanding on their inherent properties (partitioning behavior, degradation pathways, bioaccumulation behavior), accumulation mechanism (environmental and tissue transfer and distribution) and toxic effects, iii) improved understanding of their sources and occurrence, fate and transport processes, and associated risks and v) risk management. Ultimately, the session aims at center attention on the understanding of the current approaches, identify existing knowledge gaps, outlining new doors open for continued research and providing prospects for future scrutiny to ensure sustainability of these practices that will palliate severe water scarcity.