



Human and environmental risk assessment for a sustainable future

Longer title: Human and environmental risk assessment for a sustainable future

Description

There is an increasing awareness of the negative effects of chemical pollution on ecological and human health worldwide. Freshwater ecosystems are the main source of drinking water but at the same time the destination of toxic pesticides from agricultural run-off. Similarly, marine ecosystems play a pivotal role in providing food (fisheries and aquaculture), but they are also the receiver of river plumes, which have been characterised by complex mixtures of chemicals of emerging concern derived from human activities. Toxic chemicals can reduce aquatic biodiversity, alter water quality, increase diseases prevalence, and ultimately promote deaths and illnesses associated with toxic chemicals. In order to cope with such challenges, there is an urgent call for multidisciplinary approaches capable of assessing the environmental risk of toxic chemicals but also covering long-lasting consequences on humans.

Chile's economy is based on commodities (copper, fruits, wine, timber, and salmon) and consequently, the country has experienced increased use of pesticides and pharmaceuticals to increase food production (fruits, grapes, salmons). Thus, rivers and coastal areas have seen an increased occurrence of toxic chemicals, aquatic life is jeopardised, and humans have been exposed to a myriad of toxic chemicals affecting their health. There have been reports of neurotoxic pesticides present in aquatic systems, urine samples from the local residents, and signs of pesticide poisoning among agricultural workers in rural areas. On the other hand, antibiotics are widely used in coastal areas under salmon aquaculture and besides the ecological consequences on microbial communities, the development of antibiotic resistance is one of the biggest threats to global health, food security, and sustainable development today.

Expected outcomes

The UN SDG 3 (Good health and well-being) and 14 (Life below water) aims to i) reduce deaths and illness from hazardous chemicals and water pollution and ii) prevent and reduce marine pollution, respectively. This workshop will stand up to the challenges and will present research on the occurrence of chemicals of emerging concern in the aquatic environment, environmental mixture assessment strategies, and chemical exposure and its consequences on society and human health. A special focus will be on the recently published Swedish government strategy "Future chemical risk management – Accounting for combination effects and assessing chemicals in groups", and the role of pesticides and pharmaceuticals in the development of sustainable aquaculture in Chile. Therefore, the workshop will proactively foster knowledge exchange between

Sweden and Chile and lay the foundation for future research and educational collaborations on chemicals in the environment and their adverse effects on humans and aquatic life. The workshop will be intrinsically multidisciplinary combining aquatic ecology, environmental chemistry, environmental risk assessment, environmental economics, and environmental medicine. Finally, the workshop will facilitate the identification of key research areas of shared interest for future collaboration under the umbrella of "Chemicals in the aquatic environment and their eco-human consequences". Project ideas ranging from aquatic ecology to human health are expected. An agenda will be set in order to facilitate the next steps, including exploring funding options.

Possible site-visits

- On-site visit to a salmon farm in Magallanes (Punta Arenas)
- Ministry of the Environment, Government of Chile (Santiago)

Planned activities

The workshop will take place as two-day activity with face-to-face lectures from scientists from the University of Gothenburg (GU) and the University of Concepcion (UDEC). To engage the participants, the lectures will be contextualised in both Chilean and Swedish environmental problems. Lectures will cover distinct themes based on the multidisciplinary nature of the workshop, from applied aquatic ecology research, environmental chemistry, mixture assessment, environmental economics, and human health. Furthermore, in order to promote active discussion, the workshop will hold a brainstorming session for future collaboration.

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