Theme Session C Report 2024

How do we adapt our approach to deal with novel contaminants in the marine environment?

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Session synopsis

This session offered a general overview of the relevance and the potential risk of contaminants of emerging concern (CECs) in the marine environment, considering their occurrence, distribution, bioaccumulation, and effects on marine ecosystems.

Specifically, this session included seven oral presentations and two posters with a dynamic and interested audience, including more than 30 people connected online. Participants were also invited to answer a set of questions related to emerging contaminants posed on the Slido platform. From the nine responses received, the main challenging question regarding novel contaminants in the marine environment related to the behaviour of these substances, with both identification of possible biological effects and improvements of the efficiency of effluent treatment as equal next priorities; biota as the best matrix to study these contaminants; and per- and polyfluoroalkyl substances (PFAS) being the most abundant CECs expected to be found in the marine environment. Suggestions for what we need as a society to minimise impacts in the marine environment to include improving water treatment with better technology, use of active charcoal filters, use of less medicines, better education including outreach, replacement of the most toxic CECs with less toxic alternatives, and updated regulations.

The session began with a brief presentation from the ICES Marine Chemistry Working group (MCWG), because this session emerged from the discussions of this group. A general introduction to this subject was done by the first two presentations including the definition, main pollution sources, most relevant groups of contaminants considered, and distribution among the different marine matrices. CECs can be defined as any synthetic or naturally occurring chemical that is not commonly monitored, but can widely occur, in the environment and cause adverse ecological and/or human health effects.

A brief description of the main subjects considered in the oral and poster presentations of this session is subsequently included. The MCWG, collaborating with researchers from various European countries, compiled published information (including monitoring programmes data) for the period between 2010 and 2020 on the CECs in organisms, sediments, and seawater in the European Seas. This work had the main aim of increasing the knowledge on the occurrence/abundance/spatial distribution of these compounds. However, the available data for different CECs groups, sub-regions, and marine matrices is limited, as the most-commonly studied CECs were pharmaceuticals and PFAS.

The occurrence of CECs in water from two Portuguese estuaries, Douro and Lima Rivers, and adjacent coastal areas was also presented, showing that a specific group of compounds prevailed in the target areas, with concentrations varying with the period of the year, tide, and location. The presence of pharmaceuticals in marine sediments of the central Portuguese continental shelf were also confirmed, evidencing their transport to certain distance from the main pollution sources. The persistence and ample distribution were evidenced for PFAS in two presentations because they were present in surface sediments along the North Atlantic and in different species in a Dutch estuary, particularly close to the main sources. The interactions of persistent organic pollutants with microplastics from coastal wastewaters were also described. Finally, the relevance of the characterisation of the organic matter nature from sediments through different indicators and novel hydrocarbon contaminants were also described in this session. In addition, two posters were also presented by authors in the session;

one is in relation to the plastic management and the other to the bioaccumulation of heavy metals on marine mammals.

The audience present in the session were really interested in the subject and in all the oral and poster presentations, participating actively in the Q&A section. Many attendees had attended the ASC specifically because of this session and it will be good to see how, going forward, we can interact more with this conference.

Figure 1. Theme C session participants.

Conclusion

The main goal of this session, which was to offer a general overview of the relevance of the study of CECs in the marine environment, was achieved. Different studies in relation to the most relevant groups were presented; however, the necessity to get additional data in the marine environment was evidenced for all of them.

Feedback

We consider the existence of a session dedicated to emerging contaminants in marine environment and the challenges they pose to science and to society in general to be highly relevant. We believe that this is a commitment that should be maintained for future ICES ASC. This will widen the scope for a more holistic perspective on the marine environment. Besides, some participants told us that the existence of this session was the main reason for attending the conference. This participation could be incremented in future events if more sessions were included, for example, one specific in relation to plastics. MCWG will highlight this experience with other working groups such as Working Group on Marine Litter (WGML), Working Group on Offshore Renewable Energy (WGORE), Working Group on Biological Effects of Contaminants (WGBEC), and Working Group on Shipping Impacts in the Marine Environment (WGSHIP) and will be looking to see how we can increasingly integrate our expertise more widely within the ASC conferences in the future.

The following oral contribution entitled '*Microplastics Distribution in Fish: Evidence from the Gulf of Guinea*' was not presented in this session.