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TOPIC(s) : Life cycle and environmental assessment

Pharmaceuticals as environmental contaminants of concern

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PURPOSE OF THE ABSTRACT

Recent advances in analytical chemistry have enabled the detection of ever smaller concentrations of contaminants resulting in identification and quantification of numerous active pharmaceutical ingredients (APIs) in many environmental matrices. Their routes of entry into the environment vary across the life cycle from releases during production to human and animal excretion following use, to improper disposal of expired APIs at end of life. As a result, API presence in the environment has become a cause for concern due to the known bio-availability and bio-activity of these compounds even at low concentrations. Most studies on environmental levels of APIs have focused on their presence in aqueous samples, such as in wastewater treatment plant effluent and rivers, however, less is known about API distribution between other environmental matrices such as soil, sediment, or air. This study aims at using computational methods to gain insights into the possible environmental distribution and fate of APIs. Further, to address the challenge of environmental contamination with APIs, green chemistry solutions are needed, including the concept of benign by design, to design and produce pharmaceuticals that are more easily biodegraded, or triggered to degrade upon an external impulse, and thereby do not lead to environmental accumulation.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

Pharmaceuticals | Environmental burden | Environmental matrices | Benign by design

BIBLIOGRAPHY