A new method has been developed that will help identify the most important pharmaceuticals to monitor in surface waters. Human pharmaceuticals are now widely recognised as environmental contaminants. Drugs ranging from antibiotics to blood lipid-lowering agents have been found in effluents and surface waters and there is a growing need to assess the risk they pose to the environment.

Large numbers of pharmaceuticals are used to improve human health. However, data on the ecotoxicity of these molecules and their metabolites is often scarce and limits the effectiveness of environmental risk assessments. This lack of data led French researchers from the Cemagref research institute to develop a method that could be used to identify pharmaceuticals which are most likely to pose environmental risks.

The prioritisation scheme consists of three tiers:

- An exposure based classification derived from predicted exposure concentrations (PEC), which incorporates information on the level of use of pharmaceuticals. (Patterns of use of pharmaceuticals vary from country to country which affects the likely environmental exposure to these compounds.)
- A case by case expert review that considers potential environmental effect, using available ecotoxicology data, pharmacological, toxicological and physicochemical data as well as information on environmental behaviour.
- In the case of pharmaceuticals from similar chemical classes (e.g. compounds with similar chemical structures or which work in similar ways), a further selection was made to identify the most hazardous one.

The researchers applied the method using data on French consumption of pharmaceuticals and identified a list of 40 key pharmaceuticals or their metabolites that should be considered for monitoring in surface waters in France. Of the molecules included in the final priority list, 7 were chosen based on their PEC values alone. No chronic ecotoxicology data were available for these compounds to allow the case-by-case review, highlighting the need for further investigation of the potential environmental risks from these drugs. Of the remaining 33 molecules, 12 are antibiotics and two are beta-lactamase inhibitors used to overcome antibiotic resistance. Other pharmaceutical classes included in the priority list are, azole antifungals, glucocorticoids, statins and selective serotonin reuptake inhibitors.

Steroid oestrogens and cytotoxic molecules were not included in the study as steroid oestrogens already have well known environmental effects and cytotoxic molecules would require, in the authors’ opinion, a different prioritisation strategy appropriate to their effects.


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