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Umwelt Bundes Amt
For our Environment

Painkillers contaminate Germany's waterbodies

Several hundred tonnes land in wastewater every year

Germany's waterbodies and soil are showing more and more traces of pharmaceutical residues, as proven by the latest data from research projects and water monitoring programmes. Several tonnes of pharmaceutical drugs are emitted to the environment every day, mainly through human excretion. Another one hundred tonnes per year owe to the improper disposal of old prescription medicine in the toilet. There is at present no systematic approach to testing how these substances impact the environment. The Federal Environment Agency (UBA) believes this gap must be closed by instituting a system of authorisation based on environmental monitoring. "Better precautions must be taken in the handling of pharmaceutical residues for these substances can be problematic in the environment. Enhanced monitoring should help to recognise pollution hotspots and the ecological impact of pharmaceuticals and to make medical care more environmentally responsible", explained UBA President Jochen Flasbarth.

The Federal Environment Agency says the presence and effects of pharmaceuticals in the environment have been underestimated. The concentrations of pharmaceutical drugs owing to demographic changes in our society will presumably continue to increase. Says Jochen Flasbarth, "UBA therefore proposes introducing environmental monitoring of pharmaceuticals which is integrated into the existing authorisation process for these drugs. This can enhance protection of the environment and design medical care to be more environmentally responsible".

A recent literature review commissioned by the Federal Environment Agency sheds light on the ecologically problematic aspects of certain pharmaceuticals. The study contains information about the behaviour and occurrence of pharmaceuticals in the environment, listed according to amounts consumed, concentration in the environment and potential to harm the environment. Of the 156 pharmaceutical agents traced in various environmental media in Germany, 24 have been classified as high priority. This means that these agents have a high potential to harm environmental organisms. One of these agents is the popular painkiller Diclofenac, which can cause kidney damage in fish and has in the meantime become traceable in many waterbodies. This is also why it is on the EU Candidate List of new prioritised substances in so-called priority substances in the EC Water Framework Directive.

Pharmaceutical drugs are mainly channelled to the environment through household sewage. Most of these substances are excreted- often in unchanged form. Estimates of the volume of unused medications that many consumers dispose of inappropriately down the drain or toilet run at several hundred tonnes per year. Since many wastewater treatment plants nowadays are still not able to completely degrade or retain these substances, the remainder, even if heavily diluted, is put into rivers and can cause permanent damage to especially sensitive organisms such as fish. A real assessment of pollution by such substances must now be done in order to take appropriate mitigation measures at wastewater treatment installations.

Even drinking water may contain low concentrations of pollution, in the range of fractions of milligrams per litre of water. For the purpose of illustration: one microgram per litre is equivalent to concentration of a diluted sugar cube in a 50-metre length swimming pool. In terms of drinking water hygiene, these pharmaceuticals may be undesirable yet they pose no risk to human health. All measures taken to protect drinking water now serve precautionary purposes and to ensure long-security of supply, and not to avert any concrete risks.

Further information and links:

Environmental impact assessment of pharmaceuticals is a key part of the authorisation procedure in the EU. The Federal Environment Agency has been responsible for the environmental risk assessment of human and veterinary pharmaceuticals in Germany since 1998. Should environmental risk be known, the Federal Environment Agency may bring regulations to bear, or even decline authorisation in the case of veterinary drugs. The environmental impact assessment for authorisation is based on measured concentrations in the environment. There has been no systematic monitoring of actual concentrations to date. The Federal Environment Agency seeks to change this in the future. Obligatory monitoring can help to determine actual environmental concentrations of pharmaceuticals classified as critical and to better assess their environmental risk.

Expert opinion: Zusammenstellung von Monitoringdaten zu Umweltkonzentrationen von Arzneimitteln [Compiled monitoring data on environmental concentrations of pharmaceuticals]: http://www.uba.de/uba-info-medien-e/4188.html

Workshop report: Monitoring von Arzneimitteln in der Umwelt - Notwendigkeit, Erfahrungen und Perspektiven für die Arzneimittelzulassung [Monitoring pharmaceuticals in the environment – necessity, experience and prospects for authorisation]: http://www.umweltbundesamt.de/chemikalien/arzneimittel/workshop_monitoring_arzneimittel.htm

The Federal Environment Agency recently published a recommendation on practicable reduction measures to protect drinking water that can be implemented at the top of the pollution chain: http://www.umweltdaten.de/wasser/themen/trinkwasserkommission/massnahmeempfehlung_hamr.pdf

Publication by the Federal Environment Agency and the Institute for Social-Ecological Research in Frankfurt/Main: Handlungsmöglichkeiten zur Minderung des Eintrags von Humanarzneimitteln und ihren Rückständen in das Roh- und Trinkwasser [Options for action to decrease input of pharmaceuticals and their residues to sewage and drinking water systems]: http://www.umweltbundesamt.de/uba-info-medien-e/4024.html

Dessau-Roßlau, 8 February 2012