



## Low levels of medication residues in the environment

Researchers from the University of Stuttgart prove the degradation of diclofenac in soil samples for the

**Up to now residues of the common painkiller diclofenac has harmed the environment in large quantities. A research team working under Professor Bernhard Hauer from the Institute of Biochemistry and Technical Biochemistry at the University of Stuttgart has now been able to show for the first time how diclofenac can be degraded in the soil and what hinders the degradation.**

Whether in cases of bruises or rheumatism: in Germany alone diclofenac is prescribed over 14 million times annually as anti-inflammatory and painkilling medication; over 90 tons of the substance are marketed in this way. However, the popular remedy is a blessing and a curse at the same time because diclofenac is only absorbed by the body to a certain extent. Around 60 percent of the substance enters wastewater through natural excretions and in spite of modern wastewater treatment technology it has not been possible up to now to remove these residues. In the end the residues are collected in nature where the material can already be found in different habitats and also becomes an integral part of the food chain. Up to now there has only been the possibility of tracking the whereabouts of the medication in the environment. Techniques to degrade diclofenac molecules and to eliminate them from our habitat did not exist.

In laboratory experiments scientists from the University of Stuttgart have now been successful for the first time in proving the degradation of diclofenac in soil samples. Decisive for this degradation process being successful is the interaction of certain microorganisms. The

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disintegration of the compound is induced through so-called carboxylation, an exceptional reaction in nature. Only through highly-sensitive analytics was it successful in discovering the metabolic product of the microbes.

The research team likewise discovered what hindered the degradation of diclofenac: this includes in particular carbonates or also phosphates, which is particularly problematic since these are likewise to be found in considerable quantities in wastewater.

The Stuttgart researchers are now hoping that their findings will contribute towards the environment being freed from one of the numerous anthropogenic materials. In other works they want to attempt to gain a biochemical understanding of the new reaction and to investigate whether it can be applied to other drug substances.

**Original publication:**

Rapid and complete degradation of diclofenac by native soil microorganisms. *Environmental Technology & Innovation*, 10: 55 (2018).

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