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Clay helps clean up pharmaceutical pollution

A new study explains how modified clay could be used to clean up pharmaceutical pollution in water supplies. It may present a viable, low cost option for treatment of wastewater in constructed wetlands in particular. The study focuses on some frequently detected pharmaceuticals, including ibuprofen.

Pharmaceuticals are commonly detected during water pollution monitoring. Some show up in drinking water as well as in ground water. Inevitably, more widely used drugs cause higher levels of contamination and can be very difficult to eliminate completely. Additionally, some treatment methods for removing pharmaceuticals from wastewater are considered too expensive for use on a large scale.

Portuguese researchers have now demonstrated that artificially modified clay, known as LECA, light expanded clay aggregates, can significantly reduce concentrations of ibuprofen and an anti-epileptic drug called carbamazepine in water. This material is capable of removing up to 90 per cent of each drug from water, although its efficiency decreases slightly with increasing concentrations of the pollutants. The researchers observed lower efficiency rates in wastewater than clean water.

LECA was less effective at removing clofibric acid, a widely used blood lipid regulating drug, but the researchers identified a silicate called vermiculite as more capable at removing clofibric acid. For both materials, the first 24 hours of the process was the most important, and saw the majority of the pharmaceuticals removed.

Ibuprofen is one of the most commonly used drugs in the world and causes high levels of environmental pollution. Although much of this drug is removed in wastewater treatment plants, a substantial part of it remains after the treatment. This is due to the high levels present in the continually incoming wastewater. Wastewater treatment processes are particularly inefficient at removing carbamazepine. These and other drugs may be damaging to aquatic life; they may also be damaging to humans if they persist in drinking water supplies. The effects of a multitude of drugs and other chemicals in water supplies are not yet well understood and require further investigation.