



Multi parametrical indicator test for urban wastewater influence

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Austria's drinking water is abstracted from groundwater. While 50 % of the Austrian population are supplied with spring water, the other 50 % get their drinking water from groundwater supplies, in part from enormous quaternary valley and basin deposits, subjected to intensive use by population, industry, agriculture and traffic/transport.

Due to protected areas around drinking water wells and springs, there is no treatment necessary in most cases. Water bodies, however, can be affected by different pathways from natural, industrial and urban sources. Identification of anthropogenic sources is paramount for taking appropriate measures to safeguard the quality of drinking water supply.

Common parameters like boron are widely used as tracers indicating anthropogenic impacts (e.g. wastewater contamination of groundwater systems). Unfortunately application of these conventional indicators is often limited due to high dilution.

Another application where common parameters have their limits is the identification and quantification of the diffuse nitrogen input to water by the stable isotopes of nitrogen and oxygen in nitrate. Without any additional tracers the source distinction of nitrate from manure or waste water is still difficult. Even the application of boron isotopes can in some cases not avoid ambiguous interpretation.

Therefore the Umweltbundesamt (Environment Agency Austria) developed a multi parametrical indicator test which shall allow for identification and quantification of anthropogenic pollutions. The test aims at analysing eight target substances which are well known to occur in wastewater: Acesulfame and sucralose (two artificial, calorie-free sweeteners), benzotriazole and tolyltriazole (two industrial chemicals/corrosion inhibitors), metoprolol, sotalol, carbamazepine and the metabolite 10,11-Dihydro-10,11-dihydroxycarbamazepin (pharmaceuticals).

These substances are polar and degradation in the aquatic system by microbiological processes is not suspected. Moreover, they do not occur naturally which make them to ideal tracer substances. Analysis is performed by ultra-performance liquid chromatography with mass selective detection (UPLC-MSMS). Samples are enriched by solid phase extraction before. The test is able to indicate an 0.1 % entry of municipal wastewater into the analysed water.

Results of application in practise and advantages of the urban wastewater indicator test are discussed.