The artificial sweetener acesulfame as marker of domestic wastewater in groundwater

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Abstract To assess sources and magnitude of possible groundwater contamination, chemical markers have proved to be useful. A chemical that is used in everyday life, the artificial sweetener acesulfame, may be ideally suited for detection of traces of domestic wastewater in natural waters. The compound was found ubiquitously in wastewater, surface waters, and groundwater from Switzerland. Acesulfame was not eliminated in wastewater treatment plants (WWTPs), and was quite persistent in lakes, where concentrations increased with population in the catchment area and decreased with water throughflow. Highest concentrations in groundwater were observed in areas with significant infiltration of river water, where the infiltrating water received considerable discharges from WWTPs. Given the currently achieved detection limit of approx. 0.01 µg/L, the presence of ≥0.05% wastewater can be traced in groundwater.

Key words chemical marker; domestic wastewater; groundwater; artificial sweeteners