UNITED RESEARCH FORUM
(CONNECT WITH RESEARCH WORLD)

4th International Congress on Earth and Geological Sciences

July 21-22, 2025 | Paris, France

Anna Szczepaniec, Marta Kusy, Patrycja Wisińska

AGH University of Krakow, Faculty of Geology, Geophysics and Environmental Protection, Department of Hydrogeology and Engineering Geology Al. A. Mickiewicza 30, 30-059 Krakow, Poland

Assessment of Water Quality in Emergency Supply Wells: A Case Study from Kraków

The problem of surface and groundwater pollution by contaminants of emerging concern (CECs) and products of their transformation is being investigated more and more, globally, due to the risk they pose to the water-soil environment and potentially human health.

In the present study, Krakow, having 331 emergency water supply wells, was selected as a research polygon. Some of these wells exist in peripheral parts of the city and/or rural areas.

As part of the conducted research, an inventory of available wells was made, technical condition was verified, and the presence of water was confirmed. In the field, in situ, temperature, pH, and electrical conductivity of the water were measured. Water samples from all functioning wells were analyzed for the concentrations of major ions and selected potentially toxic elements. Additionally, in selected samples, the concentrations of particular compounds of the perfluoroalkyl and polyfluoroalkyl substances groups (PFAS) including perfluorooctanoic acid (PFOA), as well as pharmaceuticals and personal care products (PPCPs), were determined.

Water collected from the studied wells was characterized by a large range of measured electrical conductivity values, which is related to the varying amounts of dissolved substances and mineralization. Laboratory analysis results showed that the studied water samples contained compounds from the PFAS and PFOA groups at concentrations ranging from tenths of a nanogram per litre to several nanograms per litre. Other substances from the PPCPs group, such as carbamazepine and metformin, were also found.

The research project was supported by program “Excellence initiative – research university” IDUB for the AGH University of Krakow (Action 12, project number 9037 and 12685).

Keywords: perfluoroalkyl and polyfluoroalkyl substances groups, PFAS, groundwater quality, Krakow

Biography

I hold a B.Sc. in Environmental Engineering and Protection from the AGH University of Krakow and I am currently a master's student specializing in applied hydrogeology and geotechnics. My areas of interest include hydrogeology and mineral functional materials.

I am a member of Student Science Club “Hydro”, which manages projects connected to water quality.

ISBN: 978-1-917892-13-1

doi.org/10.51219/URForum.2025.Anna-Szczepaniec