



Impact of intense rainfall event on the physicochemical and microbiological characteristics of an urban stream

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Extreme weather events, including sudden and intense rainfall, have become increasingly frequent due to the growing impact of climate change. This rapid influx of water often carries a variety of pollutants, including nutrients, heavy metals, and microbial contaminants, significantly modifying the physicochemical and microbiological characteristics of urban streams. This study aims to evaluate the effects of rainfall events on the physicochemical and microbiological properties of the Tóció Stream, focusing on changes in key water quality parameters and microbial dynamics. Two sampling points were selected to represent different environmental areas: one site was located in a near-natural area, and the other was situated in an industrial zone, surrounded by facilities and a highway connecting road. Measurements were conducted both before and after the rainfall event. On-site measurements were performed including precipitation (mm), water level, dissolved oxygen content, and water temperature, while water samples were collected for laboratory analysis. The collected samples were tested for pH and electrical conductivity (EC) as well as for nutrient-concentrations of NH_4^+ , NO_2^- , NO_3^- , PO_4^{3-} , K^+ , SO_4^{2-} , chemical oxygen demand (COD) and biological oxygen demand (BOD_5) were also determined from the samples. In case of microbiological parameters, total coliforms, yeasts, and total plate count were determined. Our results revealed differences between the two sampling sites and the pre- and post-rainfall conditions. At the industrial site the nutrient contents have decreased due to the rainfall, while at the near natural site we did not determine such change in connection with these elements. The same trend were detected in the case of EC as well. The microbiological analysis of the water samples clearly showed that while both total bacterial count and total coliform count showed an increasing trend after the rainfall at the first site, this trend was much less pronounced at the site reflecting the natural state. Our objective was to study the influence of sudden rainfall events, for the reason that these effects remain understudied, particularly in terms of their short- and long-term impacts on water quality and microbial properties.

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