

## DYNAMICS OF FAECAL INDICATORS IN THE SAVA RIVER NEAR ŠABAC, SERBIA

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### Abstract

To determine the surface water quality, we traditionally rely on faecal indicators - organisms that, by their presence, indicate the possible presence of pathogens in the environment. Therefore, it is of great significance to know the patterns of variation in the concentration of faecal indicators in surface waters because it directly indicates how water quality improves or deteriorates during a day, a year, or a multi-year period. For this research, water monitoring data from the Sava River near Šabac during the period from 2015 to 2019 (from June 1st to August 31st during a year and from 7:30 a.m. to 1:15 p.m. during a day) were used. The sampling was carried out at a distance of 20 meters from the coast and a depth of 0.5 m. The groups of faecal bacteria monitored are total coliforms, faecal coliforms, and faecal enterococci. Bacteria detection was performed using a method based on the enzymatic decomposition of different substrates. Enumeration of bacteria is determined based on the number of positive enzymatic reactions, which was translated into the the most probable number of bacteria in 100 ml of water sample (MPN/100 ml). To determine the influence of the sampling time on the abundance of faecal indicators, correlation and regression analyses, as well as the Eta-square test according to Cohen in the SPSS program, were performed.

The abundance of faecal indicators was positively correlated with the sampling time in the period from 7:30 to 1:15 p.m. Nevertheless, this correlation was statistically significant only in the case of total coliforms, although the values of the Eta-squared test indicated a high dependence of all three groups on the sampling time. In the case of all three groups of indicators, the correlation with the sampling date during the year was negative, which indicates that during June, July, and August, there was a slight decrease in their number. However, this correlation was not statistically significant enough. In other words, the abundance of faecal indicators in the Sava River near Šabac does not show a significant dependence on the sampling date during this period. Total and faecal coliforms do not show a significant correlation with the year of sampling, and the value of the Eta-squared test also indicates a low dependence. However, if the average number of total coliforms per sample is monitored each year, it can be observed that it was increasing in the period from 2016 to 2019. Faecal coliforms also had a positive but less pronounced trend. When it comes to faecal enterococci, if the maximum recorded value was excluded from the analysis due to the large deviation, their correlation with the year of sampling was weak but statistically significant. Also, the average annual values were higher and higher from year to year during the entire observed period, which indicates a clear and very pronounced positive trend in their numbers.

For scientific research, it is necessary to plan the sampling in a specific way, depending on whether the subject is diurnal, seasonal, or annual dynamics. Data obtained by the standard monitoring program are not suitable for observing the complete dynamics of faecal indicators.