

Analysis of basic Physical-Chemical Parameters and Nutrients in Surface Water of Mura River in Croatia

Analiza glavnih fizikalno-kemijskih parametara i nutrijenata u površinskim vodama rijeke Mure

Ana Amić,¹ Iva Jurčević,¹ Ana Rack¹

¹ Department of Chemistry, Josip Juraj Strossmayer University, Osijek, Croatia

Introduction

The Mura River is a river located in central Europe, originating in Austria. It is a tributary of the River Drava (Fig. 1), and subsequently the Danube.

The Mura River passes through several settlements in Austria, Slovenia, Croatia and Hungary, and is a collector of wastewater from these settlements (areas with intensive industrial agricultural production). Since wastewaters are usually loaded with nutrients, the aim of this study was to collect and analyse concentration of nitrogen and phosphorus compounds and BOD5 and COD (whose concentration in water must comply with the permissible limit value in order to avoid nutrient overload of environment and eutrophication) in surface waters.



Figure 1. Mura River: The map of the river (1a) [1], and confluence of Mura and Drava in Croatia (1b) [2].

Methods

Water samples were collected and analysed monthly over the period of ten years, and refer to the period from 2009 to 2018 (Hrvatske vode). Analysed parameters were pH, chemical oxygen demand (COD-Mn), five-day biochemical oxygen demand (BOD5), and nutrients: nitrogen compounds (nitrates, nitrites and total nitrogen) and phosphorus compounds (orthophosphates and total phosphorus) (Fig. 2).

This is an area with developed food industry (agricultural production, livestock farming, fishing) and also some other types of industry (especially until 1990-ties).

References

- [1] https://www.researchgate.net/figure/Project-area-Mura-River-Basin-www-wikipedia-com_fig13_280309238, 15/09/20
- [2] [https://en.wikipedia.org/wiki/Mura_\(river\)#/media/File:ZusammenflussDrauMur.jpg](https://en.wikipedia.org/wiki/Mura_(river)#/media/File:ZusammenflussDrauMur.jpg), 15/09/20

Results

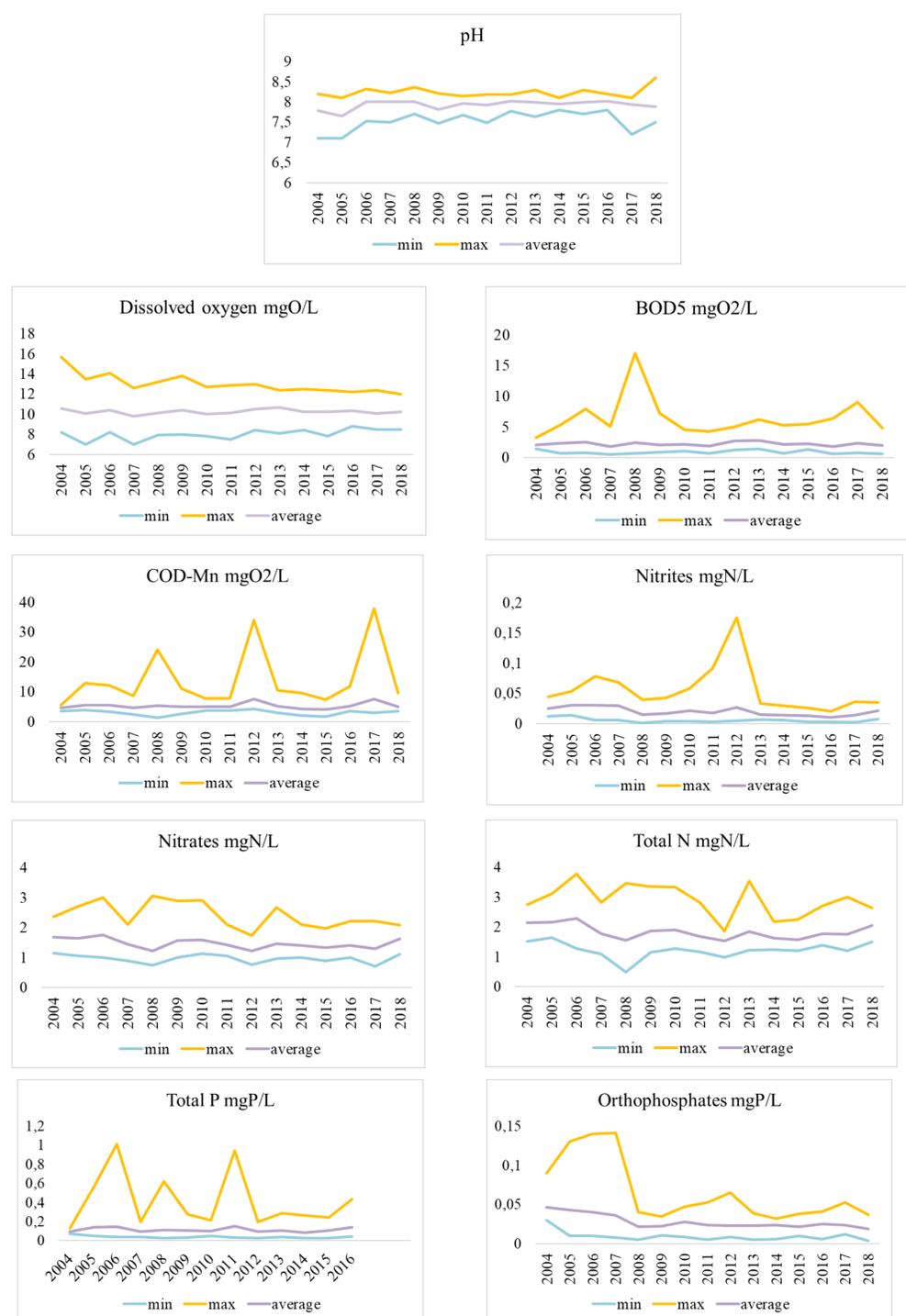


Figure 2. Minimum, maximum and average of annual concentration of studied physicochemical parameters (expressed in mg/L) in Mura River surface water.

Conclusions

Ever increasing world population requires efficient food production and extensive urbanization. Hence, annual increase in implementation of nitrogen fertilizers which significantly increase agricultural yield, but also increase water pollution. Though nitrates are necessary for rapid plant growth, their increased concentration is toxic and has a negative impact on the environment (eutrophication) and on human health (methemoglobinemia and some types of cancer). This paper gives an overview and an assessment of water quality of Mura River in Croatia, based on the analysis of water physical and chemical parameters according to the national Decree on Water Quality Standards (2013). The obtained results indicate a water quality status between moderate and good, depending on the parameter and year. However, it is necessary to take actions to protect Mura River from pollution. Also, continuous monitoring of water quality is necessary in order to insure adequate implementation of measures for water quality protection.