

Water quality of the upper flow of the river Kolubara

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The problem of pollution of water resources and surface and underground waters is always a popular subject. Surface streams, which flow through populated areas and industrial zones, unfortunately represent a recipient for polluted waters that in most of the cases go to the stream without any filtering and control. The city of Valjevo (90 000 inhabitants) is located in West Serbia, in the upper part of the basin of River Kolubara. The most important industrial zone in Valjevo is, qualified as a metal and agricultural-food complex, but textile industry, furniture industry, printing press and metal processing are also presented there. The city was developed on the upper part of the River Kolubara. The river represents a recipient for all industrial and municipal polluted waters.

The Hydrometeorological Institute of the Republic has an observation network on the upper part of River Kolubara, as well as on its tributaries Obnica, Jablanica, Gradac. However, the quality control of the water is not fully covered by the observation network.

The last research about the water quality of River Kolubara have been done in 2004 (Santrač & Daskijevic, 2004) and they have shown that River Kolubara belongs to the last, 4th class of watercourses according to its quality. That means that water is not usable without some previous treatment.

Here the results of the water quality research done in 2012 are presented. For this research we have chosen 8 places, from which 3 are located on tributaries (Obnica (1), Jablanica (2), Gradac (6)) and 5 are on Kolubara directly (Fig. 1.). The following water quality parameters were determined: NH_4 , NO_2 , NO_3 , PO_4 content and content of organic substances that was represented by KMnO_4

During the research, we found that the amount of some pollutants has been reduced, compared to the conditions documented in 2004. Due to a financial crisis, the biggest part of the industry has been extinct. The other small part still works, but with reduced capacity. A change of water quality has also been observed after inflow of polluted water from a brewery (2), mill (4), market (7) and collector for polluted waters (8) (numbers refer to Fig. 1.). Chemical analyses have shown significantly less concentrations of the examined polluting components, compared to the conditions of 2004. According to these parameters, the River Kolubara is classified to

3rd class of watercourses and it is possible to use for industrial necessities without previous treatment. The only parameter that goes above the maximal allowed concentration for this type of watercourses is the presence of organic substances on a sample that was taken right after outflow of polluted waters.



Fig. 1.: The city of Valjevo and River Kolubara, with the sampling points marked with white numbers.

Considering the fact that Kolubara originates from two rivers, which have basins linked to karst areas southwards from Valjevo and that its tributary Gradac has been declared as one of the cleanest rivers in Europe, it is obvious that Kolubara has a huge potential in its upper stream. To improve its quality, the best possible way would be to work actively on the legal regulations concerning the quality of polluted waters that go from industrial facilities to recipient rivers. Also it is very important to remove all illegal landfills that are located near the stream in the centre of the town.

Santrač N, Daskijević I (2004): *Petničke Sveske*, 57/ II: 195-204.