

WATER QUALITY AND HEAVY METALS CONTENT OF ERZENI RIVER IN ALBANIA

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Abstract

Human activities such as abusive deforestation, the plugging up of new agricultural lands and their intensive cultivation, extraction of gravel and sand from the riverbed have been intensified in surface waters rivers, lakes and lagoons in Albania. That's why the aim of our research was to analyse potential pollution resulting from watershed sources and adjacent increased human activities nearby water for Erzeni River.

Also, to analyse potential pollution resulting from watershed sources and adjacent increased human activities, we conducted a study during winter November 2021 on physico-chemical parameters nutrients, heavy metal contents and bacteriological analysis of water for Erzeni River. Erzeni River is located in the western part and is one of Albania's main rivers. The Erzeni River flows to a length 109 km, traversing the regions of Tirana and Durrës, with an area of 760 km² and finally flows into the Adriatic Sea. The study aimed to determine (i) the water quality in the lagoon of Erzeni River using physico-chemical parameters and the level of heavy metals, (ii) its status to support living life in the aquatic ecosystem. To analyse the pH value, we have used the potential difference of an electrochemical cell using a suitable pH meter. ISO 5815-1:2019 was used for the determination of biochemical oxygen demand (BOD) through respirometry BOD Measuring System. For (N-NO₃) we have used UV visible spectrophotometer, the SMEWW, 4500-NO₃. Total nitrogen measured as (N-NH₄) eventually was analysed with UV visible spectrophotometer analytical method with a wave length around 655 nm. P-PO₄ was measured with the analytical method UV visible spectrophotometer. To analyse the intestinal *Enterococcus*, we have used the principle of the method membrane filtration and culture at 44 °C in a suitable environment (in the separation of the chromogenic

substrate β -D-glucosidase from *Enterococci* colonies leading to a blue coloration. *E. coli* was analysed using the principal method of membrane filtration and cultivation at 37 °C in a suitable environment based on the simultaneous detection of β -D-glucuronidase (GLUC) and β -D-galactosidase (GAL) activities. For the analysis of total coliforms, we have used the principal method of membrane filtration and cultivation at 37 °C in a suitable medium (such as Tergitol lactose agar, Endo agar, 0.4% Teepol liquid) and colony counting. Samples was diluted or, as appropriate, concentrated in such a way that they contain from 10 to 100 colonies. The combination of selective media and conditions of growth (44 °C) inhibits the growth of Gram-negative bacteria and most Gram-positive bacteria, except *Enterococci*) and colony counting. Taking samples, transport and storage were done according to ISO 5667. Also surface water of the river were analysed for heavy metals: Pb, Cr, Cu, Cd, As, Ni, Zn (by the EPA Method No. 1637 and flame atomic absorption spectrometric method) in 3 sampling stations, Teater Kame station SS1, Ura e Beshirit station SS2, Ura e Shijakut station SS3.

From the results it can be seen that the entire surfaces of this area over the length of the Erzeni River are agricultural lands with constant agricultural activity. Besides the pollution from the sewage that flows untreated directly into the river, the urban and industrial wastes of Tirana and a good part of Durrës on the banks of this river are also discharged. The water quality is based on the parameters of the standards, also Cd and Cu concentration ranges at Erzeni River are at the same level as reported. The heavy metals, Pb and Ni in some stations are found in higher levels than the values allowed by the EU and pose a potential health risk to humans and the aquatic life of the river's ecosystem.

It is necessary to conduct further analysis for the water quality of the river as the main irrigation source for agriculture. In Albania there is a lack of knowledge and precautions about the water used for irrigation and it is possible that their contamination at such high levels has a consequence of great impact on public health. The users of this water should be aware of the consequences and the risks for the public health that come with irrigation using polluted water. The heavy metals value is lower than the EU levels but is necessary to monitor and prevent the potential health risk to humans and the aquatic life of the river's ecosystem.

Key words: *Heavy metals, Water quality, Erzeni River, Physico-chemical parameter, Support living life in the aquatic ecosystem.*