

## AN OVERVIEW OF THE WATER QUALITY OF THE TIRANA RIVER, ALBANIA

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### Abstract

The natural waters are an extraordinary asset for our country and their quality assessment from a chemical point of view is of special importance. Eutrophication, or nutrient enrichment, is the main water quality problem that may be caused by organic and biodegradable materials derived from domestic wastewater, industrial sites and runoff from agricultural and urban land surfaces. This article presents an overview of the water quality of the Tirana River, Albania based on physico-chemical parameters and concentrations of some nutrients.

This study lasted for a period of four months (May, June, July, and September 2016). Sampling was done in the upper, middle and lower part of the Tirana River, to identify the impact of human activity on changing the quality of these waters along this stream. A quantity of 1.5 liters of each water sample was taken, as a considerable amount for analysis, using polyethylene bottles, and transported to the laboratory with refrigeration equipment (cooling boxes), at a temperature of +4 °C. Samples were stored in standard conditions until analysis. Physico-chemical parameters and concentrations of some nutrients (the total phosphorus, phosphates and nitrites) were determined. Temperature, pH, conductivity and dissolved oxygen (DO) were measured directly using the WTW Multimeter 3420 Set G. Total suspended solids (TSS) was determined after filtration through a 0.45 µm glass membrane filter. The solid residue filter is dried at 105 °C and the residual mass in the filter is determined by weighing. All nutrients were determined by UV-VIS spectrophotometry technology. All analytical methods used for parameter analysis were standard methods, recommended by the contemporary international literature. The data obtained in the field and analytically, were entered into a data matrix. Descriptive statistics method was applied to analyze and interpret the results, to explain the changes in the data or to show the future trends of the studied parameters.

During this study, high values of TSS, DO and nutrient concentrations were found. So, the mean values of TSS resulted 124.8 mg/L for T1 station, 75 mg/L for T2 station, and 40 mg/L for T3 station. The mean values of DO resulted 8.74, mg/L for T1 station, 7.08mg/L for T2 station, and 4.57 mg/L for T3 station. The mean value of nitrite concentration ranged from 0.029 mg/L NO<sub>2</sub>-N for T1 station to 0.559 mg/L NO<sub>2</sub>-N for T3 station. The mean value of the total phosphorus ranged from 0.072 mg/L PO<sub>4</sub><sup>3-</sup>-P at T1 station to 0.991 mg/L PO<sub>4</sub><sup>3-</sup>-P at T3 station, and the mean value of the phosphates ranged from 0.063 mg/L PO<sub>4</sub><sup>3-</sup>-P at T1 station to 0.792 mg/L PO<sub>4</sub><sup>3-</sup>-P at T3 station. Comparing these results with European water quality standards, these waters are classified as very poor environmental quality waters. The quality of the studied waters is the result of various factors, but the most important is urban and industrial discharges are one of the main factors affecting the environmental condition of these waters.

From the gained results we can recommend regular monitoring of these waters, creation of a database for urban and industrial discharges, as well as the construction of plants for the treatment of urban and industrial discharges.

**Key words:** Water quality, Tirana River, Physico-chemical parameters, Nutrients, Descriptive statistics.