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## PHYSICO-CHEMICAL EVALUATION OF OSTROVENI LAKE FROM VALCEA COUNTY

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### Introduction

Lakes are part of the aquatic ecosystem and represents one of the most important freshwater source with economical, social and ecological benefits. Lakes are considered surface water bodies that can be used as a reliable detector for any climate change such as: rising temperatures, floods or droughts, due to the limited mobility of the substances. The main anthropogenic sources of lakes pollution are agricultural runoff, domestic sewage or industrial effluents which could generate either inorganic contaminants (heavy metals, nitrogen) and / or organic compounds (pesticides, fertilizers, pharmaceutical drugs) alongside pathogens. The physical-chemical parameters are important tools for the water quality monitoring, their variation may be critical for aquatic life. Thus, the objective of the present study was to assess the main physical-chemical parameters such as pH, electric conductivity (EC), heavy metals, ammonium, sulphate, chloride, total nitrogen (TN), dissolved oxygen (DO), chemical oxygen demand (COD), total dissolved solids (TDS) and chlorophyll "a" from Ostroveni lake, located in Valcea County, in order to appreciate the water quality of the water body according with Order 161/2006.

### Materials and methods

The study area was the artificially lake – Ostroveni (Figure 1) being the former bed of the Olt River which is very rich in fish. The water samples from three different points (P1 - the southern part, P2 - the eastern part, P3 - the western part), in two seasonal campaigns – May 2020 and February 2021 - were collected in triplicate, in sterilized one liter polyethylene containers. All samples were subjected to chemical analyses immediately after the collection. The parameters such as pH, conductivity and dissolved oxygen were measured using a multiparameter Thermo Scientific Orion Star A215. The chlorides content was determined in accordance with SR ISO 9297:2001. Samples for ammonium and sulphates were analyzed using a spectrophotometer UV-Vis (Analytic Jena Specord 210 Plus, Germany). The total contents of metals such as Cd, Cr, Cu, Fe, Mn, Ni, Zn, Na, Ca and Mg were analyzed using the ICP-OES Optima 5300 DV Perkin Elmer Spectrometer (USA).

The organic matter by means of chemical oxygen demand (COD) was detected by permanganate oxidation method SR ISO 6060:1996. Chlorophyll "a" content was quantified following SR ISO 10260:1996 standard method.

### Results and conclusions

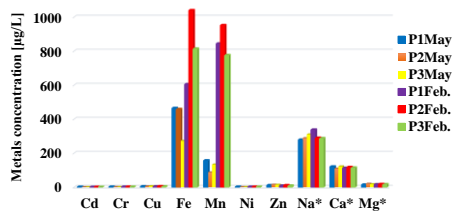
The physico-chemical parameters have been used to evaluate the water quality of Ostroveni lake. Table 1 and Figure 2 show the seasonal variations of the analysis results obtained after the two sampling campaigns.

**Table 1.** Analytical results of physico-chemical parameters of the studied area.

	pH	EC μS/cm	DO mg/L	COD mg/L	NH <sub>4</sub> <sup>+</sup> mg/L	TN mg/L	SO <sub>4</sub> <sup>2-</sup> mg/L	Cl <sup>-</sup> mg/L	TDS mg/L
P1May	7.68	1238	8.44	36.50	1.47	3.09	61.67	194.30	672
P2May	7.71	1218	13.40	38.40	1.45	2.21	62.30	214.10	688
P3May	7.82	1224	11.15	36.50	1.23	1.80	60.84	198.50	696
P1Feb.	8.33	2297	8.08	49.50	5.06	2.50	63.30	491.70	1190
P2Feb.	8.14	2070	8.06	52.90	4.84	3.30	58.40	424.40	1163
P3Feb.	8.09	2122	9.52	49.80	4.94	2.30	62.60	431.10	1170



**Fig. 1.** Ostroveni Lake



**Fig. 2.** Metals concentration of the studied area (\* - the concentration is divided by 1000)

At higher temperatures (May was a rainy season) the values obtained for the majority of the parameters were lower than in February campaign. The results of chlorophyll "a" concentrations obtained (P1May - 125.6 μg/L, P2May - 118.5 μg/L, P3May - 134.8 μg/L) frame Ostroveni as a hypertrophic system according with Order 161/2006. A comparative assessment regarding the water quality classes for each indicator was presented in the Table 2 below.

**Table 2.** Comparative overview for surface water quality classes for each analyzed parameter from Ostroveni Lake\*

	DO	COD	NH <sub>4</sub> <sup>+</sup>	TN	SO <sub>4</sub> <sup>2-</sup>	Cl <sup>-</sup>	TDS	Cd	Cr	Cu	Fe	Mn	Ni	Zn	Na	Ca	Mg
May	I	III	IV	II	II	III	II	II	I	I	II	III	I	I	V	III	II
Feb.	I	IV	V	II	II	V	IV	I	I	I	III	IV	I	I	V	III	II

\*Quality classes according to Order 161/2006 for the approval of the Normative concerning the classification of surface water quality to establish the ecological status of the water bodies.

In conclusion, compared to the May campaign, most of the analyzed parameters in the February campaign from Ostroveni Lake, framed the surface water in quality classes higher than III (V – lowest water quality) according with Order 161/2006.