

Groundwater quality

National College Tudor Vladimirescu,
Targu-Jiu, Gorj
Romania



Introduction:

- Groundwater quality is negatively affected by anthropogenic activities through actions such as pollution, especially soil
- Because groundwater flows slowly through the subsoil, the impact of human activities can affect it for a long time. This means that pollution that occurred decades ago - be it agriculture, industry or other human activities - can still threaten water quality today, and in some cases will continue to do so for generations to come.

Research question:

- How do chemical indicators vary in groundwater?
- How do we interpret the values obtained from the analysis of water from various sources?



Methods:



- a. Laboratory analysis of some groundwater sources: Targu-Jiu city network water, Targu-Jiu city fountain water and Preajba fountain water
- b. Comparison of the obtained values with the maximum allowed values
- c. Making comparative graphics of the determined parameters
- d. Study of the influence of parameters on living things

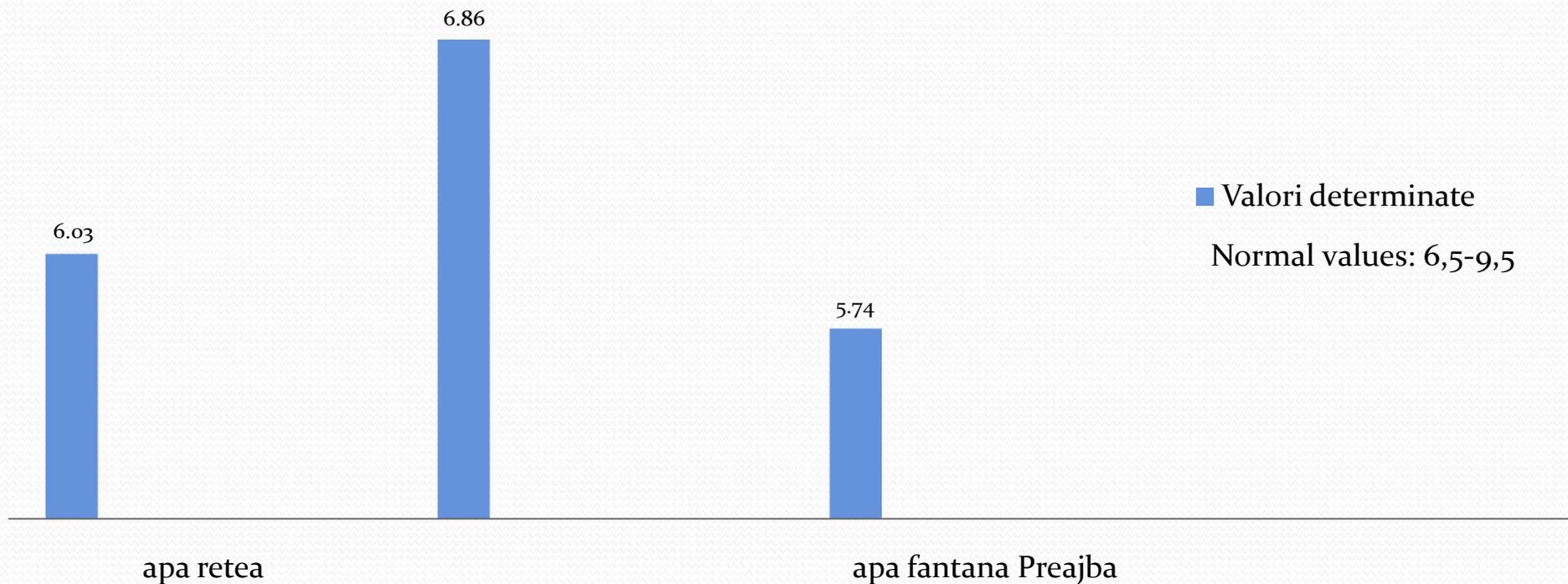
	pH	Water hardness	Nitrogen compounds
generalities	The compounds that cause changes in the pH of natural waters are carbon dioxide, carbonates and bicarbonates.	Water hardness is the total amount of calcium and magnesium salts found in water (drinking water, wells, rivers, lakes).	In low oxygen environments, low forms (nitrite, ammonium) predominate, while in high oxygen waters, nitrate predominates.
Effects on life	In order to be consumed, both tap and well water must have a pH between 6.5 and 9.	A water of low hardness, which contains few calcium and magnesium salts, is called fresh water. Hard water is not good to drink because it tastes bad (willow)	The presence of nitrites in drinking water or well water is particularly dangerous for the human body due to the disease it causes - blue disease (methemoglobinemia).

Water analysis results

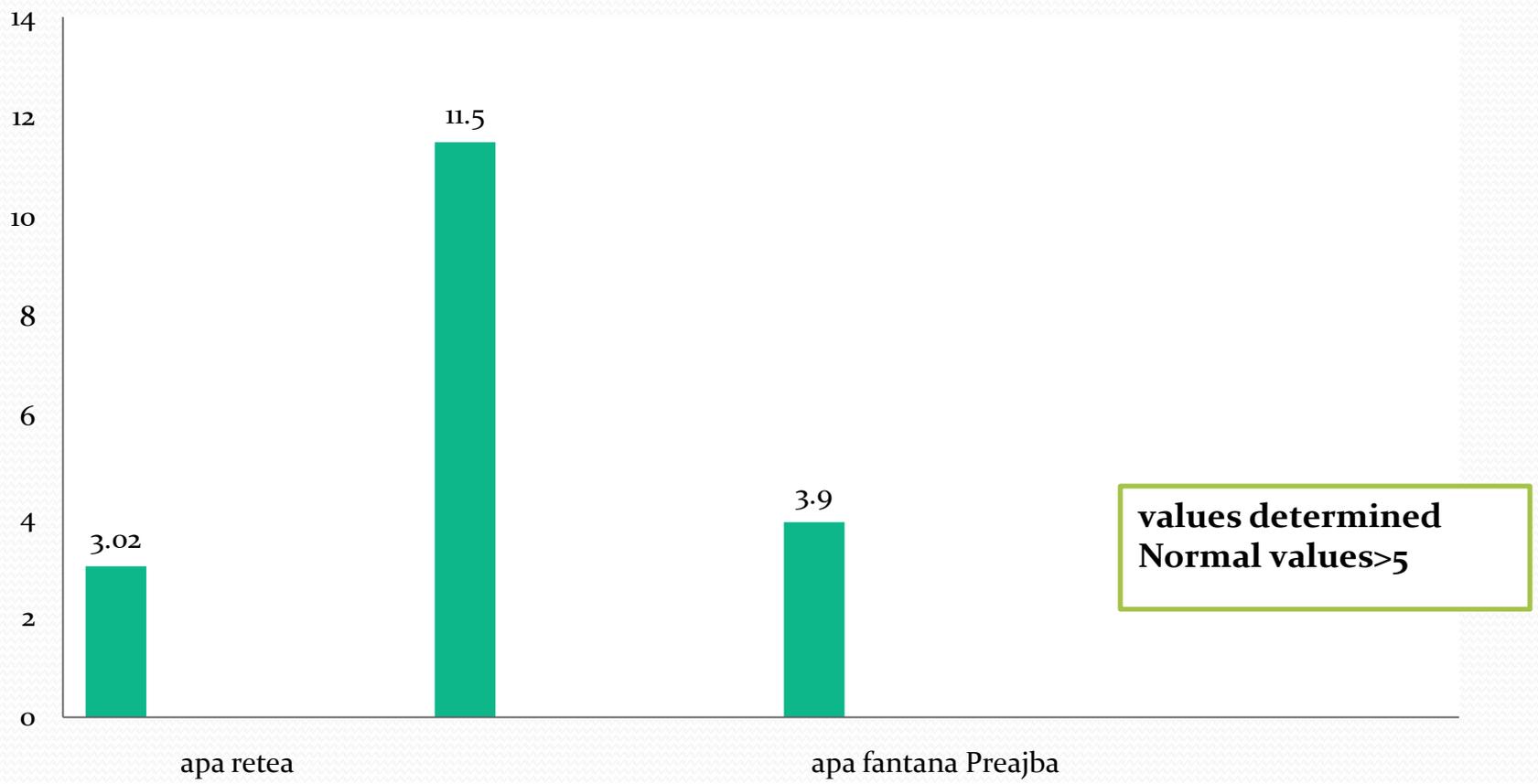
Nb. Crt.	Water type	pH		Conductivity μS / cm	Ammonium mg/l VISOCO	Nitrites g/l VISOCO	Total hardness ⁰ Ge	Ca ²⁺ mg/l	Mg ²⁺ mg/l
		paper	pH – meter						
1	Fountain Water Targu – Jiu	6 – 7	6,86	480	0	0	11,5	75	48
2	Tap Water	5 – 6	6,03	111	0,034	0,018	3,02	25,6	14,4
2	Fountain Water PREAJBA	5 – 6	5,74	130	0,5	0	3,90	28,8	24
CMA* conformable Law 458/2002 updated by Ordinance 22 / 30.08.2017			6,5 - 9,5	under 2500	<0,5	<0,5	>5	not specifi ed	not specifi ed

Because most reactions in the body are influenced by the activity of hydrogen ions, the pH level in water or other liquids or in food is very important for health. The water from the Targu Jiu well has an optimal pH. The lowest pH level has water in the Preajba area.

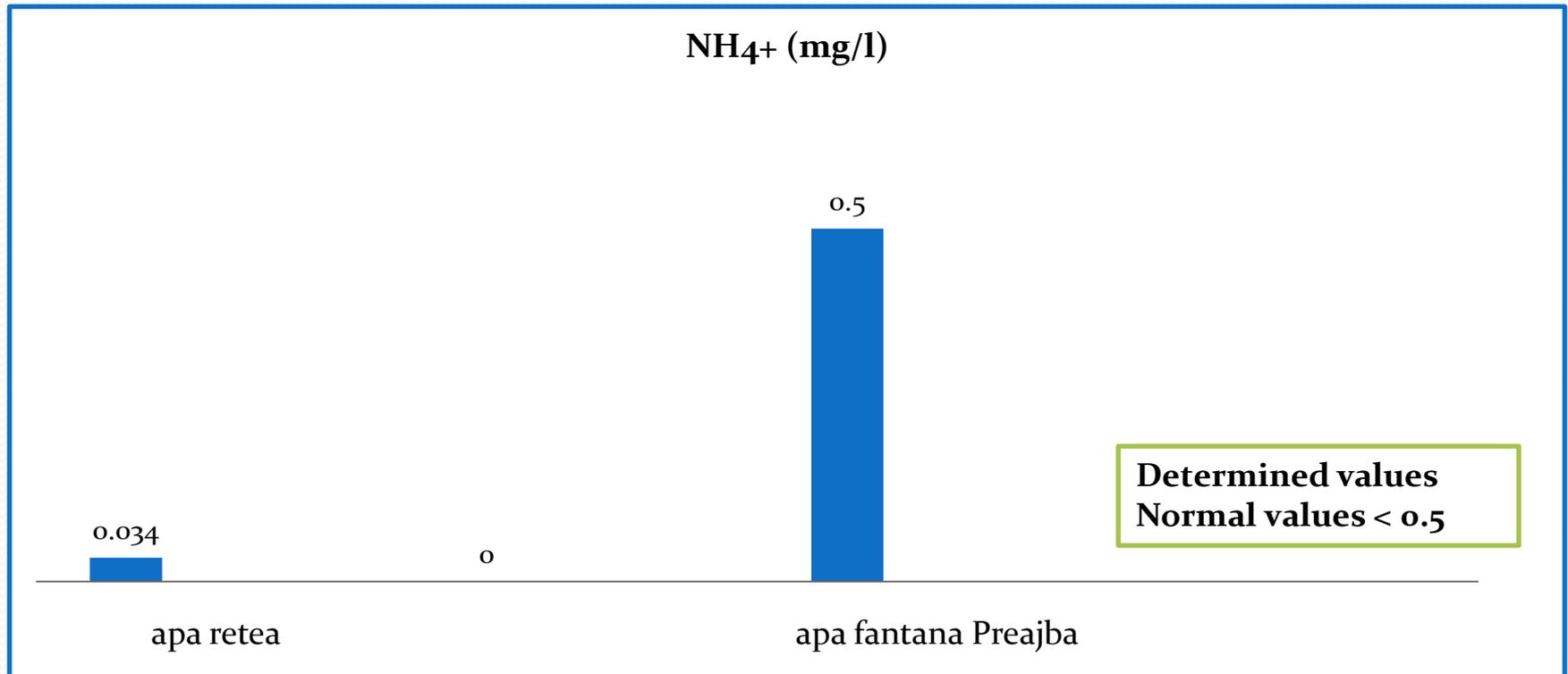
pH (pH units)



Water hardness. Normal value > 5, and the water in the Tg Jiu well has a large amount of calcium and magnesium. Excessive hardness means that these waters cannot be used in the domestic or industrial field, due to the chemical aggressiveness that causes salt deposits on the pipes, and its daily consumption leads to the formation of kidney stones.

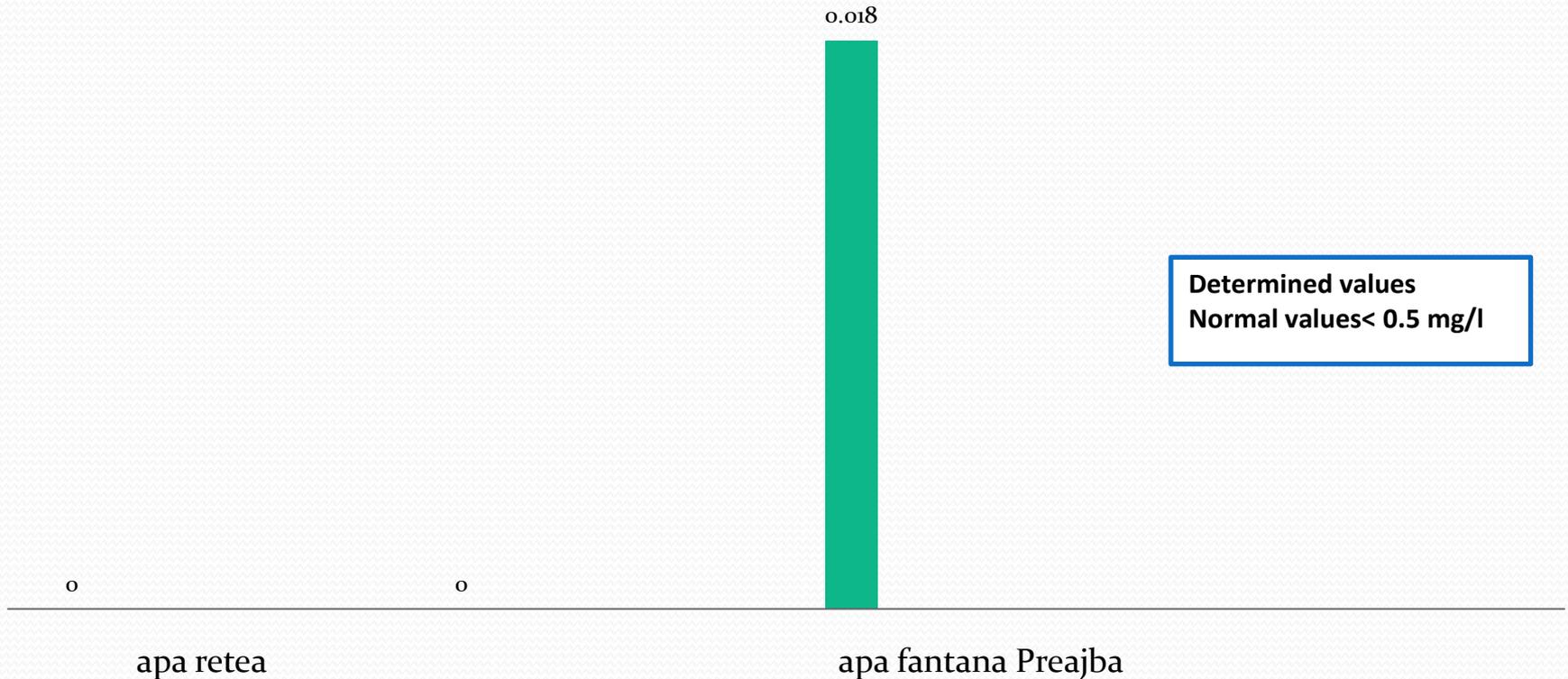


The ammonium level highlights the contamination of drinking water with water from the sewage network, from domestic and industrial networks through infiltrations and discharges. Ammonia can also be mineral in nature, coming from ores that contain nitrates. It is also formed by the decomposition of nitric acid in the presence of pyrite as well as by the process of decomposition of organic substances under anaerobic conditions in the presence of bacteria. All 3 water sources have permissible ammonium values. The water from the Preajba fountain has the highest level of ammonium.



Nitrate and nitrite are two natural ions ubiquitous in the environment, being produced by the oxidation of nitrogen by microorganisms in plants, soil and water. All 3 water sources have allowed values of nitrite ion, below the value of 0.5. The water from the Preajba fountain has the highest level.

NO₂⁻ (mg/l)



In order to see the influence of the three water sources on the living things, we planted wheat seeds and watered them with water from each source and watched their development.



After a week, we weighed the 3 types of plants and measured their length. The highest growth was observed in water-soaked plants in the Preajba area, due to the high content of nitrogen compounds.

