

MARAMURES COUNTY DRINKING WATER QUALITY

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Surface water and groundwater represent the main sources of drinking water in Romania. Ammonium, iron, manganese and arsenic are the main potential pollutants that can be found in groundwater. In high concentrations or long term consumption they can have a dangerous effect on the human health when present in drinking water. Ammonia can have a compromising effect over the disinfection process efficiency leading to taste and odour problems. Excess iron and manganese can modify the drinking water organoleptic characteristics (turbidity, colour) making it hardly acceptable for human consumption. Long term arsenic consumption can have a dangerous effect over the human body like skin cancer, cardiovascular diseases and dermal lesions. In Romania, drinking water is controlled by the national Drinking Water Quality Act no. 458/2002, republished in 2011. For this reason, the present study focused on determining drinking water quality according to the national legislation.



Six drinking water sources from Maramures county were analysed within the study. The geographic locations are presented in figure 1. *Ardusat, Sarasau* and *Ulmeni* drinking water treatment flows use raw groundwater while in *Rona de Jos, Poienile de sub Munte, Grosii Tiblesului* raw surface water is used.



Figure1. Study area map



Drinking water quality from the selected locations

Parameters determination was done according to the standard methods:

- iron and manganese - SR EN ISO 11885:2009
- ammonium - SR ISO 7150-1:2001
- arsenic – SR EN ISO 11885:2009
- turbidity – SR EN ISO 7027-1:2016
- hardness – SR ISO 6059:2008.



Concentrations that exceed the imposed limits for ammonium, iron, manganese and arsenic can be found in locations that use raw groundwater as water source for potabilisation while turbidity concentrations over the imposed limit can be observed in locations that use raw surface water.

In order to bring the identified non-compliant parameters within the limits regulated by the national legislation, drinking water treatment flows must be completed accordingly.

Quality parameter	Ardusat	Grosii Tiblesului	Rona de Jos	Poienile de sub Munte	Sarasau	Ulmeni	MAC (Act no. 458/2002)
NH ₄ ⁺ (mg/l)	0.63-2.17	0.02-0.13	0.08-1	0.05-0.11	0.1	0.12-0.4	0.5
Fe _t (µg/l)	18.9- 206.8	11.5-41	54-123.4	12.5- 319.6	15.2-40.7	93.9-177	200
Mn _t (µg/l)	20.1-46.7	3.8-15	10.2-13.1	4.6-17.7	3.1-4.2	70.7-637	50
As (µg/l)	16-25	<2-3.7	<2	<2	<2	<2	10
Turbidity (NTU)	1.6-3.2	0.7-3.2	1.2- 7.1	<1- 18.7	<1	<1-1.7	5
Hardness (German degree)	5.6-6.9	3.9-4.2	4.9-8.6	6.4-14	10.3-10.6	19.6-21.8	≥5