RESEARCHES CONCERNING THE GROUND WATER QUALITY IN SAG-PARTA DOMESTIC WASTE DEPOSITION AREA, DISTRICT TIMIS

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The Şag-Parţa domestic wastes deposition, district of Timis is situated at about 10 km from the center of the town, respectively 6 km South of Timisoara. It covers an area of 17 ha being located between the national highway E 70 to Moraviţa and a county road to Parţa.

The experimental results was comparated with maximum admitted limit provided in standards the analysed ground waters were framed in quality class according with the obtained results. The experimental results indicated values under the maximum admitted limits for the following chemical indicators cyanides, sulphates, phosphates, nitrate, nitrite and natrium contents existing exceeds of the maximum admitted limits for the drinking water especially at the metal content (Pb, Cd, Mn, Ni, Fe) but also regarding the content of chlorides and ammonium.

Key words: *house waste, deposition, water contamination, heavy metals*

The industrial, agricultural, demographical explosion as well as the urbanization, have made out any sort of wastes, the main source and cause of pollution of the environmental factors (air, surface waters, soil-under-ground waters) and out of man, the master and subject of the consumption society of the market economy, the most important waste producer and consequently, by the lack of interest, sanitary health and human conscience, the main pollution vector of the environment.

The house wastes collected from the population, and the commercial agencies as well as the street wastes are carried to the house waste platform Sag-Parta situated to approximately 10km from the centre of the town, more exactly 6 km South of Timisoara. [1]

The chemical analyzed parameters was: anions (nitrate, nitrite, chloride, sulphate, phosphate) cations (ammonium, natrium, potassium, calcium, magnesium, iron, manganese) heavy metals (lead, cadmium, nickel, zinc, chromium) and toxic compounds (cyanide).

MATERIAL AND METHOD

To evaluate the risks factors regarding the water pollution, samples have been taken from 3 drillings situated near the deposition made at 5-10 m depth. The samples have been taken once at three months during the year 2007.

The content of nitrates, nitrites and ammonium, was determined colorimetricly by quik AQUA MERCK tests with by spectrophotometry using SQ 118 device at 515, 525, 690 nm wave lenght. The determination of the sulphates was achieved according to the 95 [2] USA Standard method. The determination of the chlorides was achieved according to the SR ISO 9297/01 [3] standard method. The determination of the phosphates was achieved according to the SR-EN 1189-2000 [4] standard.

The determination of the metallic cations and of the heavy metals (Na, K, Ca, Fe, Mn, Ni, Pb, Cd) from the water samples was made according to the normative rules concerning the measurement of the ground and surface water parametres [5].

The obtained values regarding the content of the anions, cationic metals and metals were compared to the maximum admitted limits for the drinking waters according to the 458/2002 law.

RESULTS AND DISCUSSIONS

The experimental results referring to the anionic and cationic compounds in water samples taken from the drillings belonging to the deposition place are presented in *table 1-3*.

Table 1

The analysis of the anionic and cationic compounds from the drilling F1 in 2007

Analysed compound	Month				CMA (mg/l) In drinking water
	January	April	July	October	
Ammonium	0,6	2,5	0,8	3,4	**0.5**
Nitrites	0,3	0,1	0,4	0,3	**0.5**
Nitrates	25	13	12	23	**50**
Phosphates	0.3	0.1	0.4	0.1	**0.5**
Chloride	455	866	133	60	**250**
Sulphates	188	202	172	130	**250**
Cyanide	<0.01	<0.01	<0.01	<0.01	**0.05**
Lead	<0.01	<0.01	<0.01	0.02	**0.01**
Cadmium	<0.005	<0.005	<0.005	<0.005	**0.005**
Manganese	0.4	0.22	0.56	0.2	**0.05**
Nickel	0.04	0.02	0.05	0.03	**0.02**
Iron	0.04	0.02	0.03	0.03	**0,2**
Magnesium	52	48	34	56	**-**
Calcium	104	98	80	103	**-**
Potassium	3	5	2	5	**-**
Natrium	30	28	20	30	**200**

Table 2

The analysis of the the anionic and cationic compounds from the drilling F2 in 2007

Analysed compound	Month				CMA (mg/l) In drinking water
	January	April	July	October	
Ammonium	0.8	2.4	0.6	0.6	**0.5**
Nitrites	0.2	0.05	0.2	0.4	**0.5**
Nitrates	15	11	7	9	**50**
Phosphates	0.4	0.2	0.1	0.1	**0,5**
Chloride	345	859	245	58	**250**
Sulphates	200	110	154	162	**250**
Cyanide	<0.01	<0.01	<0,01	<0,01	**0.05**
Lead	<0.01	<0.01	<0,01	0.03	**0,01**
Cadmium	<0.005	<0.005	<0.005	<0.005	**0.005**
Manganese	0.09	0.5	0.1	0.08	**0.05**
Nickel	0.02	0.02	0.01	0.05	**0.02**
Iron	22	10	1	8	**0.2**
Magnesium	82	132	37	55	**-**
Calcium	52	128	106	87	**-**
Potassium	8	3	7	5	**-**
Natrium	60	48	75	56	**200**

Table 3

The analysis of the the anionic and cationic compounds from the drilling F3 in 2007

Analysed compound	Month				CMA (mg/l) In drinking water
	January	April	July	October	
Ammonium	1.0	2.00	0.6	0.6	**0.5**
Nitrites	0.1	0.05	0.3	0.3	**0.5**
Nitrates	15	22	12	8	**50**
Phosphates	0.1	0.1	0.1	0.2	**0.5**
Chlorides	578	804	120	58	**250**
Sulphates	189	202	179	166	**250**
Cyanide	<0.01	<0.01	<0.01	<0.01	**0.05**
Lead	0.17	0.03	0.05	0.02	**0.01**
Cadmium	0.05	0.07	0.04	0..01	**0.005**
Manganese	0.8	0.5	0.4	0.07	**0.05**
Nickel	0.17	0.05	0.16	0.05	**0.02**
Iron	0.04	0.08	0.08	0.1	**0.2**
Magnesium	34	36	130	58	**-**
Calcium	75	48	66	82	**-**
Potassiu	4	1	6	5	**-**
Natrium	187	159	140	84	**200**

The forms in which the nitrogen appears in water: molecular nitrogen – N_2, nitrogen present in different organic combinations, ammonia – NH_3, ammonium – NH_4^+, nitrites – NO_2^-, nitrates – NO_3^-.

The obtained experimental results analysis show the fact that the exceeding of the maximum admitted limit, reported to the drinking water of 0.5 mg/l ammonium is registered in all analysed samples. In the case of the three drillings analysed, the content of the nitrites and nitrates is in the admitted limits, for all the prelevated samples. The presence of the ammoniacal nitrogen in a relative important quantity, may point to a contamination with human or industrial dejections, a great number of industries being at the origin of the supplying with ammoniacal nitrogen of the rivers (the chemical industry, coking works, ice factories , textile industry etc.)

Its presence in the supply waters is limited by the rules to very small quantities (under 0.5 mg/l)–the recommendation of the Health World Organization–for the bad effects which it can have over the consumers[6].

The content of sulphates, cyanides and phosphates of the analyzed samples frame into the normal limits, according to the requires imposed by the drinking water standard stipulated by the 458/2002 law completed by the 311/2005 law.

The maximum admitted content of chlorides in water is that of 250 mg/l this value being exceeded in 2007 in a proportion of 33.33%. The maximum recorded value was 866 ppm registered in April at drilling 1. His increasing is caused by the industrial pollution and from excreta.

The samples connected with the presence of the metallic elements in the environment, belong to the area of the world politics interests, making up a special chapter of the European Union politics regarding assurance of the human health and of an unaltered ecological environment.

The admitted maximum content of Ca, Mg and K is not specific in the drinking water present standard.

The Calcium does not affect health, but by the increased hardness may affect the pipes, the washing and the tastes of the food. Calcium and magnesium, under the forms of bicarbonates, carbonates, and sulphates cause the hardness of water. The content of the calcium in the analyzed samples is framed between 48 and128 mg/l.

The Sodium and potassium in concentration of over 50 mg /l, in the presence of suspension, produce foaming which accelerates the precipitation and the deposition of crusts in the boilers and alembics. The content of the Na (sodium) in the analysed samples vary in its large limits between 20-187 mg/l being under the maximum admitted limit in the drinking water that of 200 mg/l. The content of potassium in the drillings varies between 1-8 mg/l, and the content of Mg is between 34-132 mg/l.

The content of the Manganese in the drinking water is limited to 0,05 mg/l. This value was present in the three drillings along the whole 2007 year, the maximum recorded value being of 0.8 mg/l, exceeding mostly 10 times the admitted maximum limit.

From among the analysed heavy metals there were recorded exceeded values of the maximum admitted limits, according to the standard of the drinking water for Pb, Cd, Ni and Fe.

The maximum admitted content of Fe in the drinking water, according to the 458/2002 law is that of 0,2 mg/l. This value was exceeded at drilling no.3 pointing this a punctual pollution source in the area nearby drilling no.3.

The content of Ni exceeded the value of the admitted limit in the drinking water of 0,02 mg/l at all the analyzed drillings. The maximum recorded value being 0.17 mg/l, in January at drilling no.3.

Pb and Cd are considered the most toxic metals, the maximum admitted limits for these compounds in the drinking water being of 0.01 and 0.005 mg/l. The analyses of the content of Pb in the drillings situated in the neighborhood of the deposition of the house wastes in the Timisoara city points the fact that there exists exceeding of the maximum admitted limits especially in the case of drilling no.3 where the maximum recorded value was of 0.17 mg/l in January 2007. In drillings 1and 2 there were recorded values easily exceeded only in October. The maximum contents of Cd was recorded also at drilling no.3 with a value of 0.007 mg/l, exceeding thus 10 times the admitted maximum limit. In the drillings no.1and 2 there weren't recorded exceeded values for the indicator Cd.

The presence of the heavy metals in the drillings made in the immediate neighborhood of the deposition is due to throwing off some high quantities of ferrous and not ferrous metallic wastes, or to the wastes of the minerals coming from the brick factory placed once in the limits of the actual deposition.

CONCLUSIONS

1. In the deposition drillings there are registered high values of the ammonium nitrogen concentrations, lower ones of nitrates and nitrites as a result of the biodegradation of the organic matter.

2. The content of cyanides, sulphates, phosphates, sodium, potassium and calcium situates itself in the normal limits according to the valid standards.

3. The chlorides contents exceeds the maximum admitted limits of 250 mg/l and it is because the industrial pollution or excreta.

4. The heavy metals for which there were recorded exceeding of the maximum admitted limit for the drinking water were: Pb, Cd, Mn, Ni, Fe.

5. The drilling situated in the immediate neighborhood of the house wastes deposition Sag-Parta does not integrate itself in the category of the drinking waters, from the point of view of the quality of the chemical indicators.

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