MONITORING OF DRINKING WATER QUALITY IN THE REFERENCE POINTS OF THE DISTRIBUTION NETWORK OF RWC "RADONIQ" GJAKOVA

Luan Daija, PhD
Xhelal Kepuska, PhD
Leonard Shehu, Mr.
Kompanija Regjionale e Ujësjellësit "Radoniqi"në Gjakovë, Kosove

Abstract

Control and monitoring of water quality indicators in RWC "Radoniqi" Gjakova is carried out in compliance with the requirements specified in the Administrative Instruction nr.16/2012 for water quality for human consumption.

Regular internal monitoring of water quality for human consumption is carried out to check that the water is potable and that it meets the requirements of this administrative directive, and in particular, set parametric values.

Monitoring includes inspection, measurements, samplings or analysis either periodically or continuously.

Monitoring indicators of drinking water quality in reference points of the distribution network of RWC "Radoniqi" Gjakova is carried by two laboratories for monitoring of physical-chemical and bacteriological parameters.

In the laboratories for analysis of water quality indicators in the reference points of the distribution network of RWC "Radoniqi" Gjakova, is carried out water quality monitoring for physical-chemical and bacteriological indicators according to a particular timeline in the following locations: the Reservoir in Treatment Plant Radoniqi, Reservoir Qerim, City Ambulance, Hospital, the main reservoir in Rahovac, Health Center Rahovac, Petrol station in Krusha e vogël.

Parameters to be analyzed:

Physical-chemical indicators: determination of free chlorine, water temperature, m - alkaline, air temperature, pH value, dry residue, turbidity, total hardness, color, taste, electrical conductivity, iron, manganese, KMnO4 (permanganate) value, NH4 + ammonium, dissolved oxygen, nitrites, chlorides, etc.

Bacteriological indicators: these are analyzed bacteriological parameters such as: total number of coliform bacteria in 100 ml of water, fecal origin coliform bacteria per 100 ml, total number of viable bacteria in 1 ml.

From the results obtained in the laboratory can be concluded that the treated water of RWC "Radoniqi" is of good quality and that it meets standards according to WHO, EU and Administrative Instruction nr.16/2012 for drinking water quality for human consumption.

Keywords: Monitoring, parameters, water, network, methods, results

Introduction

Monitoring of water quality indicators in the reference points of distribution network of RWC "Radoniqi" Gjakova is carried out in compliance with the requirements specified

with Administrative Instruction no. 16/2012 for drinking water quality for human consumption.

Regular internal monitoring of water quality for human consumption is carried out to check that the water is potable and that it meets the requirements of this administrative directive, and in particular, set parametric values.

Monitoring includes inspection, measurements, samplings and analysis either periodically or continuously.

Monitoring indicators of drinking water quality in reference points of the distribution network of RWC "Radoniqi" Gjakova is carried by two laboratories for monitoring of physical-chemical and bacteriological parameters in the following locations: the Reservoir in Treatment Plant Radoniqi, Reservoir Qerim, City Ambulance, Hospital , the main reservoir in Rahovac, Health Center Rahovac, Petrol station in Krusha e vogël.

Material and methods

In order to control and monitor the water quality indicators in the reference points of distribution network of RWC "Radoniqi" Gjakova, numerous analyzes were carried out continually. Water samples were analyzed in physical-chemical and bacteriological laboratories of water treatment plant. Water samples were taken in 2012 at several points of distribution network where during laboratory analysis; various methods were applied like chemical or bacteriological methods. Following devices were used as Atomic Absorption Spectrophotometer (SAA), Nova 60 and Merck photometer, Turbidimeter Spectraquant 1500 T, pH meter, Conductometer and volumetric methods, whereas for bacteriological analysis has been used membrane filtration system with porous membrane filter Ø 045 μm and associated devices such as incubator, autoclaves, sterilizer, etc.

Results and discussions

From the results of the water analysis carried out during 2012 in the distribution network of drinking water it was observed fluctuations of physical-chemical and bacteriological parameters starting from Turbidity, free chlorine, KMnO4 value, Nitrites.

Also bacteriological parameters had an increase of total number of coliform and mesophilic bacteria the day when there was mixing of irrigation water with the drinking water in the network. Water samples at this point were taken immediately in polyethylene bottles of 500 ml which were initially thoroughly cleaned.

Important parameters to be discussed are: Turbidity, KMnO4 value, free chlorine, nitrites, etc.

Turbidity: In terms of water turbidity on the critical day in location 8 in Krusha e vogël, due to mixing of irrigation water with the drinking water, has resulted with an increase in turbidity of 1.4 NTU.

Chlorine free - to this parameter also influenced mixing of irrigation water with drinking water which resulted in 0.0 mg/l of chlorine. In drinking water it is not allowed the quantity of free chlorine below 0.2 mg/l, and the absence of free chlorine resulted with increase of coliform bacteria that have penetrated from the lake water where they are present. There were also changes in other parameters like KMnO4 value and nitrites. However, following the intervention of the maintenance team on the distribution network, we took again water samples that were sent to the laboratory and normal parameters resulted as required by guidelines and standards for drinking water.

Control of the quality of drinking water in the reference points or distribution network

Dt. 15.05. 2012									
	1	2	3	4	5	6	7	8-1	8-2
Physical-chemical indicators	Rez. S.F.	Rez. Qerim	Ambulanta e qytetit	Spitali	Rez. Rahovec	Q. e fëmijëve-R.	Shtëpia Shëndetit-R.	P. e benz.. Krush e v.	P. e benz.. Krush e v.
Temperature TºC	10.4	10.6	10.7	10.7	10.5	10.8	10.7	11.1	10.8
Color	pa	pa	pa	pa	pa	pa	pa	pa	pa
Odor	pa	pa	pa	pa	pa	pa	pa	me	pa
Taste	pa	pa	pa	pa	pa	pa	pa	/	pa
Turbidity	0.18	0,.20	0,21	0,.20	0,.24	0,.21	0,.22	1,4	0.37
pH value	7.42	7.44	7,42	7.43	7.47	7.45	7.45	7.53	7.46
Electr.conductivity	244	248	238	234	246	233	238	256	241
Free chlorine	0.5	0.36	0.,32	0.3	0.36	0.33	0.32	0.0	2.2
$KMnO_4$ value	2.8	3.16	3,16	2.8	3.16	3.16	3.16	6,54	3.2
Total hardness	7.28	7.28	7,28	7.28	7.28	7.14	7.28	7.5	7.28
Dry residue	146.4	148.8	143	140.4	147.6	139.8	142.8	153.6	144.6
Chlorides	6.38	6.38	6,38	6.02	6.38	6.38	6.02	7..09	6.38
Dissolved oxygen	11.5	11.2	11	10.8	10.5	10.4	10.3	9,5	9.9
Nitrites(NO_2)	0.002	0.004	0.003	0.003	0.004	0.003	0.003	0,0052	0,0035
Nitrates NO_3	0.07	0.09	0.08	0.09	0.10	0.09	0.09	0,.34	0,09
Iron(Fe)	0.02	0.03	0.02	0.02	0.035	0.025	0.03	0,.05	0,.035
Manganese(Mn)	0.2	0.03	0.03	0.04	0.045	0.035	0.03	0,04	0,035
NH4 + ammonium	0.04	0.05	0.03	0.03	0.05	0.04	0.035	0,04	0,035
Bacteri.indicators									
Total no. coliform	0	0		0	0	0	0	90	0
E.coli	0	0	0	0	0	0	0	E-coli	0
Total no. of viable bac.	0	0	0	0	0	0	0	120	0

Table no.1, Results of physical-chemical and bacteriological analysis

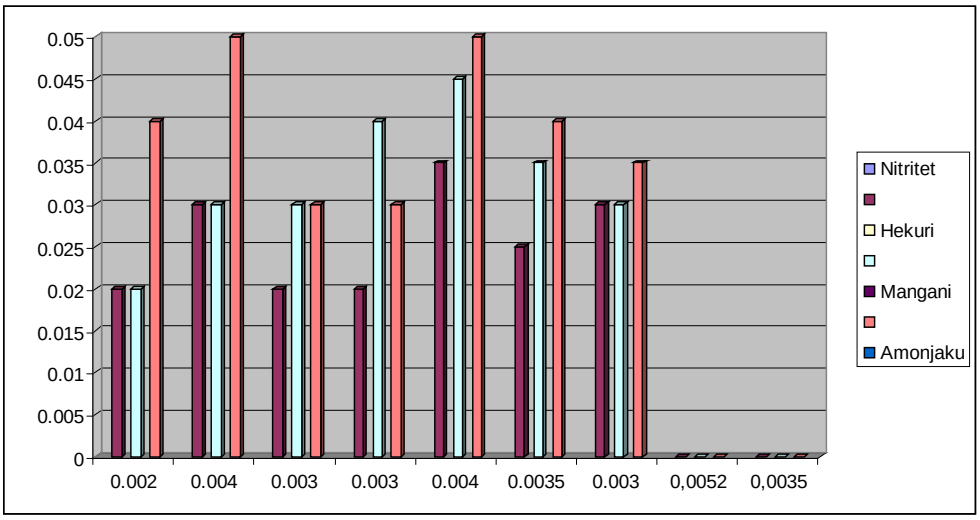

Diagram 1: nitrites, iron, manganese and ammonia.

Control of the quality of drinking water in the reference points or distribution network

2012								
Spring - Summer	1	2	3	4	5	6	7	8
Physical-chemical indicators	Rez. S.F.	Rez. Qerim	Ambulanta e qytetit	Spitali	Rez. Rahovec	Q. e fëmijëve-R.	Shtëpia Shëndetit-R.	P. e benz.. Krush e v.
Temperature TºC	11.4	11.4	11.5	11.6	11.7	11.7	11.5	11.8
Color	pa	pa	pa	pa	pa	pa	pa	pa
Odor	pa	pa	pa	pa	pa	pa	pa	pa
Taste	pa	pa	pa	pa	pa	pa	pa	pa
Turbidity	0.16	0.19	0.19	0.2	0.2	0.21	0.2	0.22
pH value	7.49	7.45	7.48	7.45	7.46	7.44	7.48	7.52
Electr.conductivity	249	253	251	247	257	242	241	238
Free chlorine	0.5	0.38	0.33	0.31	0.35	0.32	0.32	0.2
$KMnO_4$ value	2.8	3.2	2.8	3.2	3.47	3.2	3.2	3.63
Total hardness	7.42	7.28	7.42	7.28	7.42	7.28	7.28	7.42
Dry residue	149.4	151.8	150.6	148.2	154.2	145.2	144.6	142.8
Chlorides	6.38	6.02	5.67	6.02	6.38	6.02	6.02	5.67
Dissolved oxygen	11.5	11.1	11.0	10.8	10.4	10.4	10.2	10.0
Nitrites(NO_2)	0.002	0.003	0.003	0.003	0.003	0.002	0.003	0.004
Nitrates NO_3	0.07	0.08	0.08	0.09	0.11	0.08	0.09	0.13
Iron(Fe)	0.02	0.03	0.02	0.02	0.03	0.02	0.03	0.04
Manganese(Mn)	0.03	0.04	0.03	0.04	0.04	0.03	0.03	0.03
NH4 + ammonium	0.04	0.05	0.04	0.02	0.05	0.04	0.03	0.05
Bacteri.indicators								
Total no. coliform	0	0	0	0	0	0	0	0
E.coli	0	0	0	0	0	0	0	0
Total no. of viable bac.	0	0	0	0	0	0	0	0

Table no.2, Results of physical-chemical and bacteriological analysis

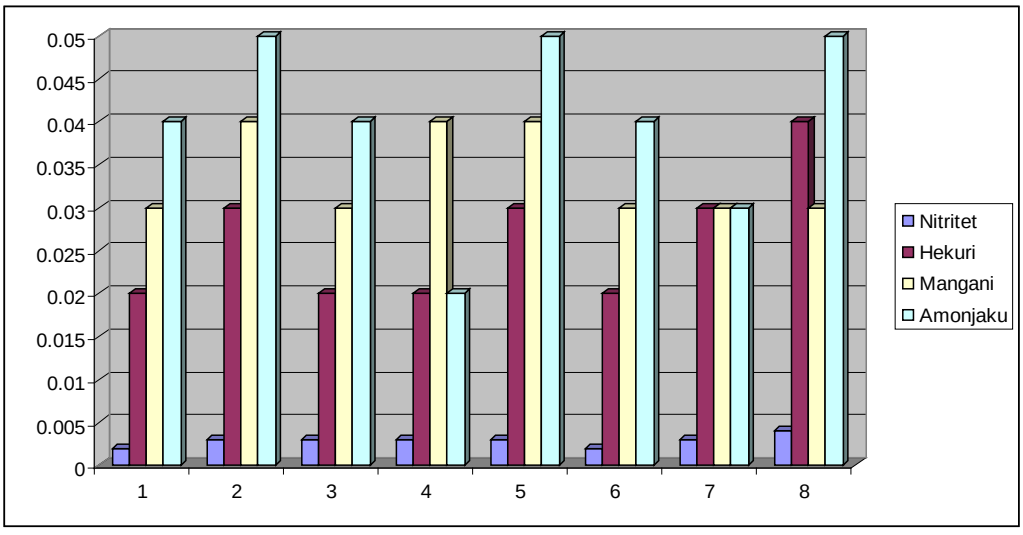

Diagram 2: nitrites, iron, manganese and ammonia.

Control of the quality of drinking water in the reference points or distribution network

Viti 2012								
Fall-Winter	1	2	3	4	5	6	7	8
Physical-chemical indicators	Rez. S.F.	Rez. Qerim	Ambulanta e qytetit	Spitali	Rez. Rahovec	Q. e fëmijëve-R.	Shtëpia Shëndetit-R.	P. e benz.. Krush e v.
Temperature TºC	8.5	8.6	8.7	8.8	8.7	8.8	8.7	8.9
Color	pa	pa	pa	pa	pa	pa	pa	pa
Odor	pa	pa	pa	pa	pa	pa	pa	pa
Taste	pa	pa	pa	pa	pa	pa	pa	pa
Turbidity	0.21	0.24	0.21	0.2	0.22	0.21	0.2	0.26
pH value	7.52	7.5	7.52	7.53	7.55	7.54	7.58	7.57
Electr.conductivity	251	254	251	249	257	259	249	247
Free chlorine	0.48	0.36	0.31	0.3	0.34	0.31	0.31	0.2
$KMnO_4$ value	2.8	3.2	2.8	3.2	3.47	3.2	3.2	3.63
Total hardness	7.28	7.28	7.28	7.28	7.28	7.28	7.28	7.42
Dry residue	150.6	152.4	150.6	149.4	154.2	155.4	149.4	148.2
Chlorides	7.09	6.73	6.38	6.38	6.73	6.38	6.02	6.02
Dissolved oxygen	11.7	11.3	11.1	10.9	10.5	10.5	10.3	10.1
Nitrites(NO_2)	0.0025	0.003	0.003	0.003	0.003	0.0025	0.003	0.004
Nitrates NO_3	0.85	0.085	0.08	0.095	0.12	0.083	0.091	0.14
Iron(Fe)	0.025	0.032	0.025	0.025	0.032	0.023	0.03	0.04
Manganese(Mn)	0.031	0.04	0.031	0.04	0.04	0.032	0.034	0.035
NH4 + ammonium	0.042	0.052	0.045	0.024	0.05	0.04	0.032	0.05
Bacteri.indicators								
Total no. coliform	0	0	0	0	0	0	0	0
E.coli	0	0	0	0	0	0	0	0
Total no. of viable bac.	0	0	0	0	0	0	0	0

Table no.3, Results of physical-chemical and bacteriological analysis

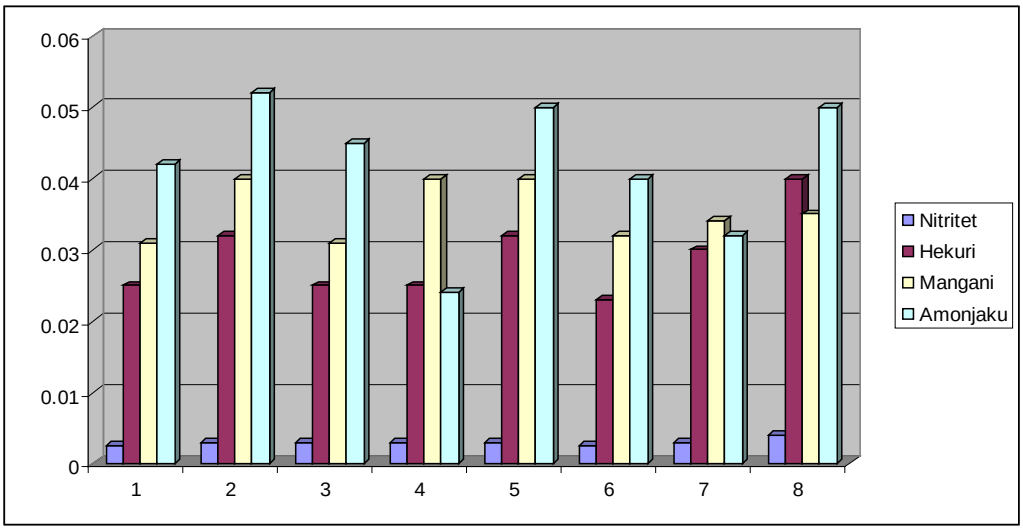

Diagram 3: nitrites, iron, manganese and ammonia.

Conclusions

The experimental results of water samples taken at the reference points of the distribution network of RWC "Radoniqi" Gjakova, were analyzed immediately in laboratory of treatment plant.

In table 1 and chart 1 in location 8-1 (Krusha e Vogel) are presented parameters with changes on organoleptic properties of water and some parameters beyond the permitted limit value as a result of mixing of drinking water with irrigation water due to installations made by the residents of the village. A warning is given immediately, and after the interventions 12 hours later analyzes have resulted according normative.

In Tables 2 and 3, as well as charts 2 and 3 are presented the results of physical-chemical and bacteriological parameters in 8 reference points of the distribution network during the spring - summer and fall - winter season, where all results are within the permitted normative limits.

Therefore, the results obtained on physical-chemical and bacteriological analysis in 8 reference points of the distribution network, show that the treated water of RWC "Radoniqi" Gjakova is high quality water, according to EU norms and Administrative Instruction nr.16/2012 for water quality human for consumption

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