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Evaluation of well water pollution used for drinking by rural population on the Colchis lowland on the background of intensive ecochemical treatment of agriculture

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Abstract
In the work is given results of the chemical characteristics research of the well water used for drinking by rural population on the Colchis lowland, which seems to be well water chemical pollution cases, particularly, there are detected nitrite importance value in 10 from 14 water samples, also fixed cases of pollution by phosphate and by iron, that is possible become base of many diseases create and distribution in the population.
To accomplish this is necessary wider scale and long complex research to precise quality of well water used for drinking by rural population of the seven municipalities of the Colchis lowland.

Keywords: drinking water, pollution, well water, quality

Introduction

Georgia present the country, which has big resources of the most important natural product in the World – water, suitable for drinking [1], but despite of water resources abundance in Georgia, availability of clean drinking water remains a problem, because except for densily populated area (towns), there are no centralized water supply systems, that caused finding autonomous sources of drinking for certain part of the population (village population) and therefore necessity of using groundwater (well water) for drinking.

Recently, on the background of intensive development agriculture, the problem of ground water pollution became actual, because the use of mineral fertilizers and pesticides becomes unmanageable on the land by population, that causes the transportation of chemical pollutants (nitrate, nitrite, ammonia, pesticides ad heavy metals) in water used for drinking by population.

It should be noted that the most dangerous sources of pollution the biosphere are nitrogenous fertilizers: sodium nitrate, potassium nitrate, ammonium nitrate, urea, and ammonium sulfate. Especially the nitrate forms of these fertilizers, which characterised high solubility and an ability of movement, therefore easily transfers to the ground water, that's appears reason of creating and distributions of many acute diseases (Renal failure, cardiovascular diseases, respiratory diseases and urinary systems, etc.) [2].

The problem is particularly acute in the Colchis lowland rural population, because there are not water supply systems for rural populations on the Colchis lowland yet, often the only source of drinking water is wells water, which depth mainly is 2-30 meter, and their quality check-hydro monitoring (Constant observation of the ground water resources of the regime, formation. Also, the quality and extent of contamination are unknown) lack of funds is not implemented, accordingly, there is no indication of what measures (management systems) are needed in order to completely eliminate or substantially limit well water polluting factors, which is why the region is in today's rural population by drinking well water used unprotected.

All of the above indicates, that on the Colchis lowland is necessary as monitoring of pollution sources and nearby wells water chemical containing determination (The last 30 years in this respect nothing has been done), To determine the influence of agriculture intensive ecochemical treatment on well water quality used for drinking by population.

To accomplish this, scientific- workers of Tsotne Mirtskhulava Water Management Institute of Georgian Technical University were sent to seven municipalities of Colchis lowland on the Autumn 2016 for determining chemical pollutants in the wells water used for drinking by rural population.

Below is presented wells used for drinking by rural water nearby agricultural lands (see Fig 1, 2, 3, 4), of which around implemented using as fertilizer so pesticides in order to improve plant productivity.

Fig 1

Fig 2

Fig 3

Fig 4

The analyzes of well water were been making on the site by the mobile chemical laboratory (CEL Advanced Drinking Water Laboratory, see Fig 5).

Fig 5

The results of the research are given in table 1.

Table 1: The results of chemical analyzes of wells water used for drinking by rural population

Sampling place	Coordinates		Depth m	PH	Nitrite mg/l	Nitrate mg/l	Phosphate mg/l	Iron mg/l
Abasha vil. Sabokuchao	4213328	4210794	5	6.93	0,006	0,7	4,38	0,08
Abasha vil. Sabokuchao	4213363	4210819	5	7.10	0,005	0,4	0,77	0,12
Senaki vil. Nosiri	4215076	4208415	7	7.13	0,001	1,4	5,32	0,05
Khobi vil. Pirveli maisi	4220393	4151785	8	7.18	0,006	0,8	1,02	0,01
Zugdidi vil. Tsatskhvi	4225147	4147579	12	7.01	0,005	1	1,55	0,03
Zugdidi vil. Tsaishi	4225913	4147619	11	7.52	0,005	2,1	3,4	0,06
Zugdidi vil. Kortskheli	4232905	4155317	15	7.07	0,009	4,1	1,31	0,02
Zugdidi vil. Kortskheli	4233994	4157645	27	6.60	0,014	3,2	2,1	0,07
Zugdidi vil. Chkaduashi	4235392	4200774	4	6.35	0,003	2,1	0,9	1,44
Tsalenjikha vil. Phabrika	4236693	4202189	7	6.51	0,005	1,9	0,85	0,09
Tsalenjikha vil. Nakifu	4236314	4205849	6	6.40	0,004	1,3	1,06	0,03
Chkhorotsku vil. Patara chkhorotsku	4229871	4206914	8	6.60	0,006	1,4	1,11	0
Chkhorotsku vil. Qveda chkhorotsku	4229271	4206841	7	6.87	0,004	2,7	1,57	0
Martvili vil. Nakharebavo	4224086	4221836	5	7.00	0,008	2	1,19	0,04
The maximum admissible concentration mg/l					0,2	50	3,5	0,3

According to of analyzes results, nitrite containing of wells water chosen for analyzer is in range 0,001 - 0,014 mg/l/, nitrate 0.4-4.1 mg/l, phosphate - 0,77-5,32 mg/l, results were compared with data of technical regulations for drinking water, according to these phosphate content in some cases higher than the MPC. During field works fixed some cases tinted waters, because in selected wells water were determined iron too, according to the results show that the iron content in only one case was higher than the MPC, it is about 4 times more. It certainly cannot be considered a normal phenomenon and requires a pollution source survey [3, 4].

Because every chosen wells water are used for drinking, the results of the processing time also used health requirements for bottled drinking water quality, according which nitrite containing don't be more the 0,005 mg/l. From our selected 14 analyzing wells nitrite containing are more the 0,005 mg/l in 6 well and 0.005 mg/l in 4 well [5].

Thus, field researches implemented by us in seven-municipalities of the Colchis lowland is the first attempt of the intensive monitoring on the water quality, after the 30 years pause.

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