

Monitoring of the Nitrates and Nitrites Levels in Sources of Water Supply from Olt County

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Abstract. This study main goal was to monitor the levels of nitrates and nitrites in water sources from Olt County, during 2009-2011. There were analyzed 108 water samples from wells of 108 animals' owners in 41 localities, one sample from a lake and a spring water sample. Results showed that 30.55% of wells water samples from the first groundwater (5-6 meters to 20-22 meters) were within frame parameters stipulated by Law 458/2002 on drinking water quality. 61.8% of wells water samples does not fit the parameter nitrate, and 4.5% did not fit the both parameters.

Keywords: water, nitrate, nitrite

Introduction. Nitrates are present naturally in soil, water, plants and food. They are also present in low concentrations in air, the environment; nitrification bacteria convert ammonium ions to nitrites and nitrates. Nitrate accumulation in the environment is the result of extensive use of nitrogen based fertilizers on agriculture, high quantities of nitrogenous waste in farm animals and urban waste water treatment. High levels of nitrates in drinking water has a negative impact on the health of animals and human [2,3,4,5,6,7].

Thus, for animals nitrates levels that range between 0 and 44 ppm are not harmful, between 45 and 132 ppm are safe but nitrogen levels in feed had to be low, between 133 and 220 ppm can cause unwanted effects after a long period, between 220 and 660 ppm can cause potential losses - risky levels for dairy cows, between 660 and 800 ppm increases the risk of losses - unsafe levels, and more than 800 ppm is not recommended. Some authors [1] states that at a level higher than 1320 ppm nitrogen, water is toxic to animals and recommend not to be used, and others [5], states that, due to higher toxicity of nitrates from water than in the feed, it would be recommended that water that contain over 440 ppm nitrates to be banned for cattle watering.

Aims and objectives. This study main goal was to monitor the levels of nitrates and nitrites in water sources from Olt County, during 2009-2011.

Materials and methods. There were analyzed 108 water samples from wells of 108 animals owners in 41 localities, one sample from a lake built by damming and a spring water sample, which was arranged as a watering source of natural pasture. Nitrogen content of water samples was determined spectrophotometrically by measuring absorbance at two wavelengths in the ultraviolet light (UV) and calculating the corresponding concentration, based on Beer Lambert law. Determination of nitrite was made by molecular absorption spectrometry.

Results and discussion. Nitrite content of water samples was determined in accordance to ISO 26777/2002 Water Quality. The results were interpreted in accordance to Law no. 458/2002 on drinking water quality and to Law. 311/2004 that was amended and supplemented Law no. 458/2002 on drinking water quality. In 2009, water samples analyzed from own sources

(wells) registered levels that were within the ranges for parameters of nitrate and nitrite under Law no. 458/2002 on drinking water quality in a proportion of 34.8% (24 samples), a proportion of 65.2% (45 samples) did not fit the parameter nitrate, and a rate of 5.7% (4 samples) did not fit the parameters of nitrite. These 4 samples that did not fit the nitrite parameter did not fit also for the nitrates parameter. In 2010, water samples analyzed from own sources (wells) registered levels that were within the ranges for the parameters of nitrate and nitrite under Law no. 458/2002 on drinking water quality in a proportion of 36.3% (8 samples), and a rate of 63.7% (14 samples) did not fit the nitrate parameter. In 2011, water samples analyzed from own sources (wells) registered levels that were within the ranges for parameters of nitrate and nitrite under Law no. 458/2002 on drinking water quality a rate of 5.8% (1 sample), and a rate of 94.2% (16 samples) did not fit the parameter nitrate, which was exceeded by 2 to 5 times.

Conclusions. Following analysis for nitrites and nitrates levels, results showed that 30.55% of wells water samples from the first groundwater at a minimum depth of 5-6 meters and a maximum of 20-22 meters were within frame parameters stipulated by Law 458/2002 on drinking water quality. 61.8% of wells water samples does not fit the parameter nitrate, and 4.5% did not fit the both parameters. The sample of spring water fit parameter nitrite, nitrate level exceeded 24 times (1202.2 mg L^{-1}) the limit stipulated by Law no. 458/2002 on drinking water quality. Lake water samples analyzed fits the parameters nitrate and nitrite, and registered levels below limits provided by Law 458/2002 on drinking water quality

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