Assessing the Chemical Status of Water from Wells Which Supply Farms Located on Romania’s Territory. Part II

Cristina EL MAHDY¹, Silvana POPESCU², Anca BOARU¹, Cristin BORDA²

¹Faculty of Animal Husbandry and Biotechnologies, University of Agricultural Sciences and Veterinary Medicine, Calea Mănăştur street 3-5, Cluj-Napoca, România
²Faculty of Veterinary Medicine, University of Agricultural Sciences and Veterinary Medicine, Calea Mănăştur street 3-5, Cluj-Napoca, România

*corresponding author: cristina.hegedus@usamvcluj.ro

ABSTRACT
The study was performed in 63 wells which belong to the decentralized system from 5 counties from Romania: AB-7 wells, BZ-6 wells, CJ-33 wells, MS-1 wells, SJ-6 wells taking into account chemical parameters: nitrates (SR ISO 7890:1998), the report nitrates/nitrites in accordance with L. 458/2002. Results reveals values of NO₂: 0.32±0.08 mg/dm³ AB, 0.23±0.08 mg/dm³ BZ, 0.33±0.05 mg/dm³ CJ, 0.23±0.03 mg/dm³ MS, 0.09±0.02 mg/dm³ SJ, and NO₃: 35.71±7.53 mg/dm³ AB, 48.66±5.92 mg/dm³ BZ, 23.54±2.82 mg/dm³ CJ, 19.63±4.64 mg/dm³ MS, 31.16±5.12 mg/dm³ SJ which, theoretically include the waters in terms of two parameters in drinking water and good chemical states, but, individual samples in terms of nutrient regime presents exceedance influenced by poor cleaning, hygienisation and disinfection of wells.

Keywords: cow, drinking water, NO₂, NO₃

INTRODUCTION
Purpose of this paper was to identify the degree of cleanliness or pollution 63 wells from five counties located in SE, NW-eastern and Romania center: Alba (AB localization: central part of Romania 7 wells), Buzau (BZ- localization: SE 6 wells), Cluj (CJ localization: west central 33 wells), Mures (MS localization: central - northern 11 wells), Salaj (SJ - localization: northwest 6 wells)], used as a source of drinking water for cattle, related by the presence of biogenic elements based on nitrogen NO₂ - intermediate form and NO₃ - final form. Impurification with nitrates can have telluric nature, by using of fertilizers based on nitrogen (Harty, 2012) or poor sanitation and failure to comply hygiene and sanitary conditions or location of wells (Iacob et al, 2012). Nitrite levels in water which are over 4 ppm may be toxic to cattle (Grant, 1993).

MATERIALS AND METHODS
In this part, were followed: determination of nitrates (SR ISO 6777:1996), nitrates (SR ISO 7890/1:1998), report NO₂ and NO₃ in accordance with L. 458/2002. Study was conducted on a number of 63 wells located in the territory of five counties from Romania: AB, BZ, CJ, MS, SJ, results being compared with allowed limits and those for animals farm requirements, using as statistical tests accepted: non parametric test Krushall-Wallis and comparing the values after a value established (Fisher’s Test).

RESULTS AND DISCUSSION
By point of view of NO₂ parameter, 48 (76.19%) from samples attest good chemical status of water from which: 61.90% (39 samples) having under 0.3 mg/dm³, 14.29% (9 samples) between 0.3-0.5 mg/dm³, while, in 23.81% (15)
the aquifer is considered to be polluted: 0.55-0.91 mg/dm³ (table 1). The mean values/ counties fall in standards for drinking water, but, individual values designate poor chemical status as follows: AB: 4 samples taken from the same number of wells (0.65-0.8 mg/dm³), BZ: 1 sample: 0.55 mg/dm³; CJ: 8 samples: 0.63-0.91 mg/dm³. In MS the chemical status is good: 0.1-0.45 mg/dm³ for all samples; the same situation was found in SJ: 0.1-0.31 mg/dm³. Concerning the guide for completing the inspection notes concerning animal protection and welfare; for 3 point, the limits have to be 0.3 mg/dm³, therefore, 38.10% (24 samples) indicates poor water quality. Although the mean/county does not indicate nonconformities from point of view of the chemical status of water in relation to the parameter NO₃, are found significant differences (*P<0.05) between the mean of the analyzed samples from BZ (48.66±5.92 mg/dm³; min. value - 35.00 – max. value: 73.00 mg/dm³) compared with those from CJ (23.54±2.82 mg/dm³; min. value - 8.00 – max. value: 66 mg/dm³) and MS (19.63±4.64 mg/dm³; min. value - 10.00 – max. value: 33.00 mg/dm³).

There is a sinuous curve of individual values, poor chemical status in terms of this parameter were recorded at one wells in AB (73 mg/dm³), 3 wells (50%) BZ (53-73 mg/dm³), 9% from wells (3) in CJ (58-66 mg/dm³), 1 wells (9%) in MS (63 mg/dm³). In SJ none of the samples was present overrun at this parameter. In terms of report NO₃ + NO₂ ≤ 1 were found areas where the aquifer is polluted. One samples from AB exceeds the limit: 1.55; nonconformities are registered in BZ at 50% from samples. In CJ 3 samples (9%) are considered to have poor chemical status. In SJ were not found exceeding compared to the reference limit. To groundwater level, in 2013, 2014 most exceedances of the thresholds were found at NO₃ parameter (Moldovan et al., 2014, Bogzianu, 2015).

**CONCLUSION**

In terms of nutrient regime, the overruns are influenced by poor cleaning, hygienisation and disinfection of wells.

**REFERENCES**


