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THE IMPORTANCE OF APPLYING GOOD PRACTICES TO PREVENT POULTRY INDUSTRY POLLUTION. CASE STUDY – POULTRY FARM VASLUI COUNTY

Abstract. The study presents the positive aspects of reducing the environmental impact on water, caused by the poultry industry, through compliant practices applied to the monitoring methodology included in the ISO 14001 implementation process for intensive poultry farming facilities at AVICOM SA in Vaslui County. The aim of the research is the comparative analysis of the results published on the analysis reports, prepared by the commercial company versus the results of the analyses carried out in the Environmental Quality Laboratory of the Faculty of Ecology and Environmental Protection of the Ecological University of Bucharest. At the same time, possible changes in the environmental factor – water, by pollutants generated from poultry farming activities were also examined. This paper deals with the issue of maintaining water quality under the conditions of wastewater generation in poultry farms with a capacity of more than 40,000 heads per series. The study concludes with additional recommendations for the implementation of BAT standards to reduce water quality indicator values to within legal limits and to improve the quality of life for the local population.

Keywards: technologic wastewater, pollution, water quality, poultry farm

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1. Introduction

The aim of this paper is to analyse the evolution of pollution indicators value for the *water* environment factor, generated by the chicken breeding activity at AVICOM SA over a period of four months and it is a study in the continuation of the pollution of the environmental factor- atmosphere. Research was carried out between 20th July – 30th November 2023 for three objectives: *sanitary filter and administrative pavilion* for domestic water, *the technological wastewater* at the point of its routing to the Treatment Plant of Vaslui municipality and *observation wells* for dejecta storage platform 1 and 2.

The research also aimed to observe whether the conditions for the discharge of the technological wastewater into the local sewerage network, after prior treatment, were met. The results indicated that the quality indicators for the environmental factor water established for the samples taken in July and November 2023 for domestic water and from observation wells 1 and 2 are in line with the legal standards in force. For the technological wastewater, the results indicated values that exceed the maximum concentration legally allowed in H.G. no.352/2005 on the modification and completion of H.G. no.188/2002 for the approval of certain rules on the conditions for the discharge of wastewater into the water environment, NTPA 001/2002 and NTPA 002/2002.

The monitoring of groundwater quality at the two observation wells is carried out in accordance with Law no.278/2013 on industrial emissions, art.16, para.3, respecting both the analysis deadlines and the quality indicators regulated by the Water Management Permit issued by the National Administration of Romanian Waters to ensure the quality of life and environment.

The protection measure of environment factors and quality of environment factors are objectives that can be found in all environmental policies that try to find a common denominator between economic-social development and the protection of the environment. According to the *Treaty for Environmental Protection Right*, the best available techniques (BAT) standards for water sources are recommended to maintain and improve water quality (Lupan, 2009).

Similar studies have been carried out internationally for environmental factors (air, water, soil, forests). From the bibliographic sources studied, representative of the present paper are five researches dealing with

water quality and its importance for the health of human communities in areas affected by pollution, i.e. agriculture and poultry farming.

A team of Austrian researchers have published a series of papers in the journal *Global Water Pollution and Human Health* with a special focus on agriculture and water quality. It is noted that pesticides and agrochemical substitutes lead to contamination of water resources in watersheds of land close to potentially polluting sites and continuously expose people and the environment to contamination. The most dangerous for human health are those related to water pollution from sewage and drainage systems. From the standpoint of overall environmental impact, a reduction of soil and water pollution is considered a key element in agricultural management practices to minimise ecological change and maintain biodiversity. The study shows that there is a real risk of disease through direct exposure to drinking water from polluted sources, with poor water quality having a direct impact on people's quality of life. It is also noted that for countries that have become members of the European Union more recently, the resources and capacities for monitoring and assessing the risk to humans and the environment are very limited, and that the countries' monitoring programmes differ in continuity from the methods used in developed countries (Larsen et al., 2010).

The study *Global effect. Water pollution and human health* was carried out by a team of specialists from Switzerland, who demonstrated how aquatic pollutants from agriculture affect human health. The study focused on mitigating water pollution, pollution from agriculture/zootechnics caused by diffuse losses from wastewater and pesticides. Issues of current scientific advances to deal with the diversity of pollutants were addressed, as well as some aspects of the urgent need to provide and improve sanitation systems, especially in less developed countries. The findings highlighted that pollution from wastewater sources and agricultural/zootechnical chemicals have short-term impact on human health at local and regional scales. In this respect, there is a need to set up measures and increase the efficiency of *Monitoring Programs* to ensure water quality (Schwarzenbach et al., 2010).

In the paper "The EU poultry meat and egg sector: main characteristics, challenges and prospects", specialists from the European Parliament Research Service (EPRS) have produced a detailed paper on the yield

and types of farms within and between European countries, highlighting that this is one of the most active farming systems at European level. The research aimed to provide an overview of the structure of the poultry sector in the EU, relevant legislation and policy instruments – from CAP (Common Agricultural Policy) support for farmers, to trade and marketing standards, to food safety legislation, to public health and animal health and welfare. The in-depth analysis focused on the main problems affecting the poultry sector, the most common being the intensive production methods used on a large scale. Particular attention was also paid to the European Parliament's resolution on animal health, the use of antimicrobial treatments and the environmental impact of broiler farming. The paper is part of an EPRS (European Parliamentary Research Service) series which focuses on various agricultural sectors in the European Union (Augère-Granier, 2019).

A similar study was conducted at the University of Burdwan (India - West Bengal) in 2019-2020 by a group of ecologists. They conducted a water quality analysis for the quality indicators EC, TDS, TSS, TA, TH and pH, looking at the influence that seasonal variations in climate have on the aquifer. Particular attention was paid to the value of nitrate NO3- (nitrite/nitrate formed by the degradation/oxidation of organic matter/ deject in areas with high livestock and poultry populations (Benciu, 2007). The results of the study showed that the maximum values of quality indicators were recorded in the winter period. Measures were taken in *Water Quality Management Plans* to monitor pollution levels and they suggested the ecological conservation of nitrate affected aquatic areas (Sukhendu Dey et al., 2023).

Representative for this paper is a recent study on biosecurity issues in poultry farms. Taking into account the huge diversity of poultry farming practices and systems across Europe, an extensive qualitative study was carried out at EU level on the issue of biosecurity as an essential tool for healthy animal husbandry. The aim of the study was to provide an overview of the implementation of biosecurity procedures in poultry farming in Europe (according to the specific zootechnical characteristics of each country), in order to better understand the reporting steps and the recognition of potential obstacles arising from the non-implementation of these measures. The research focused on the application of standard hygiene practices for most of the production categories where deficiencies were

found: tank disinfection after each collection, feed silo disinfection and bacterial control, hall disinfection, etc. and it was found that there is a need to improve biosecurity practices at the farmer level. Implementation requires adequate support and supervision from specialists to make the project feasible at individual farm level. For the future, another Netpoulsafe study is underway to look at other views on the implementation of biosecurity measures on poultry farms in Europe (Souillard et al., 2024).

2. Methodology

According to the methodology of scientific research, the steps of the case study were followed: bibliographic documentation through access to primary data, to the Environmental *Monitoring Test Reports* of July and November 2023, to the *Analysis Reports* extracted from the annual reports of the Vaslui Environmental Protection Agency, to the public information on the study objective, to the establishment of the critical analysis method and to the choice of the best method for the success of the investigation. All these analysis reports have been duplicated by analyses on the waters adjacent to the farm, within the limits of the company's safety zone. The laboratory tests were carried out in the Environmental Quality and Biodiversity Laboratory, Faculty of Ecology and Environmental Protection, UEB. However, the study focused on the analysis bulletins carried out in the farm's monitoring programme, as they are complete and conclusive, as they are public documents, thus respecting the confidentiality and security of the commercial company.

The survey was carried out during the calendar period 20 July to 30 November 2023 for three objectives: *sanitary filter* and *administrative pavilion* for wastewater, *technological wastewater* at the point where it is directed to the Vaslui Municipal Wastewater Treatment Plant and at the observation wells for waste storage 1 and 2.

The aim of the research is to analyse the changes in the environmental factor water by pollutants generated from poultry farming activities. The paper deals with the problem of maintaining water quality under conditions of technological wastewater generation in poultry farms with a capacity of more than 40,000 heads per series.

The research was conducted during the calendar period July 20 – November 30, 2023, and the results represent the interpretation of the data from the analysis reports for the technological wastewater emissions collected at the sanitary filter and the administrative pavilion before discharge to the sewer system. A total of 38 samples were taken during this period, of which: 10 at the sanitary filter and the administrative pavilion for domestic water, 14 samples were taken for technological wastewater and 14 analyses were carried out at the observation wells of the manure storage platform 1 and 2 for groundwater monitoring. Six *Test Reports* were drawn up based on these, as follows: three in July (no. 381, no. 382 and no. 383) and three in November (no. 631, no.632 and no. 633). The results of these analyses indicated that the sample taken in July (Test report no. 383/ 23.07.2023); and in November (Test report no. 631/28.11.2023) indicated exceeds the maximum allowable concentration of NTPA 002/2002 of GD no. 352/2002 on the modification and completion of GD no. 188/2002 for the approval of some rules on the conditions of discharge into the aquatic environment of wastewater, NTPA 001/2002 and NTPA 002/2002. For the other samples contained in Test Reports No. 381 and No. 382 of July and Test Reports No. 632, No. 633 of November, the results showed that the values of the quality indicators comply with the legal norms in force provided for by H.G. No. 352/2005 for the approval of some norms concerning the conditions of discharge of waste water into the aquatic environment, NTPA 001/2002 and NTPA 002/2002.

By analogy, the method of interpreting the data from the test reports of 23 July and 28 November and the analysis reports carried out on the technological waste water indicated that the maximum legally permissible concentrations were exceeded for seven quality indicators: pH, suspended solids, BOD5, CrCOC, ammonium, total phosphorus, sulphides and H2S. The results showed that there were exceedances allowed by NTPA 002/2002 for all parameters analysed. The analysis carried out on the sanitary filter and administrative pavilion on 23 July 2023 covered ten pollutants: suspended solids BOD5, CrCOC, fixed residue, detergents, organic solvent extractible, ammoniac nitrogen, sulphides and hydrogen sulphide, total phosphorus and pH. Samples were taken at the points of generation prior to discharge of the wastewater into the sewer system. The results showed that the conditions for the discharge of wastewater into the sewerage system were

complied with, the limit values allowed being within the limits prescribed by NTPA 002/2002. The final results were plotted for each indicator, highlighting the value of the sample in relation to the limits allowed by H.G. no. 352/2005 and Law no. 458/2002 on drinking water quality.

At the end of the research, a series of BAT standards for water (best available techniques) were recommended to maintain water quality by reducing values at quality indicators exceeded. These standards agreed by national and European legislation are also included in the priority objectives set out in the AVICOM SA Vaslui Management Plan for the environmental factor water.

3. CASE STUDY: Pollution possibilities / probabilities of environmental factor – water resulted at AVICOM SA VASLUI farm

AVICOM SA, poultry farm, located in the south-eastern part of Vaslui municipality, is engaged in the *rearing of meat poultry* and falls under CAEN code 0147 – Poultry farming. The technological flow provides for modernized halls for the optimal rearing of poultry, an important role being played by compliance with health standards and maintaining cleanliness in the premises. The sanitation procedure is carried out in stages, starting with washing the walls and floors with sodium hydroxide – 3% concentration, washing the enclosure and rinsing with water and airing the rooms. These operations take place during the sanitary vacuum period, and the wastewater resulting from sanitation is discharged through the sewerage network leading to the Vaslui municipality's wastewater treatment plant.

The ecological analysis was carried out following a potential pollution event of the local water network with pollutants infiltrating into the groundwater body, facilitated by the location of the site near the Vasluieț stream. Of great importance in assessing the deterioration of the quality of the environmental factor water are the concentration of pollutants and the variation of the concentration over a certain period of time. These two parameters give the dimension of water pollution and the impact on the quality of life in the vicinity of the polluting source. (Benciu, 2020, Benciu, et al., 2023).

From the information in the *County report on the state of the environment in Vaslui County 2020,* of *Vaslui Environmental Protection Agency*, livestock farms (zootechnical and poultry) must comply with the Water Law no. 107/1996 with subsequent amendments and additions. The assessment of the chemical status of the water refers to the classification of the sample values in the test reports, in *environmental quality standards* set for the water environment factor: the value of *arithmetic mean* (SCM-MA), the value of *maximum allowed concentration* (SCM-CMA) and quality standards set for the investigation environment BIOTA (SCM Biota), according to the G.H. no. 570/2016 on the approval of the Programme for the phasing out of discharges, emissions and losses of priority hazardous substances and other measures for the main pollutants, the livestock units that are inventoried in the E-PRTR (Emitted and Transferred Pollutants Register) also cover the environmental factor water. According to the provisions of the G.D. no. 352/2005 for the approval of some rules on the conditions of discharge of wastewater into the aquatic environment (completion and modification of the G.D. no. 188/2002) published in Official Journal no. 398 of 11 May 2005; following technological processes, wastewater is treated in the city wastewater treatment plant according to the NTPA001/2002 and NTPA002/2002 regulations.

According to the *Integrated Environment Authorization* water needs of the poultry farm are met from its own sources, and the resource is used as drinking water, for sanitary and hygiene purposes, for technical purposes for the operation of the facilities and as an intangible PSI (Fire Prevention and Extinguishing) reserve. Drinking water is supplied from two sources: *own source* that includes five wells, of which only two are active, functioning permanently and the other three are in a state of conservation. The second source refers to *two active borehole capture facilities* that provide transport to the above-ground storage tank (water tower).

3.1. Impact of poultry activities on environmental factor – water

The poultry farm has poultry rearing facilities of more than 40,000 birds per series, and according to Law No. 278/2013 on industrial emissions, published in the Official Journal No. 671 on 1st November 2013, the economic operator has a legal obligation to ensure the protection of the quality of the

environmental factors set out in the *Integrated Environmental Authorisation*, issued by Vaslui Environmental Protection Agency. At the same time, the water supply and wastewater and rainwater discharge is regulated by the *Water Management Authorization* issued by the National Administration of Romanian Waters – Prut-Bârlad Water Basin Administration. This document is structured according to BAT (best available techniques) provisions concerning:

– water consumption:
  - water consumption is recorded on a monthly basis to track any changes from initial planning;
  - watering systems are inspected on a daily basis for uncontrolled leaks to make sure that water is available when needed;
  - high-pressure equipment is used to clean surfaces in order to lower water consumption.

– wastewater emission:
  - rainwater from hall roofs and concrete alleys is collected separately through gutters and does not come into contact with technological wastewater;
  - the technological process of poultry rearing generates technological and domestic wastewater that are collected in a divider system, through independent networks and directed to concrete tanks that are disposed of by draining;
  - the leachate resulted following the storage of waste on the storage platform is collected in a drainable reinforced concrete basin that is located underground.

The domestic wastewater from the sanitary filter area and the administrative pavilion, generated during 2023, was discharged by emptying with direction to the Vaslui Municipality Wastewater Treatment Plant, verifying the compliance with the limits of NTPA 002/2002 of the G.D. no. 352/2005 on the modification and completion of the G.D. no. 188/2002 for the approval of some rules on the conditions of wastewater discharge into the aquatic environment. Technological wastewater from the period of sanitary vacuum was subject to the same procedure.

At the intake to the sewerage network, analyses were carried out to monitor water quality for seven indicators presented in Table 1. The values obtained from the samples were recorded in the test reports and compared

with the maximum allowed concentrations laid down in GD 352/2005 and according to NTPA 002/2002 with subsequent amendments.

The analysis reports issued by the environmental laboratory showed that the maximum allowable concentrations of the indicators analysed for the technological wastewater were exceeded compared to the limits of NTPA 002/2002 (Table 1 and figures 1÷7).

Table 1

Water quality indicators vs. legal limits imposed by NTPA 002/2002

No.	Quality indicator	Value of Test report No. 383/ 23.07.2023 (mg/l)	Value of Test report No. 631/ 28.11.2023 (mg/l)	Maximum allowed Concentration NTPA 002/2002, GD 352/2005 (mg/l)	Excess value (mg/l) Test Report No. 383	Excess value (mg/l) Test report No. 631
1.	pH	6,68	7,08	6,5-8,5	–	–
2.	Suspended matter	**622**	**592**	350	+272	+242
3.	CBO_5	**517**	**462**	300	+217	+162
4.	CCOCr	**1.292**	**1.147**	500	+729	+647
5.	Ammonium	**64,26**	**47,27**	30	+34,26	+17,27
6.	Phosphorus total	**13**	**15,55**	5	+8	+10,55
7.	Sulphides and H_2S	**15,2**	**14,34**	1	+14,2	+13,34

Source: AVICOM SA poultry farm, Vaslui county – primary data, 2023.

Analysis results. From the interpretation of the processed data it appears that for all analysed indicators for process wastewater (pH, suspended solids BOD5, CrCOC, ammonium, total phosphorus, sulphides and H_2S) the values of the maximum allowable concentration were exceeded well above the legal limit.

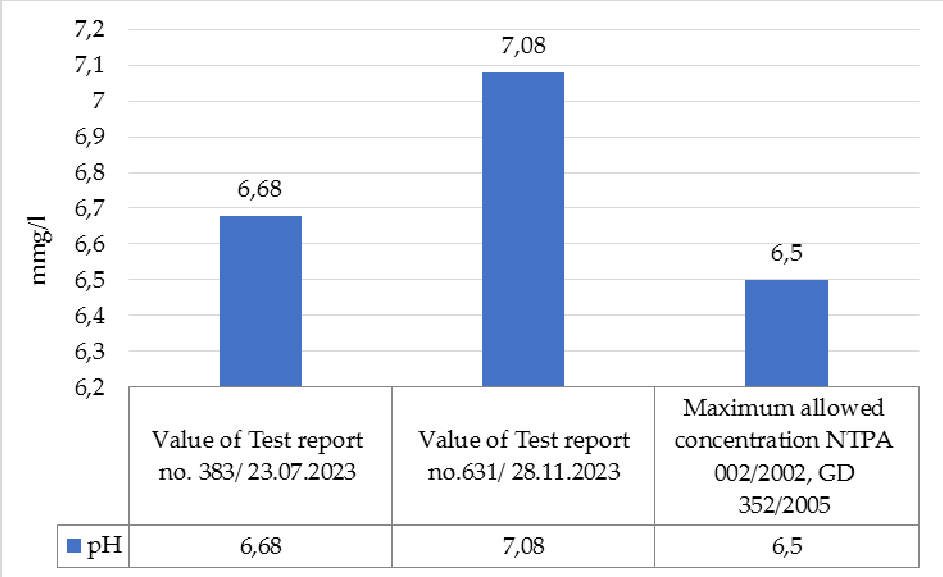

Figure 1. The **pH** value in relation to the c.m.a. allowed by NTPA 002/2002

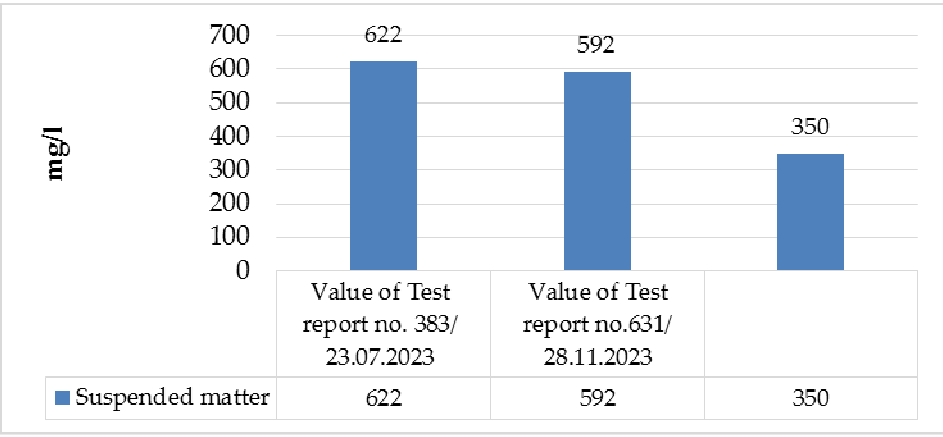

Figure 2. **Suspended matter** values compared to the c.m.a. allowed by NTPA 002/2002

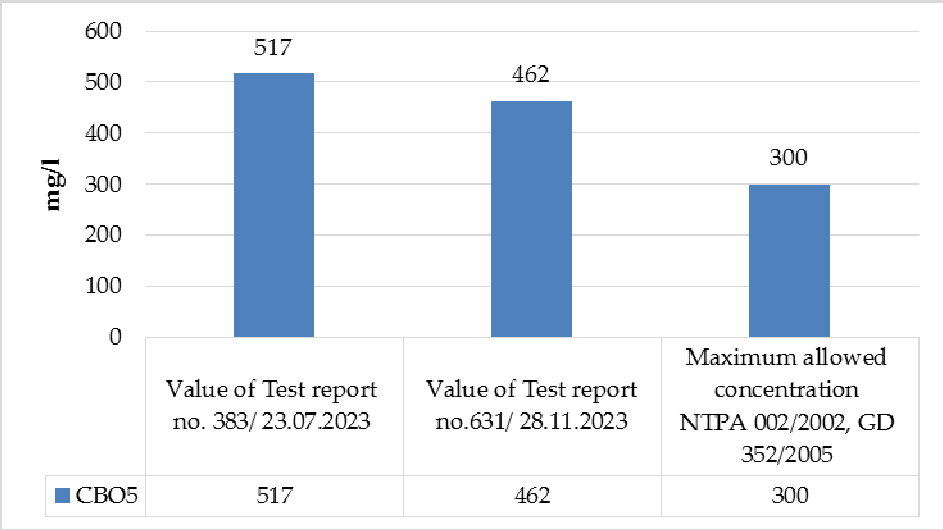

Figure 3. **CBO5** values compared to c.m.a. allowed by NTPA 002/2002

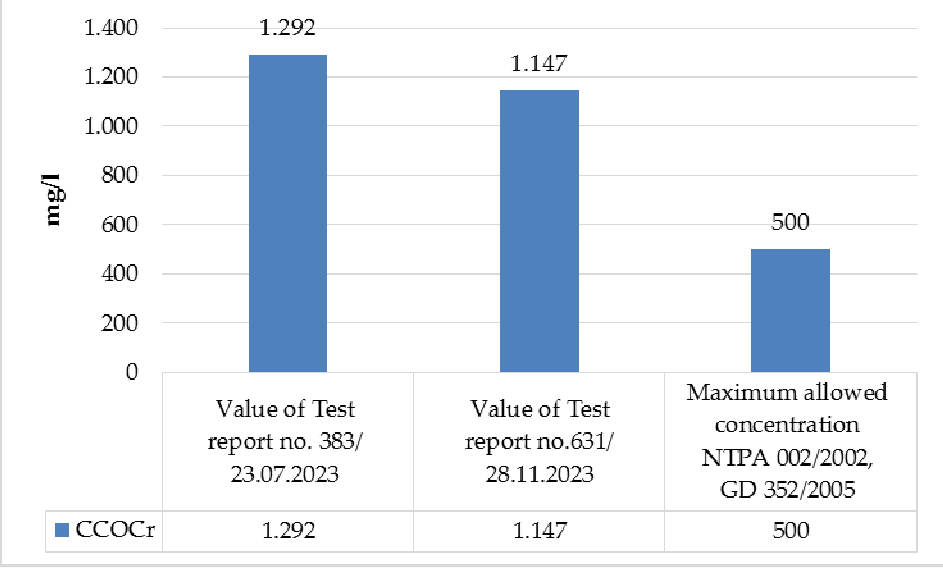

Figure 4. **CCOCr** value compared to c.m.a. allowed by NTPA 002/2002

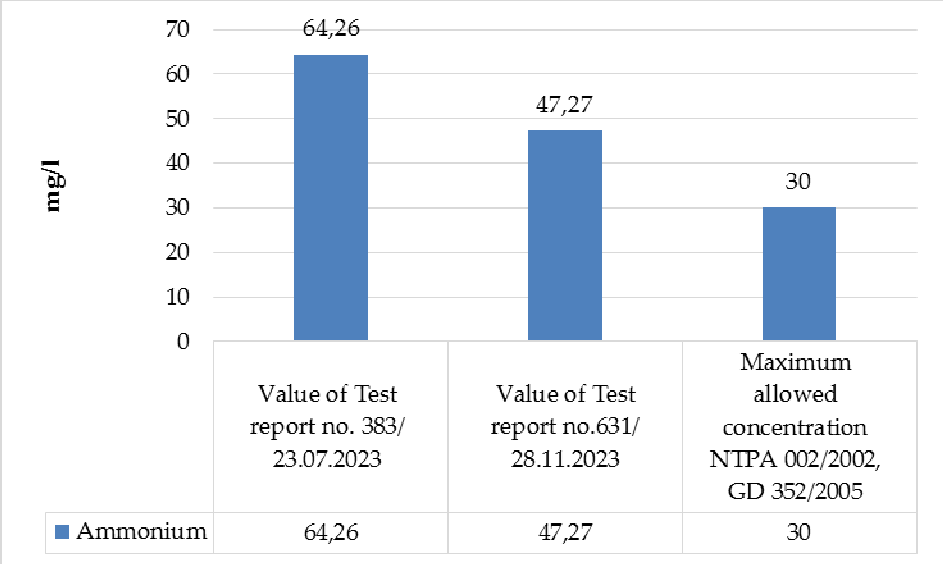

Figure 5. **Ammonium** value compared to c.m.a. allowed by NTPA 002/2002

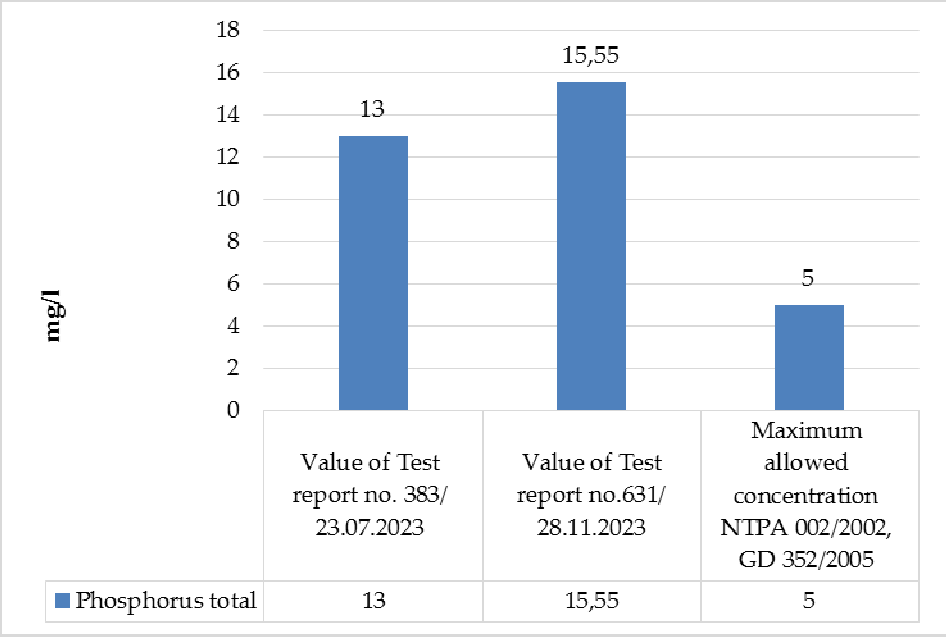

Figure 6. **Total phosphorus** value compared to c.m.a. allowed by NTPA 002/2002

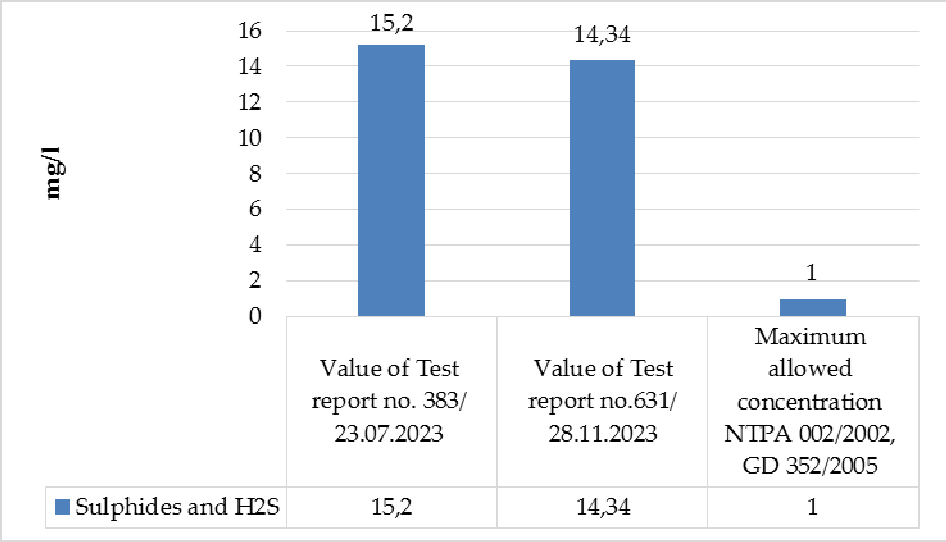

Figure 7. **Sulphur and H_2S** values in relation to the c.m.a. permitted by NTPA 002/2002

Table 2 shows the results of the samples taken at the sanitary filter and at the administrative pavilion – discharge conditions for technological wastewater (Test report no. 382/23.07.2023), compared with the limit values allowed by the NTPA 002/2002.

Table 2

Discharge conditions for technological waste water

Generating point	Water type	Polluter	Allowed Limit Value (mg/l)	Value – Trial report 382/23.07.2023 (mg/l)	Difference (mg/l)
Sanitary filter and administration pavilion	Waste water	pH	6,5-8,5	7,15	–
		Suspended matter	350	296	-54
		CBO_5	300	135,9	-164,1
		CCO-Cr	500	284,65	-215,35
		Fixed residue	2000	820	-1180
		Detergents	25	10,5	-14,5
		Organic solvent extractable substances	30	21,85	-8,15

		Ammoniac nitrogen	30	21,5	-8,5
		Sulphides and hydrogen sulphide	1	0,62	-0,38
		Total phosphorus	5	2,6	-2,4

Source: AVICOM SA poultry farm, Vaslui county – primary data, November 2023.

Analyses result. The interpretation of the results shows that the conditions for wastewater discharge to the Vaslui Municipal Wastewater Treatment Plant are met for the ten pollutants: pH, suspended solids, BOD5, CCO-Cr, fixed residue, detergents, extractable substances with organic solvents, i.e., the values of the samples were within the legal limit values.

The graphical representation was made for values below 30 mg/l (Figure 8) and for values above 300 mg/l (Figure 9).

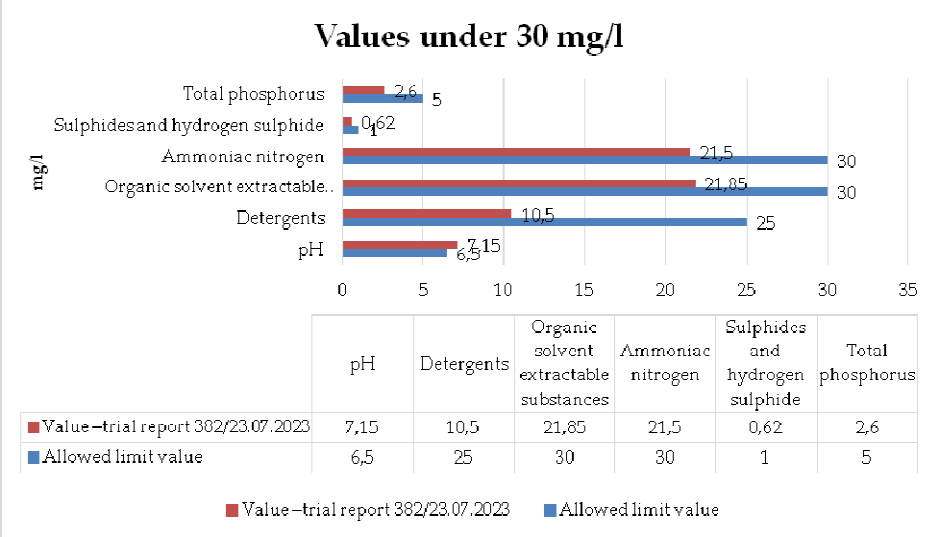

Figure 8. Polluters – wastewater, with values under 30 mg/l

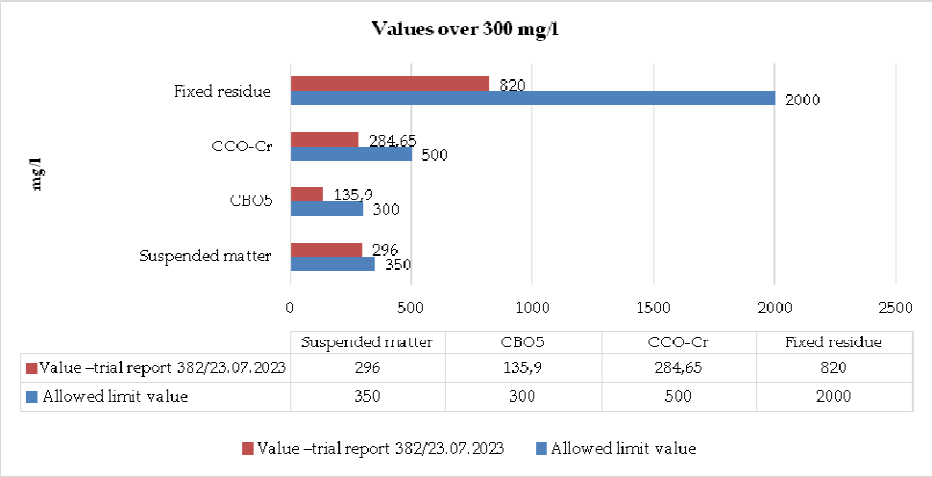

Figure 9. Polluters – wastewater, with values over 300 mg/l

3.2. Groundwater monitoring

According to Law no.278/2013 on industrial emissions, art.16, para.3 "At least once every five years water quality monitoring must be carried out for each of the two observation wells", the indicators being regulated also by the Water Management Permit, issued by the National Administration of Romanian Waters.

In November 2023 measurements were made for a number of 14 indicators that are part of the *Water Quality Monitoring Programme* at the two sampling points Observation Well for excreta storage platform 1 and Observation Well for excreta storage platform 2. The measured values for all parameters are within the limit values allowed under the Law 458/2002 *republished, on drinking water quality, issued by the Romanian Parliament and published in the Official Journal no.875/12.12.2011 (Table 3 and figure 10).

Table 3

Water quality monitoring – values on 28.11.2023

Collection point	Polluter	MU	Measured value	Limit value as per Law 458/2002 on drinking water quality
Observation well for excreta storage platform – 1 Test Report 632/28.11.2023 (mg/l)	pH	units pH	7,1	6,5-9,5
	Residue	mg/l	8,83	0
	Oxidability	O_2 mg/l	1,6	5
	Ammonium	mg/l	0,051	0,5
	Nitrates	mg/l	8,5	50
	Cu^{2+}	mg/l	0,019	0,1
	Zn^{2+}	mg/l	0,75	5
Observation well for excreta storage platform – 2 Test Report 633/28.11.2023 (mg/l)	pH	units pH	7,18	6,5-9,5
	Residue	mg/l	8,35	0
	Oxidability mg O_2/l	O_2 mg/l	1,55	5
	Ammonium	mg/l	0,062	0,5
	Nitrates	mg/l	6,2	50
	Cu^{2+}	mg/l	0,016	0,1
	Zn^{2+}	mg/l	0,89	5

Source: AVICOM SA poultry farm, Vaslui county – primary data, November 2023.

The interpretation reveals that the pollutant ammonium is exceeded at Well 3 by 0.012 mg/l and at Well 1 by 0.001 mg/l above the maximum permitted concentration. The local bibliographical sources mention that the poultry farm was established in 1972, when the first poultry rearing and farming sheds with a capacity of 100,000 birds were put into operation. Thus, it was found that the excesses of ammonium values are historical, coming from the activities of the poultry farm SC AVICOM SA before the modernization of the halls for the breeding of chickens (2000) and the implementation of European regulations on nitrates, fully transposed into the environmental legislation of Romania with the accession to the European area, from January 1st 2007.

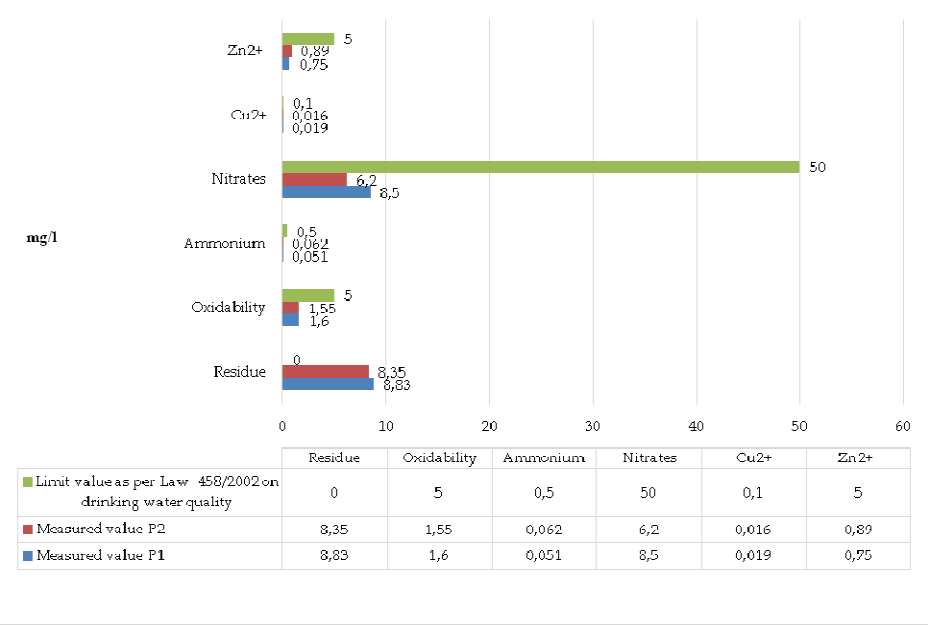

Figure 10. Values obtained from water quality monitoring samples on 28.11.2023

In this context, it is mentioned that the results of the tests on accessible water samples from adjacent areas (drinking water network and samples taken from the Vasluieț river), carried out in the Environmental Quality Laboratory of the Faculty of Ecology and Environmental Protection – UEB, revealed compliant values for nitrates, nitrites, sulphates, ammonium and phosphates. These parameters do not exceed the maximum concentrations allowed by NTPA 002/2002 and are within the values declared on the website of the local public institutions responsible for the quality of life.

In the process of implementing the Nitrates Directive 91/676/EC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources, *Codes of Good Agricultural Practice and Action Programmes* have been adopted. Since June 2013, the decision was taken to apply them to the whole territory of Romania, which has been fully declared a "nutrient sensitive area".

The result of the finding highlights the fact that although poultry farming on farms provides benefits to society, some internal activities can generate pressures on water bodies and thus impact the quality of life in adjacent areas.

Conclusions and recommendations

At present *AVICOM SA* Vaslui poultry farm has an efficient *Management Program* regarding it object of activity, providing internal facilities, organising technological flow and related activities, which reduces the possibility of being a local or regional polluter for adjacent inhabited areas and even the environment. *The Water Emission and Water Monitoring Program* is implemented according to the Water Management Permit issued by ABA-Prut Bârlad, and groundwater monitoring in the area of Wells 1 and 3 is carried out according to Law no.278/2013 on industrial emissions, art.16, paragraph (3).

On the site, domestic wastewater from the area of the administrative pavilion and the sanitary filter is discharged by drainage with a direction to the Vaslui Municipality Wastewater Treatment Plant. Before discharge into the sewerage system, all the parameters analysed must be within the limits of NTPA 002/2002 of the Government Decision no. 352/2005 on the modification and completion of the Government Decision no. 188/2002 approving the conditions for discharging waste water into the aquatic environment.

As far as technological wastewater is concerned, seven analyses of pollution indicators and fourteen analyses at Wells 1 and 3 (seven at each well) were carried out between July and November 2023 with the aim of bringing the sample values within the maximum limits allowed under NTPA 002/2002 as amended. The analysis reports issued by the environmental laboratory showed that the concentrations of the seven pollution indicators analysed were exceeded.

The analysis and results of the wastewater quality indicators at the generation points (sanitary filter and administrative pavilion) showed that the discharge conditions laid down in Order No.756/1997 approving the Regulation on the Assessment of Environmental Pollution are met.

The conclusions show that the environmental factor – water – is not affected by pollution from the poultry farm activities, as the environmental protection obligations laid down in the regulations and legislation in force are respected. It is also stated that the farm has a health protection zone and complies with the minimum protection distances foreseen in WHO no. 994/2018, art.11, for poultry farms with more than 10,000 flocks.

The recommendations are aimed at maintaining and improving the quality of life in inhabited environments close to institutions that may cause environmental pollution and discomfort to the population:

- Retrofitting of existing infrastructure facilities and/or technological processes to achieve legal water quality parameters after treatment.
- Proper sanitary maintenance of water facilities for the entire farm, with special attention to both the poultry house and the administrative pavilion.
- Notification of Vaslui Environmental Protection Agency whenever irregularities are detected with regard to the quality water supply system in the farm premises, since, according to art.78, paragraph (1) of the Water Law no.107/1996 "The water management activity and compliance with the provisions of this law are subject to specialized control."
- Regular inspection of water installations to check that they are operating as specified in the Water Management Permit.
- Support of projects for the upgrading of wastewater treatment plants and plants, with the ultimate objective of improving water quality.
- The water quality monitoring programme (surface and groundwater, including protected areas) must comply with Article 8 (1, 2) of the Water Framework Directive for a better understanding of its status.
- Evaluation of surveillance, operational and investigation programmes to ensure more effective design of future monitoring programmes.
- Increase of the number of analysis parameters (according to Annex V of Water Framework Directive) and the *Updated Management Plan of the Prut – Bârlad River Basin Area 2016 – 2021* with annexes 2021 (vol. 1 and vol. 2), approved by GD no. 859/2016 for the approval of the updated National Management Plan for the part of the Danube International River Basin falling within the territory of Romania, published in the Official Gazette no. 1.004 of 14 December 2016.
- Adoption of high-performance analytical methods for priority substances.
- Review of analytical performance criteria.
- Holding open sessions (periodical – quarterly or annual), public meetings, round tables, in which the participants are representatives of the local community and population, who will be joined by

representatives of the Environmental Protection Agency of Vaslui municipality. During these meetings, topics on environmental protection issues will be presented, emphasizing the role of knowledge and application of environmental legislation in ensuring a higher quality of life.

– Implementing a planting program for a forest/ hedge with both sanitary protection and recreational and educational purpose for local population. This will benefit both *AVICOM SA*, and the locals and will improve the quality of life.

The suggested recommendations can prevent some of the shortcomings observed during the preparation of the case study and are feasible in the short, medium and long term.

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DECLARATION OF CONFLICTING INTERESTS

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