International Conference Sustainable Agriculture and the Environment
Mostaganem May 27 and 28, 2024

STUDY OF GROUNDWATER POLLUTION IN SKIKDA

NEFLA Loubna[1,2*], BERGAL Amira[3], GHEID SAMIRA[3], BOUMARAF Warda[3], BOUKSSIBA Charazed[1,2]

•[1] *Laboratoire de biodiversité et pollution des écosystèmes, Département de Biologie, Faculté des Sciences, Université Chadli Bendjedid, El-Tarf, , BP 73, 36000, EL TARF, Algeria*

•[2] *Faculty of Natural and Life Sciences, Department of Biology. University Chadli Bendjedid El Tarf, Algeria, BP 73, 36000, EL TARF, Algeria.*

•[3] *Laboratory SEAGROE. .Faculty of Natural and Life Sciences, Department of Biology. University Chadli Bendjedid El Tarf, Algeria, BP 73, 36000, EL TARF, Algeria.*

•*e-mail :l.nefla@univ-eltarf.dz*

1 iNTRODUCTION

The aim of this study is to assess the physico-chemical and bacterial quality of water in several areas of the Skikda region. Through this study, I analyzed three articles dealing with variations in the pollution of groundwater and certain surface waters in certain regions of the wilaya of Skikda. I extracted the results of the physico-chemical and bacteriological analyses carried out by the researchers, and concluded that the waters of the wilaya of Skikda suffer from significant pollution due to human and natural factors.

2 METHODS AND MATERIALS

ARTICLE	METHODES
01: According to M.Khelfaoui et all 2022 In order to assess the impact on water quality of the abandoned Sidi Kamber mine in Skikda, NE.  	Conventional hydrochemical methods, heavy metals pollution index (HPI) and multivariate statistical analysis techniques: correlation matrix (CM). Principal component analysis (PCA) and hierarchical cluster analysis (HCA) were used. Multivariate statistical analysis (MSA) was performed on twenty-eight water samples for metals, using statistical software (SPSS).
02: According to S.Ouamane and All 2022, the aim of their study is to assess the physicochemical and bacteriological quality of drinking water from different sources in the Skikda region, Algeria (groundwater, dams and desalination). The study was carried out over a period of 3 months and focused on the physico-chemical aspects and bacteriological analysis of drinking water from different sources: groundwater from the western region of Skikda (2 underground springs located in the Collo mountains (Ouled Atia), water from the Béni Zid and Oum Etoub dams).	Measured in each water sample taken per month and per site. The analysis focuses on the quantification of fecal indicator bacteria (total coliforms, thermomotolerants, fecal streptococci and sulfo-reducers) using the most probable number (MPN) liquid enumeration method and agar incorporation; as well as the determination of certain physico-chemical parameters (electrical conduction, contivity, pH, dissolved oxygen, etc.).
03: According to S.Bouhayene et all 2018. a study deployed over one year, between February 2015 and January 2016 at the rate of a monthly sampling and having for objective the hygienic evaluation (physicochemical and bacteriological) of the quality of wastewater of as well, as drinking water and also for domestic activities by the population of the region of Larbi Ben M'hidi - Skikda.	The main physico-chemical and bacteriological elements of water quality were therefore measured, so a bivariate analysis, which mainly consisted in calculating the Bravais-Pearson linear correlation coefficient between variables, and a principal component analysis (PCA) were carried out on the medium stocks of each parameter. A total of 168 water samples were taken from 07 wells likely to pose a health risk to their users.

3 RESULTS

ARTICLE	RESULTATS
01	For surface water, the results show that the El-Souk river has a high level of pollution, but water from the Guenitra dam is less contaminated. As for groundwater, wells and springs are not suitable for drinking. The overall quality estimated by HPI values of surface and groundwater is poor, and may present a potential health risk for the local population, as both surface and groundwater are contaminated by two sources: anthropogenic and natural. According to the results obtained, the state of surface and groundwater pollution in this area raises serious health and environmental concerns.
02	Physico-chemical • Spring water from the Ouled Atia site (S2) is of good quality according to national and international standards. • Beni Zid spring (S1), Oum Etoub dam (S4) and desalination water (S5) are of acceptable quality. • The Béni Zid dam (S3) is of poor quality, which can be justified by the dam's siltation status. • The water analyzed does not contain any heavy metals, which enables them to conclude that the water is of good drinking quality, Bacteriological • Ouled Atia spring (S2), Béni Zid and Oum Etoub dams (S3 and S4), and desalination water (S5) are of good bacteriological quality. • Beni Zid spring (S1) is of poor quality.
03	• Significant and almost permanent microbial pollution in some of the water points studied, from runoff and domestic and industrial wastewater. • Low-level chemical pollution in all wells, originating from discharges from agricultural and/or domestic activities. • To avoid possible health risks, the adoption of hygienic measures for water transport and storage, including periodic chlorination of well water at family level, was recommended for the population concerned; and permanent management and/or control of polluted wells and water sources near potential pollution points was recommended to local authorities and hygiene services.

4 CONCLUSION

These studies led to the conclusion that bacteriological and physico-chemical contamination of water in certain camps in the Skikda willaya varied from one group to another. This study also demonstrated the importance and usefulness of univariate and multivariate statistical analysis techniques for obtaining information on the hygienic quality of water and preventing all kinds of pollution from domestic, agricultural and/or industrial activities. The results of these studies will be of great interest to health services, leading to the implementation of preventive and curative actions to avoid potential serious health risks.

5 REFERENCES

[1] malika khelfaoui, A. Benaissa, S. Kherraf, M. S. Madjram, I. Bouras, et karima Mehri, « Assessment of groundwater and surface water pollution by hazardous metals using multivariate analysis and metal pollution index around the old Sidi Kamber mine NE Algeria », *Pollution*, vol. 8, nº 3, mai 2022, doi: 10.22059/poll.2022.335695.1294.

[2] S. Ouamane, A. Bouzekri, et L. Mezedjri, « Physicochemical and bacteriological quality of drinking water from different regions of the wilaya of Skikda (Algeria) », *Biodiversity Journal*, vol. 13, nº 2, p. 381-385, juin 2022, doi: 10.31396/Biodiv.Jour.2022.13.2.381.385.

[3] S. Bouhayene et D. Gueddah, « Approach Statistical the Underground Water Pollution of Larbi Ben M'hidI - North-East Skikda », *IJEBS*, vol. 01, nº 01, p. 8-15, avr. 2018, doi: 10.30558/ijebs.20180101003.