Comparative Analysis Of Anthropogenic Impact On Surface Waters In Kharkiv Region

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Compared to other types of water, surface waters are under the most anthropogenic pressure. The paper analyzes the state of a number of bodies of surface water of the Kharkiv region (Ukraine), which are under various types of anthropogenic impact. Total dissolved solids (TDS) and conductivity indicators are used as parameters of comparison. The impact of agricultural activities and the urban run-off on the state of the water bodies have been studied. There is more influence of the urban run-off from more built-up areas of the city compared to detached house areas. The obtained total dissolved solids values of the bodies of water of Kharkiv region vary in the range of 190–700 mg/L and the conductivity is 280–1070 μS/cm with a measurement error of 2% max for the conductivity and TDS.

KEYWORDS

Water quality, Urban run-off, Agriculture, Electrical conductivity, Total dissolved solids

REFERENCES

1. Baker, A. 2006. Landuse and water quality. **In** Encyclopedia of hydrological sciences. **Ed** M.G. Anderson and J.J. McDonnell. John Wiley and Sons, Ltd. doi:10.1002/0470848944.hsa 195.
2. Rakh, G.B. and M.B. Mule. 2019. Physico-chemical parameters study of sewage from open sewerage system of urban areas of Aurangabad city. *Indian J. Env. Prot.,* 39(1):3-16.
3. Kandlikar, A. and A. Bhosle. 2019. A study on watr nutrient content of Dhanora reservoir-An ecological and pollution investigation. *Indian J. Env. Prot.,* 39(4):364-368.
4. Wang, Y. 2018. Investigation and analysis of water environment of Dalian. IOP Conf. Ser.: Earth Environ. Sci., 189 052023.
5. Mohsin, M., *et al.* 2013. Assessment of drinking water quality and its impact on residents health in Bahawalpur city. *Int. J. Humanities and Social Sci.,* 3(15):114-128.
6. Chatanga, P., *et al.* 2019. Situational analysis of physico-chemical, biochemical and microbiological quality of water along Mohokare river, Lesotho. *The Egyptian J. Aquatic Res.,* 5(1):45-51.
7. Chen, J. and J. Lu. 2014. Effects of landuse topography and socio-economic factors on river water quality in a mountainous watershed with intensive agricultual production in east China. *PLoS One.* 9(8):e102714. doi:10.137/journal. pone.0102714.
8. Yu, S., *et al.* 2016. Effect of landuse types on stream water quality under seasonal variation and topographic characteristics in the Wei river basin, China. *Ecological Indicators.* 60:202-212.
9. Muhammad, S., S. Nadeem and R. Saeed. 2014. Determination of water quality parameters of water supply in different areas of Karachi city. *European Academic Res.,* I(12):6030-6050.
10. Adeola Fashae, O., *et al.* 2019. Landuse and surface water quality in an emerging urban city. *Appl. Water. Sci.,* 9:25. https://doi.org.10.1007/s13201-019-0903-2.
11. Haydar, S., M. Arshad and J.A. Aziz. 2009. Evaluation of drinking water quality in urban areas of Pakistan: A case study of southern Lahore. *Pak. J. Eng. and Appl. Sci.,* 5:16-23.
12. Khan, S., *et al.* 2018. Drinking water quality in 13 different districts of Sindh. *Pakistan Health Care Current Reviews.* 6:4. DOI:10.4172/2375-4273.1000235.

13. Giri, N. and O. Singh. 2013. Urban growth and water quality in Thimphu, Bhutan. *J. Urban and Env., Eng:,* 7(1) 82-95. DOI: *https://doi.org/10.4090/juee. 2013.v7n1.*
14. Bai, X., *et al.* 2018. Occurrence, distribution and seasonality of emerging contaminants in urban watersheds. *Chemosphere.* 200:133-142.
15. Sharma, B.M., *et al.* 2019. Health and ecological risk assessment of emerging contaminants (pharmaceuticals, personal care products and artifical sweeteners) in surface and groundwater (drinking water) in the Ganges river basin, India. *Sci. the Total Env.,* 646:1459-1467.
16. Gogoi. A., *et al.* 2018. Occurrence and fate of emerging contaminants in water environment : A review. *Groundwater for Sustainable Develop.,* 6:169-180.
17. Taheran, M., *et al.* 2018. Emerging contaminants : Here today, there tomorrow! *Env. Nanotech. Monitoring and Manage.,* 10:122-126.
18. Petrie, B., R. Barden/B. Kasprzy-Hordern. 2015. A review on emerging contaminants in wastewaters and the environment : Current knowledge, understudied areas and recommendations for future monitoring. *Water Res.,* 72:3-27.
19. Dubinin, D., *et al.* 2018. Improving the installation for fire extinguishing with inelydispersed water. *Eastern European J. Enterprise Tech.*, 2 (10-92):38-43. DOI:10.15587/1729-4061.2018. 127865.
20. Mygalenko, K.*, et al.* 2018. Development of the technique for restricting the propagation of fire in natural peat ecosystems. *Eastern European J. Enterprise Tech.*, 1(10-91):31-37. DOI:10.15587/1729-4061.2018.121727.
21. Long, Y.*, et al.* 2019. Integrated assessment method of emergency plan for sudden water pollution accidents based on improved TOPSIS, shannon entropy and a coordinated development degree model. *Sustainability*. 11(2):510.
22. Abramov, Y.A.*, et al.* 2018. Model of thermal effect of fire within a dike on the oil tank. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu.* 2:95-100. DOI:10.29202/nvngu/2018-2/12.
23. Giri, S. and Z. Qiu. 2016. Understanding the relationship of landuses and water quality in twenty first century : A review. *J. Env. Manage.*, 173:41-48.
24. Namugize, J. N., G. Jewitt and M. Graham. 2018. Effects of landuse and land cover changes on water quality in the uMngeni river catchment, South Africa. *Physics and Chemistry of the Earth, Parts A/B/C.*105:247-264.
25. Bo, W.*, et al.* 2017. Influence of landuse and point source pollution on water quality in a developed region : A case study in Shunde, China. *Int. J. Env. Res. Public. Health*. 15(1):51.doi:10.3390/ijerph15010051.
26. Cheng, P.*, et al.* 2018. The impacts of landuse patterns on water quality in a Trans-Boundary river basin in northeast China based on eco-functional regionalization. *Int. J. Env. Res. Public Health*. 15(9):1872. 9. doi:10.3390/ijerph15091872.
27. Mateo-Sagasta, J.*, et al.* 2017. Water pollution from agriculture: A global review. Executive summary. Published by the Food and Agriculture Organization of the United Nations, Rome and the International Water Management Institute on behalf of the Water Land and Ecosystems Research Programme, Colombo.
28. Evans, A.EV., *et al.* 2019. Agricultural water pollution: Key knowledge gaps and research needs. *Current Opinion in Env. Sustainability.* 36:20-27.
29. Mateo-Sagasta, J., S.M. Zadeh and H. Turral. 2018. More people, more food, worse water? A global review of water pollution from agriculture. Published by the Food and Agriculture Organization of the United Nations Rome and the International Water Management Institute on behalf of the Water Land and Ecosystems Research Programme of the CGIAR, Colombo.
30. Camara, M., N.R. Jamil and A.F.B. Abdullah. 2019. Impact of landuses on water quality in Malaysia: A review. *Ecol. Process.,*8:10. https://doi.org/10.1186/s13717-019-0164-x.
31. DSTU ISO 5667-3-2001. 2001. Water quality. Sampling. Part 3. Guidance on the storage and handling of samples (ISO 5667-3: 1994, IDT). K .: Derzhspozhyv standard (in Ukranian).
32. DSTU ISO 5667-6: 2009. 2009. Water quality. Sampling. Part 6. Guidelines for the sampling of water from rivers and streams (ISO 5667-6: 2005, IDT). K.: Derzhspozhyv standard (in Ukranian).
33. DSTU ISO 5667-11: 2005. 2001. Water quality. Sampling. Part 11. Guidance on the sampling of underground water samples. K.: Derzhspozhyv standard (in Ukranian).
34. Andronov, V., B. Pospelov B. and E. Rybka. 2016. Increase of accuracy of definition of temperature by sensors of fire alarms in real conditions of fire on objects. *Eastern European J. Enterprise Tech.*, 4 (5-82):38 44.
35. Dvorkin, V.I. 2001. Metrology and quality assurance of quantitative chemcial analysis. M. : Chemistry (In Russian).