

Kolwzan, B. Use of Biosensors for the Assessment of Water Quality. *Ochrona Srodowiska* 2009, Vol. 31, No. 4, pp. 3–14.

Abstract: Water quality assessments are based on the analysis of the physical, chemical and bacteriological parameters chosen, which requires customized apparatus and trained staff. Such analytical procedures differ in duration. For example, a bacteriological analysis with the relevant replications may take as long as several days. The need of supplying the user with water of the quality desired has triggered action to find new techniques that would enable the results of analysis to be obtained within a shorter time. Time is a crucial factor, as there is the potential risk that pathogens will be transmitted in the aquatic environment, which is also open to bioterrorist attacks. Recent advances in science and technology, and biotechnology in particular, have led to the design and construction of high-selectivity biosensors enabling the presence of chemical and biological water pollutants to be detected in a short time span. Biosensors combine the sensitivity and selectivity of classic analytical methods with a wide spectrum of advanced technological designs. The study reported on in this paper is focused on examining the biological materials used as detectors in biosensors, as well as various types of biological phenomenon/electric signal converters. Particular consideration is given to the problem of how the sensitivity and selectivity of the biosensors compare with the sensitivity and selectivity of the classic analytical methods. It has been demonstrated that the use of biosensors is very promising for the determination of water quality variations, as they enable a quick detection not only of chemical substances but also pathogens (viruses, bacteria, protozoa) that are present in the water. This offers the possibility of producing quick assessments of both ‘single’ water quality parameters that are used in water analysis and ‘groups’ of water quality parameters (organic matter content, toxicity, mutagenicity, carcinogenicity), which have also found wide acceptance in analytics. The use of biosensors in the monitoring of water distribution systems will substantially upgrade the quality and safety of the water supplied for human consumption.

Keywords: Water quality, biosensor, chemical quality, biological quality.