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The current state of electrochemical methods of analysis for the study of water systems

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Abstract

An overview of the works published from 2005 to 2021 on the use of electrochemical methods in the analysis of water systems is given, certified and standardized measurement methods are indicated. The complexity of modern problems of public health protection forces researchers to use all modern highly sensitive methods of analysis to solve them. The purpose of the scientific review article is the theoretical substantiation of the current state of electrochemical methods of analysis in research and experimental works in the field of studying water systems. The main task of the work is to systematize and generalize publications mainly in the period from 2011 to 2021, to identify modern possibilities of electrochemical methods of analysis for the study of water systems. Among the publications identified on the topic, there are three review articles on this topic and two monographs. The article presents the results of a biochemical study of aqueous media according to the indicator of antioxidant activity. Modern ideas about the properties of water are based on its cluster structure, to which a significant number of theoretical and experimental works are devoted. They indicate that the structure of water is formed by clusters that are built from water molecules held by hydrogen bonds. We report on the development of our own water quality index, which additionally includes the parameter of their total antioxidant activity, the reactions of water structures with free radicals include electron transfer, which allows us to use electroanalysis methods for their determination, characterized by high sensitivity, speed of the procedure and relatively low cost. In another review, examples of the use of various nanomaterials in electroanalytical analysis methods are considered, and in the third, electrochemical analysis methods in flow analytical systems are described. The

application of the method of galvanostatic coulometry in determining the antioxidant activity of various types of biological raw materials and products of their processing, with a detailed description of the certified and standardized methodology, the properties of water clusters and their relationship to the structure are given in monographs.

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