CZU: 504.4.054:577.164.1

ADAPTATION OF THE METHOD FOR DETERMINING VITAMIN B_9 IN AQUEOUS SOLUTIONS

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Assessing the impact of natural waters pollution with chemical compounds is a complex and difficult process, especially at the stage of quantitative determination of pollutants in water composition, which are complex and multiphase systems. From a chemical point of view, pollution can be interpreted as the entrainment of the polluting compound in the processes of chemical self-purification and the shift of the dynamic equilibrium in the sense of the dominance of the reducing compounds. The pharmaceutical industry can become a dangerous source of natural waters pollution because pharmaceutical preparations contain biologically active substances. Once in the water, such substances not only upset the balance of self-purification processes, but can also show toxicity to hydrobionts.

Thus, in order to evaluate the intake of vitamin B_9, on the processes of chemical self-purification and the redox state of natural waters, the optimal conditions for modeling the systems in which vitamins have the role of potential pollutants were established. Vitamin B_9 is marketed as tablets, and 5 mg tablets were used in the study. Given that the modeled systems simulate the redox and photochemical processes of water self-purification, in which other substrates are present, such as hydrogen peroxide, transition metal ions (Cu, Fe), the selected spectrophotometric method must meet certain criteria, namely that other substrates must not interfere with the determination of the vitamin concentration. Secondly, it is necessary to select the optimal conditions for "preparation" of the vitamin solution from the pharmaceutical forms used, in order to obtain true results.

Vitamin B_9 in the form of tablets contains the following excipients: glucose and stearic acid. Therefore, the solution prepared in distilled water has turbidity. In order to eliminate the turbidity caused by stearic acid, 2 methods were applied: filtering through a simple paper filter and centrifugation (V = 3500 rpm, t = 15 min), and subsequently recorded the UV absorption spectra in the UV domain for comparison. Both procedures showed the same result, the absorption maximum wavelength for vitamin B_9 solution is 281 nm in both cases. The maximum absorption of vitamin B_9 solution allows its direct determination with the construction of the calibration curve A = f (C), because this wavelength does not coincide with the absorption maximums of other substrates in the modeled systems. In order to demonstrate that the pH of the system does not influence the proposed spectrophotometric method, the UV absorption spectra were recorded at different pH values, respectively the wavelength of the absorption maximum is in all cases the same - 281 nm.

Further in the study of the legitimacy of the participation of vitamin B_9 in chemical self-purification processes of aquatic systems for the fast and effective quantitative determination, the spectrophotometric method will be used, based on the own absorption of the substrate in the UV spectrum.

Keywords: vitamin B9, chemical self-purification, redox state, natural waters, photochemical processes.