DOH P2 LASER SPECTROSCOPY FOR ANALYSIS OF WATER ON THE CONTENT OF TOXIC IMPURITIES

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Toxic, harmful and dangerous for human health and the whole ecosystem pesticides that are widely used in agriculture nowadays, often pollute natural waters. Therefore, when we use natural waters for various industrial and technological purposes or in particular as a drinking water, it is of growing importance to develop reliable methods to control concentration and stability of dissolved organic matter. One of the main methods used to determine the concentrations of organic substances dissolved in water is fluorimetry. This method, based on the principle of calibration of the fluorescence signal of dissolved matter to the internal standard - the Raman scattering (RS) signal of solvent molecules, stands out as very simple, highly sensitive and accurate way of qualitative and quantitative determination of impurities in water.

With the aim to study photochemical processes taking place in aqueous solutions, we measured pesticides solution photoluminescence (PL) spectra under the influence of light irradiation sunlight UV. It was established that the intensity of the characteristic photoluminescence bands can be determined for pesticide concentration as low as 10^{-7}-10^{-8} mg/l. This value is lower than minimum contaminant levels (MCL) of many pesticides dissolved in water. Optical signals of Fuzilade-super aqueous solutions in different concentrations, normalized to the water RS spectra are shown in fig.1. The shape of some spectra (fig.1, curve 1) suggests a superposition of numerous irradiating processes occurring in one time. To distinguish these processes we used Gauss function. Peak λ_1 was observed for the main compound in concentrations up to MCL. Shape and position of this PL peak of solutions measured after 72 hours and 6 months of exposure to the UV completely coincide with the initial ones, which mean that the specimens are stable. The material in general is weakly sensitive to the light action. The exposure of the specimens in the light during 2 hours practically does not change the shape and intensity of the rest of fluorescence spectrum as well (fig. 1, curves 2, 3). Intensity of the peaks at λ = 410, 420 and 460 nm as a function of solution concentration is shown in fig.2. Obtained information could contribute to the analysis of the complex fluorescence spectrum of natural water.

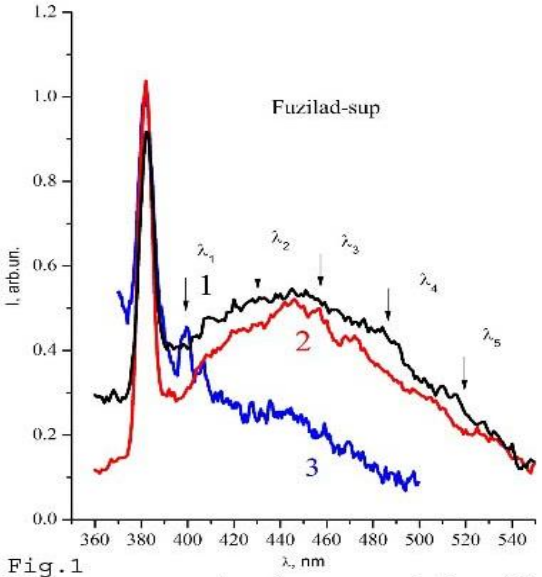

Fig.1
Fluorescence spectra of agueous solution of fuzilad:
1- immediately after preparation
2- after exposure in dark during 144 hours
3- after exposure in dark during 6 month's

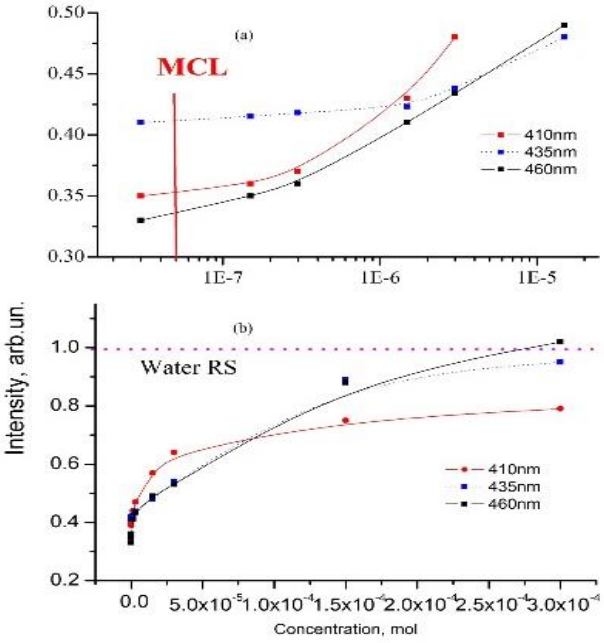

Fig.2 Concentration nomogram's of the fuzilad-super