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THE TECHNICAL APPROACHES OF HUMIC SUBSTANCES INVESTIGATION IN SURFACE NATURAL WATERS

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Humic substances (HS) are ubiquitous component of organic matter presented in natural waters and grounds. HS are produced by complicated mixture of organic polyelectrolytes with different molecular weight, structural features and functional-grouping composition. HS are created in grounds and natural surface waters during the polycondensation process of different biomolecules [1]. Due to the water solubility all HS of natural waters are divided into the two groups: fulvic acids (FA) and humid acids (HA). FA are soluble at full range of pH of aquatic environment, while HA at the pH 2,0 and lower are insoluble [5]. It is known fact that in comparison to the biological polymers HS are not created by genetic code, however humus creation occurs under the natural environmental conditions and therefore each of HS molecule structurally is unequal. Chemical structure and properties of HS are substantially depending on structure and chemical properties of their parent substances, but both of them are only recently studied [1].

Due to the ecological meaning, it is difficult to overestimate the role of HS in functioning of hydro-ecosystems. As a matter of the fact, HS are very important source of organic substances in the total natural environment and nutrients for the aquatic plants and animals.

Furthermore, HS are a basic store of organic carbon in its global cycling and play very important role in nitrogen and phosphorus cycles. Humic compounds are dominative component among other natural aquatic organic substances [1]. However, the high content of HS in water objects has both positive and negative consequences. On the one hand, it is established out fact, that the HS due to their complexation properties are able to the binding some heavy metal ions and organic toxicants in the complex compounds and organic adducts, which in the consequence, are voided the toxic properties, whereby their detoxification is provided. On the other hand, high HS content provokes the decreasing of algae photosensitive activity and also induces decreasing of dissolved oxygen concentration, which is spent by their oxidation [1].

In this paper only partial aspects of HS investigation are represented. For derivation of HS from the natural water different adsorbents are used [1, 6]. For achieve this aim, dietylaminoetylcellulose (DEAE-cellulose) are usually applied. However, even using DEAE-cellulose can not preventive some losses of HS, that may have been happened at the derivation process. Moreover, higher content of HS in the water under research provokes their greater losses at the derivation process. The first of all, this problem concerns to the high colored waters, because in this occurrence losses of HS are the highest and may have been achieved to 18–25%. It was elucidated that, the using of three-stage desorbing scheme by 0.3 N NaOH and 0.1 N H_2SO_4 solutions is the best way to resolution of this problem, because this tool provides the most completely derivation of HS from DEAE-cellulose. It is known that degree of concentration of HS at the DEAE-cellulose column is none the less significant thing because, HS molecular weight distribution (MWD) depending on its value can be changed. It is proven fact that, the excessive concentration grade provokes the aggregation of HS molecules whereby the share of high molecular compounds in HS composition is increased. Do to the obtained results, relative content of high molecular compounds may have been increased from 49 to 58%. The Changes like these are usually observed at the passing through DEAE-cellulose column the high colored waters, such as bog's water or water from Prypiat River. However, concentration degree is very important value for the investigation of low colored waters. On the grounds of carried out observation it was established that the optimal degree of concentration for the high colored waters is equal to 10-12 times, while for low colored ones it is 40-50 times.

Separation of HS on the humid and fulvic acids is carried out by way of acidification of their solution to pH 1,5-2,0 at the room temperature with following coagulation and precipitation that happens during 24 hours. HS separation is required for estimation of the complexion ability of HA and FA with ions of different metals. It is known, that during the separation process some irreversible changes of HS structure can be occurred. However, prevention of them remains impossible because alternative method of the HS separation is not invented. For determination of HS concentration molecular spectroscopy methods are usually applied, especially method of spectrophotometry and fluorescent spectrometry are used the most frequently [6]. Spectrophotometric determination is grounded on the measurement of the optical density at the 254 nm of wavelength. Concentration of HA is estimated by its self light absorption while, for the FA determination method of azocombination is used. Moreover, HS content in the water environment is also fond by the measurements of water colority. As a consequence of our investigation it was established that results of measuring the optical density at 254 nm of solutions in comparison to other methods give slightly overestimated values of HS content, this is also evidenced by the results of our studies.

Due to the observation results, some discrepancies also arise among the results of HS MWD estimation obtained by method of spectrophotometry and fluorescent method at the applying both sectrophotometry and fluorescent methods for the HS MWD estimation which is carried out after its gel-chromatography separation process. Evidently, that the HS with different molecular weights have different fluorescent and light absorption properties [3, 4, 6].

For the MWD investigation of HS gel-chromatography and ultrafiltration methods are usually used [2]. Furthermore, above mentioned gel-chromatography method has proven to be a high performance and reliable tool for the MWD investigation not only of HS, but also for other dissolved organic substances [2].

In detail results of investigation are evidenced in the report.

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DEDIAZONIZATION OF ARYLDIAZONIUM TOSYLATES IN THE PRESENCE OF TRIFLUOROMRTHYLSULFIDE ANIONS

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The high reactivity of aromatic diazonium salts necessitates their use immediately after preparation, so these compounds are often not isolated from solutions in their individual state (halides, nitrates, sulfates, perchlorates, etc.). Aryldiazonium salts with complex anions