THE ROLE OF VARIOUS FRACTIONS OF HUMIC SUBSTANCES FROM SURFACE WATER IN BINDING Al(III), Fe(III), AND Cu(II) INTO COMPLEXES

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Abstract. The aim of this research work was to evaluate the role of various fractions of humic substances (HS) in binding Al(III), Fe(III) and Cu(II) ions into complexes using gel chromatography. With the total concentration of HS in surface water bodies in Ukraine, the share of fraction with a molecular weight of 20–5 kDa increases from 37% to 59%. In the fresh water bodies under study the HS' fractions with molecular weight 20–5 kDa and < 1 kDa play a principal role in the studied metals' migration. The situation is different, if the metals concentration bound by 1 mg fraction of HS with a certain molecular weight is calculated. HS with molecular weight 20–5 kDa have been found to bind the smallest amount of Al(III), Fe(III) and Cu(II) in complexes. This is also confirmed by the experimental findings. The studied metals, which were added to the natural water filtrate in the experiment, were bound into complexes mainly by HS with a molecular weight of >20 and <1 kDa. In the water bodies under study 1 mg of humic acids has a greater binding ability in relation to Al(III), Fe(III) and Cu(II) ions than 1 mg of fulvic acids. Fulvic acids and humic acids with a molecular weight of 20–5 kDa also have the lowest binding ability.

Keywords: water body, humic substance, metal, binding ability, molecular weight distribution.