

The role of aminoacids for technogenic radionuclide migration in soils

O.B.LYSENKO AND N.R.MERKULYEVA

1. Institute of environmental geochemistry NAS of Ukraine

2. Ecology of human Ukrainian branch

human@kiev-page.com.ua

Conception of radionuclide chelate organic-mineral compounds migration.

Amino-acid ability may be applied for chelate complexes formation with metals aiming for investigation the mechanism of migration processes for the radionuclides of Chernobyl origin and for comprehensive study of radionuclide chelate complexes as one among the forms of entering the exchange natural cycle.

Geochemical migration. The soil section upper layers (0-10 cm) of different genetic types in Kyiv Polissia northern regions served as the subject for study. The contents of amino-acids, cesium-137 and strontium-90, of some stable elements (C, N, Ti, Mn, V, Cr, Fe, Ni, Cu, Zn, Cl, Br, Rb, Sr, Y, Pb, Tr etc.) in the initial soils, in the soil extracts and in the insoluble sediment have been carried-out. Amino-acid factors were calculated in parallel for each soil sample and for each soil extract, for example the ratio between concentration of amino-acid each group ($\sum_{\text{group } A}$) and \sum_A in % and etc.

Speculation concerning the results. The correlation analysis provided a basis for the preparation of schemes reflecting the dynamics of vertical distribution by layers for chelate complexes (amino-acid - radionuclide) in different soils in order that the amino-acid selective ability on radionuclide accumulating in the soils (in a system: soil – soil extracts - insoluble sediment) should be justified. Participation of “irreplaceable” AA (threonine-Thr, valine-Val, methionine-Met, isoleucine-Ileu, leucine-Leu, phenilalanine-Phe, lysine-Lys) in the chelate compounds can increase the probability of radionuclide supply to the human organism through the trophic chains, since these AA are not synthesized within the human organism, and they have to find their way for the organism along with ready food. Special feature of amino-acids can be used to assess the internal irradiation doses at the expense of food and water. Summary correlation series for the system as a whole, which reflect the variations of amino-acid selective ability to chelate the radionuclides, as dictated by the system parameters and by the soil types were obtained. This schemes (for Sr-90, Cs-137) in our judgement, carry essential information about the mechanism for formation of specific organic-mineral complexes and their role in technogenic radionuclides migration in soils under the different landscape-geochemical conditions.