

Speciation of ^{226}Ra and ^{232}Th in Albic Stagnic Retisol

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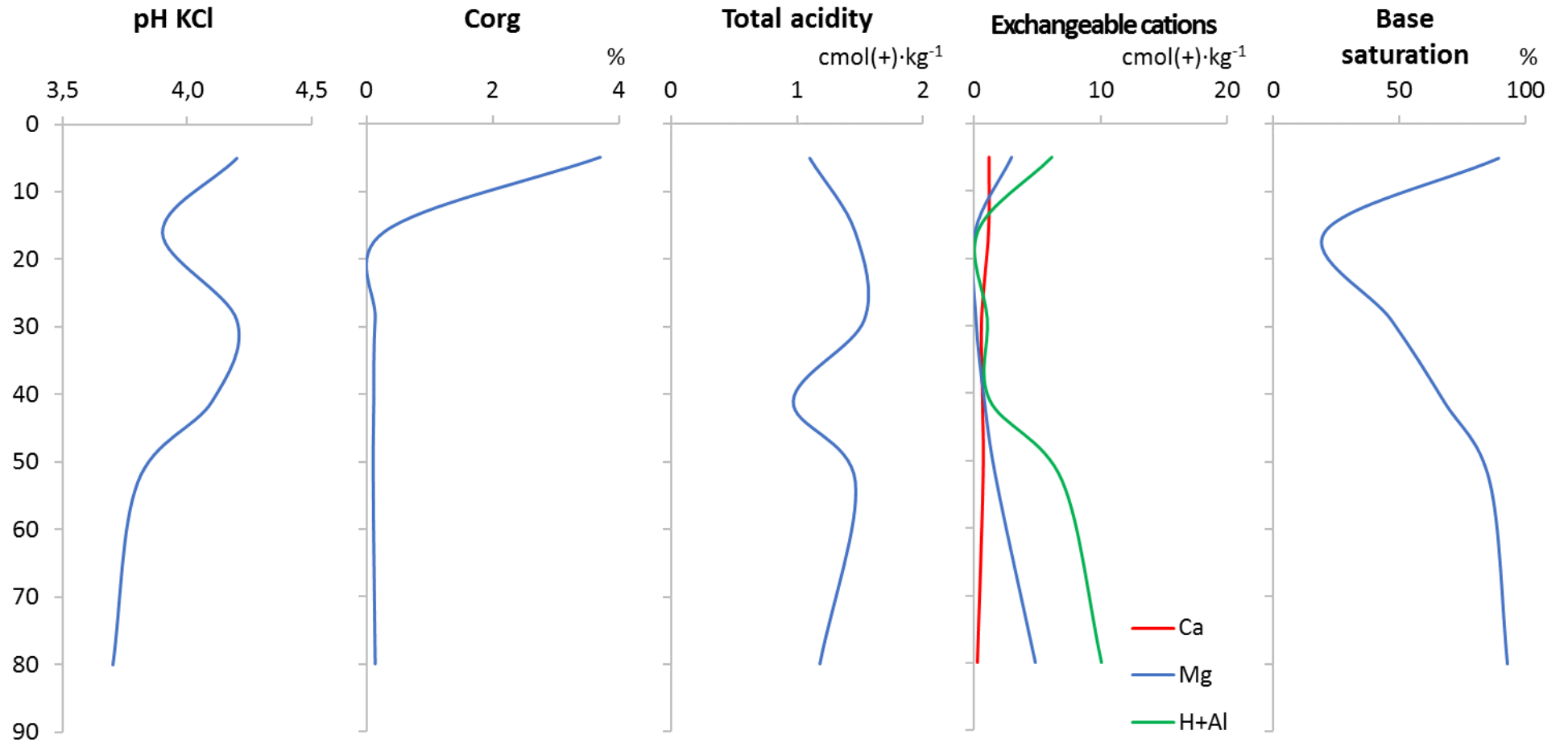
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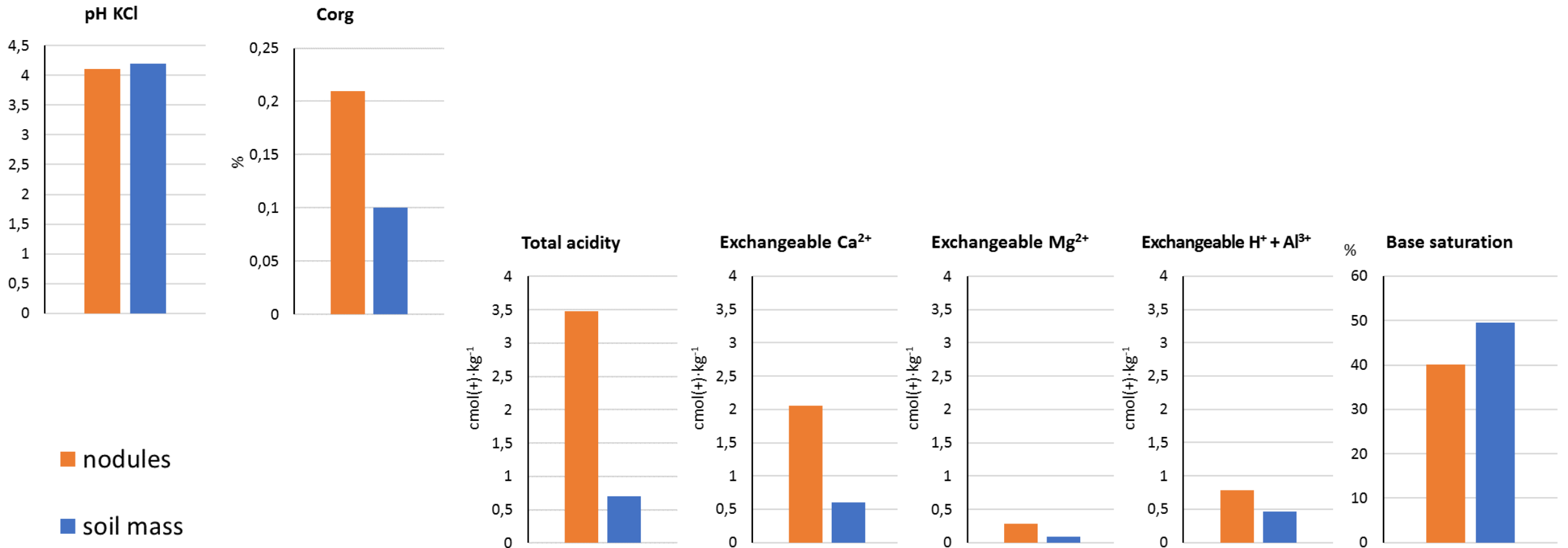
Albic Stagnic Retisol properties



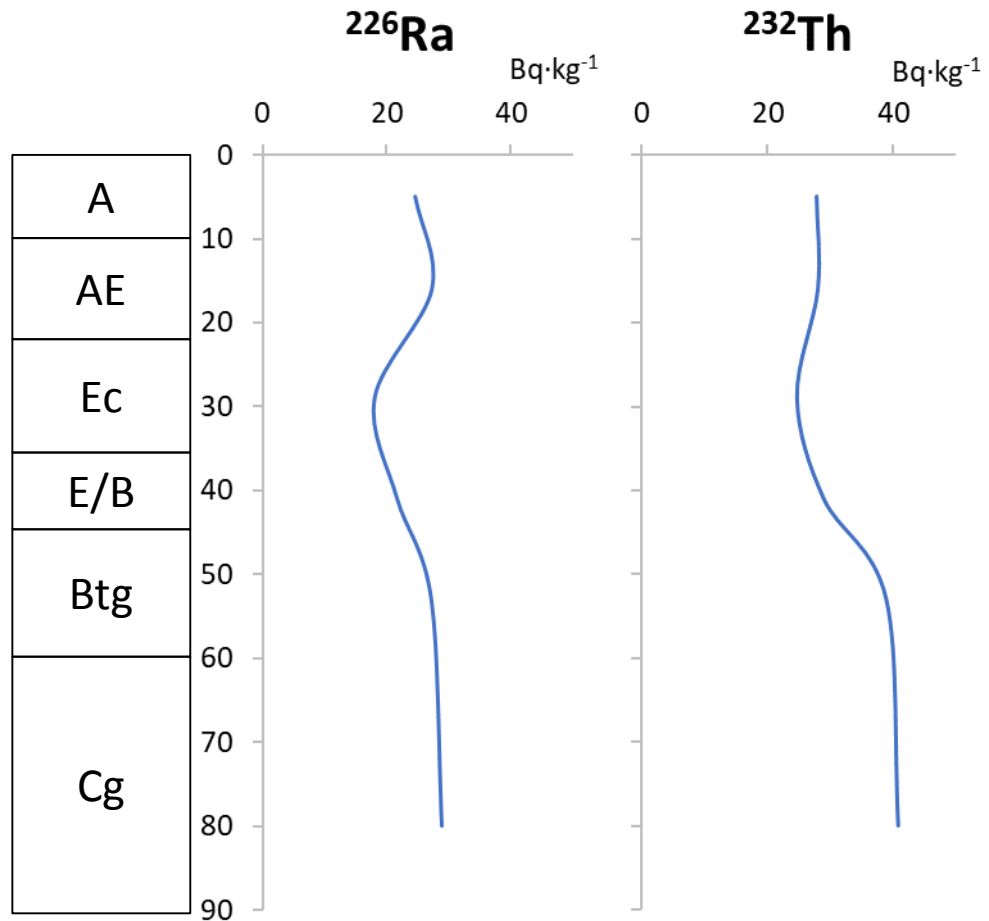
A
AE
Ec
E/B
Btg
Cg



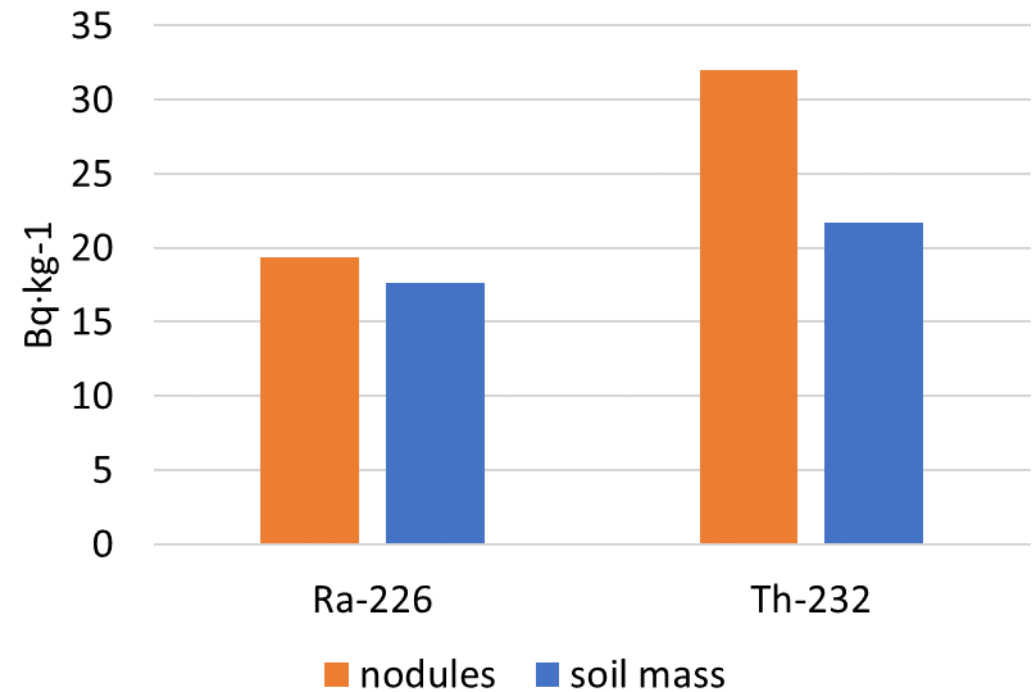
Albic Stagnic Retisol nodules and soil mass of eluvial horizon



Heavy natural radionuclides total activity



Nodules and soil mass of eluvial horizon

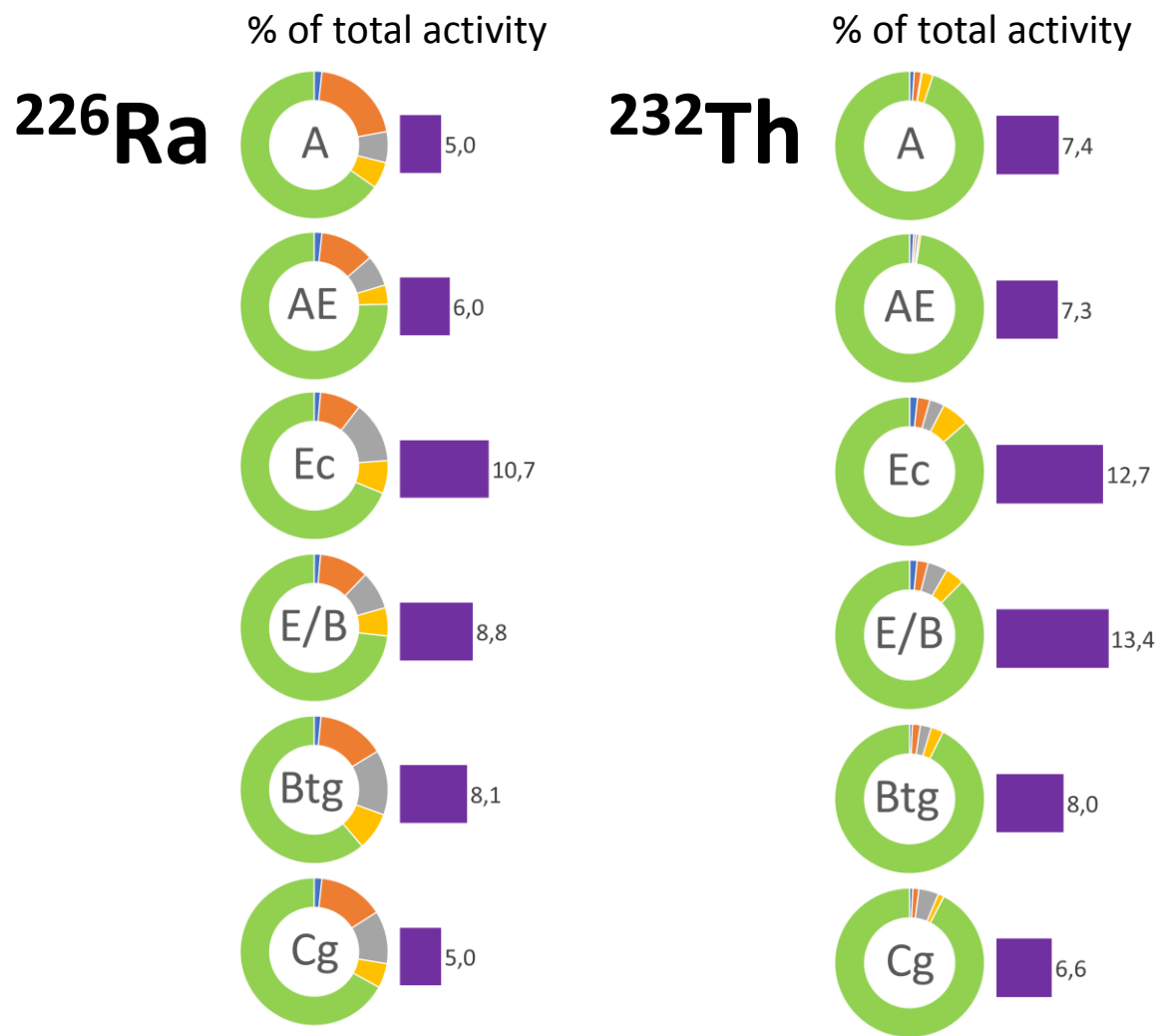


The procedure of sequential extraction by the Pavlotskaya's method*

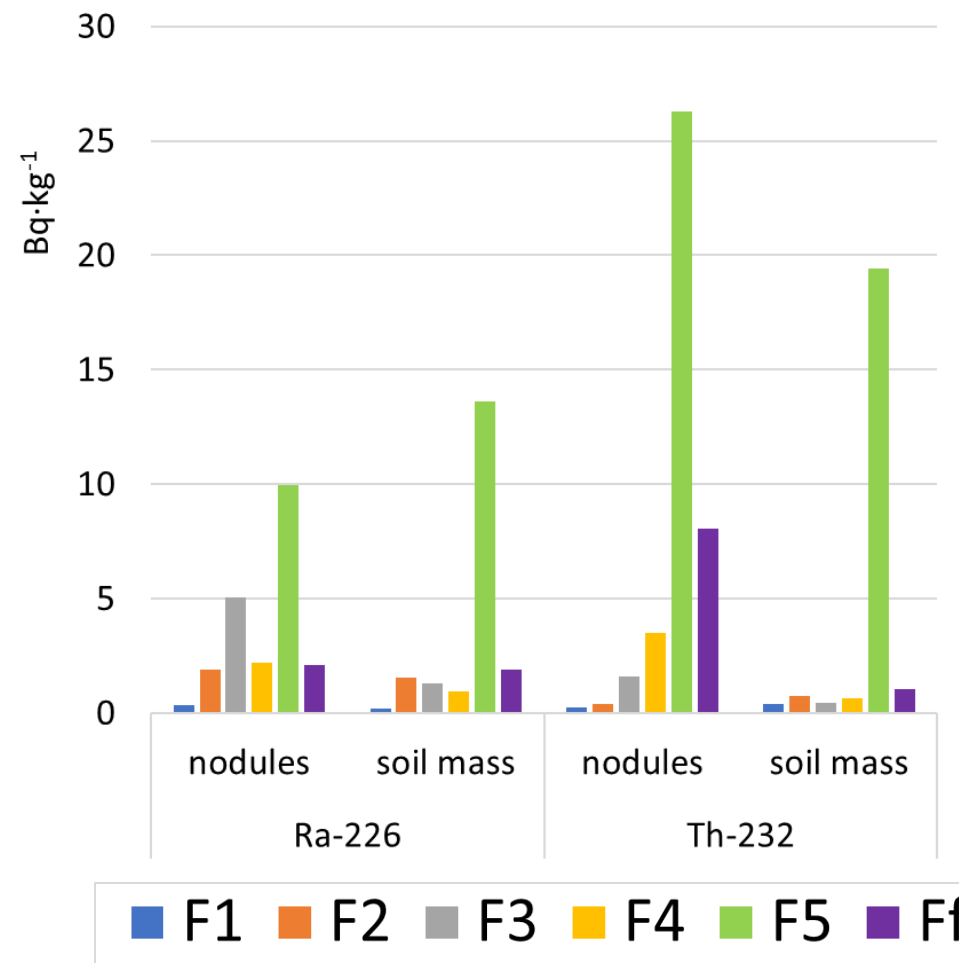
	Fraction	Extraction reagent	Conditions
1			
■ F1	Water-soluble	H ₂ O	s:l = 1:5, t = 5 min, 20°C
■ F2	Exchangeable and readily soluble	1M CH ₃ COONH ₄ , pH 4.8	s:l = 1:10, t = 1 h, 20°C
■ F3	Mobile	1M HCl	s:l = 1:10, t = 1 h, 20°C
■ F4	Acid-soluble	6M HCl	s:l = 1:10, t = 1 h, 20°C
■ F5	Residual	sintering with Na ₂ CO ₃	900°C
2			
■ Ff	Amorphous	0.2M (NH ₄) ₂ C ₂ O ₄ , 0.1M H ₂ C ₂ O ₄	s:l = 1:20, t = 1 h, two times at 20°C
	Mineral	sintering with Na ₂ CO ₃	900°C

*Goryachenkova T.A., Kazinskaya I.E., Novikov A.P. et al. Comparison of methods for assessing plutonium speciation in environmental objects // Radiochem. 2005. V. 47. № 6. P. 599–604.

Speciation of heavy natural radionuclides



Nodules and soil mass of eluvial horizon



Conclusion

- For ^{226}Ra in nodules, an increase in the content of the water-soluble, exchangeable, mobile, and acid-soluble fractions is observed, with a decrease in the activity of the residue fraction. For ^{232}Th , the content of mobile and acid-soluble fractions and the residue fraction increases, while the activity of water-soluble and exchangeable compounds decreases.
- Therefore, with respect to ^{232}Th , segregation concretions of the eluvial horizons of the Albic Stagnic Retisol act as a geochemical barrier, reducing its mobility in the soil profile. A significant part of ^{232}Th is firmly fixed inside the crystal lattices of the newly formed well-crystallized minerals.