



## **Effectiveness of complex fertilizers of new generation on radioactive contaminated lands**

A.N. Ratnikov, N.I. Sanzharova, D.G. Sviridenko, and T.L. Zhigareva

Russian Research Institute of Agricultural Radiology and Agroecology, Russian Academy of Agricultural Sciences, 249032, Obninsk, Kaluga region, Kievskoe shosse, 109 km, Russia

Effectiveness of complex fertilizers of new generation on radioactive contaminated lands

A.N. Ratnikov, N.I. Sanzharova, D.G. Sviridenko, T.L. Zhigareva

Russian Research Institute of Agricultural Radiology and Agroecology, Russian Academy of Agricultural Sciences, 249032, Obninsk, Kaluga region, Kievskoe shosse, 109 km, Russia

[ratnikov\\_a\\_n@mail.ru](mailto:ratnikov_a_n@mail.ru)

The basic and general remediation principles of agricultural lands affected by technological contamination are presented. One of the perspective method of soil fertility rising is application of natural clays and minerals. This is the most effective measure on contaminated lands. We can reduce the uptake of  $^{137}\text{Cs}$  in 3-5 times because of retention of radionuclides in crystal structures of minerals and its transformation in unapproachable form for plants. Nowdays a special attention pays to sorbents. The stores of natural sorbents (trepel and polygorskite clay) are founded in a great amount in Kaluga region.

A complex sorbent has been developed and on its basis a fundamentally new compound manufactured which combines properties of both sorbent and complex long-acting fertilizer ("Suprodit") that contains NPK (patent on the invention № 2336257). The base of complex sorbent is  $\text{SiO}_2$  enriched mineral – trepel. Complex sorbent is a mixture of hydrothermally processed permutite and silicagel with significant sorption properties for radionuclides. This sorbent may be used for fertility rising of the contaminated lands and grain yield, and also for reducing of pollutants uptake. The most effectiveness of "Suprodit" was on fodder lands contaminated with 500-920 kBq $^{137}\text{Cs}/\text{m}^2$ . It has been found that the use of resource-saving technologies with using "Suprodit" increased the yield of barley by 10-40% and the productivity of sowing grasses by 4-5 times. "Suprodit" decreased the concentration of  $^{137}\text{Cs}$  in sowing grasses by 1,8-4,0 times. It has been studied the effect of "Suprodit" and industrial fertilizers (NPK and "nitropfoska") on the biological activity of soddy-podzolic soil, contaminated of  $^{137}\text{Cs}$  (100 kBq/kg). "Suprodit" increased the  $\text{CO}_2$  emission rate on radioactively contaminated soil by 1,5 times in comparison with NPK and "nitropfoska", accordingly.