

Oily waste with natural radionuclides—does it stimulate or inhibit soil bacterial community?

November 24 2015

Kazan Federal University, in collaboration with Justus Liebig University Giessen, Russian Academy of Sciences and Georg August University Gottingen, have conducted research revealing both structural and functional changes of the microbial community able to resist and decompose oily wastes in soil.

Contamination with oily wastes containing natural radionuclides is a potential hazard for soil health and function. Knowledge about the effects of compound mixtures containing stimulating and inhibiting compounds on soils may provide better understanding and further regulation of sewage sludge and organic waste management, including disposal.

Most investigations of such waste are focused on the direct effect of radionuclides on humans. Less attention is paid to their impact on the microbially mediated decomposition of soil organic matter (OM). Radioactive elements of the oily waste may cause chromosomal aberrations, single strand breaks, and base pair substitution in the DNA of microorganisms.

The experiment was dedicated to measuring CO₂ efflux, [microbial biomass](#), and community structure for 120 d after application of radioactive oily wastes to the soil at the ratio 1:4. Both waste and [soil](#) samples were collected in Tatarstan, Russia.

Disposal of radioactive petroleum waste strongly altered the structure of the microbial community resulting in the selection of resistant species able to decompose pollutants; it also affected the community function (inhibition of microbial biomass and stimulation of respiration), which tended to stabilize after long-term incubation.

According to Polina Galitskaya, the next step of the investigation is to understand the mechanisms of [microbial communities](#)' behavior under the influence of compounds—which strains survive and which do not; who influences changes in community; strategy of nutrient consumption, biomass growth and so on.

More information: Polina Galitskaya et al. Oily waste containing natural radionuclides: does it cause stimulation or inhibition of soil bacterial community?, *Journal of Plant Nutrition and Soil Science* (2015). [DOI: 10.1002/jpln.201400641](https://doi.org/10.1002/jpln.201400641)

Provided by Kazan Federal University

Citation: Oily waste with natural radionuclides—does it stimulate or inhibit soil bacterial community? (2015, November 24) retrieved 26 April 2024 from <https://phys.org/news/2015-11-oily-natural-radionuclidesdoes-inhibit-soil.html>

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