Effects of Co-Composted Drilling Waste Application on Soil N Dynamics and Tree Nutrition. (5631)

Authors:
- W.J. Choi - University of Alberta, Edmonton, Alberta
- S.X. Chang - University of Alberta, Edmonton, Alberta

Abstract:
Composting is an alternative treatment for hydrocarbon-contaminated drilling wastes produced from oil and gas drilling activities. However, composting in the active windrowing stage does not completely remove the hydrocarbons and their recalcitrant fractions can become very slow to decompose. Composted drilling waste that does not meet the criteria for land application would normally have to be hauled to the landfill; an alternative method is to enhance the decomposition of the residual hydrocarbons through land application, expecting the hydrocarbon content to be reduced in 2 to 3 years to the level allowed for such uses. Concerns have been raised in relation to the land application of composted drilling wastes: 1) plant growth may be inhibited by the residual hydrocarbons; and 2) application of organic amendments with wide C/N ratios may lead to N deficiencies of plants. We conducted a four-month greenhouse experiment with pots planted to white spruce (Picea glauca) using co-composted drilling wastes with different ages as growth media, with or without N fertilization. In this paper, we will discuss 1) whether tree growth is affected by hydrocarbon concentrations (that are a function of the age of compost), 2) whether supplementary application of N fertilizer improves tree uptake of N, and 3) the fate of applied $^{15}$N-labelled fertilizer N in the plant-soil system.

Speaker Information: Woo-Jung Choi, Univ. of Alberta, 442 Earth Science Building, Department of Renewable Resources, Edmonton, AB T6G 2E3; Phone: 780-492-6375; E-mail: woo-jung.choi@ualberta.ca

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