



Response of soil organic layer characteristics to different amounts of logging residue in a Scots pine thinning stand

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Since there is an increasing demand for production of bioenergy, forest management using logging residue from both clear-cutting and thinning stands is becoming more common. Therefore there is a need of information how this whole-tree harvest, as compared to the traditional stem-only harvest, changes forest soil characteristics in long-term.

The aim of this study was to investigate the effects of logging residue removal on soil microbial processes related to C and N cycling and on two major groups of plant secondary compounds, phenolic compounds and terpenes. These two groups of compounds were of interest since logging residue contains the highest proportion of most of these compounds. In addition, certain phenolic compounds and terpenes have been shown to regulate N transformations in forests soils.

The study site was a young Scots pine stand in central Finland. It was thinned and four different amounts of logging residue, consisting of needles and tree branches, were distributed around a tree: 0, 40, 80 and 120 kg of fresh logging residue on a circle (diameter 2.5 m) around a tree. Samples were taken from the organic layer (F+H) four years after the treatment.

Two highest amounts of logging residue increased both C and net N mineralization and glucose-induced respiration, but the amount of logging residue did not affect microbial biomass C or N. There were not any large differences between the treatments in the concentrations of mono, sesqui-, di- or triterpenes, although some terpenes showed an increase with the highest amount of residues. Amount of logging residue did not clearly affect the concentrations of volatile monoterpenes in soil atmosphere.