



## **Changes in soil nitrogen cycling under Norway spruce logging residues on a clear-cut**

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In Europe, forest biomass is increasingly being used as a source of energy to replace fossil fuels. In practice, this means that logging residues, consisting of green branches and stem tops, are more commonly harvested. In 2012 logging residues were harvested from about one third of clear-cuts in Finland. Our aim was to study how logging residues affect soil organic matter quality, in particular soil N cycling processes and composition of certain groups of plant secondary compounds, tannins and terpenes. Compounds in these groups were of interest because they are abundant in logging residues, and they have been shown to control soil N cycling. In connection with clear-cutting a Norway spruce stand in southern Finland, we established a controlled field experiment by building logging residue piles (40 kg/m<sup>2</sup>) on study plots. The piles consisted of fresh spruce branches and tops with green foliage. Control plots with no residues were included (0 kg/m<sup>2</sup>). Changes in soil organic matter properties have now been monitored for three growing seasons. Logging residues affected organic layer properties strongly. For example, they increased net nitrification and nitrate concentrations. There were also increases in the concentrations of certain terpenes and condensed tannins due to the residues. The significance of logging residues on soil processes and properties will be shown.