



Response of soil C and N transformations to tannin fractions originating from Scots pine and Norway spruce needles

S. Kanerva, V. Kitunen and A. Smolander

Finnish Forest Research Institute, Vantaa Research Centre, Vantaa, Finland

sanna.kanerva@metla.fi

Tannins are polyphenolic compounds that may influence litter decomposition, humus formation, nutrient - especially N - cycling, and ultimately plant nutrition and growth in a certain soil environment. Molecular weight of tannins or phenolic compounds seems to be a crucial factor when considering their influence on soil nutrient cycling. The aim of this study was to find out the response of soil C and N transformations to tannins of different molecular weight from Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*) needles. Soil and needle samples were taken from adjacent 70-year-old stands located in Kivalo, northern Finland, which were dominated by Scots pine or Norway spruce growing in originally similar soil. Tannins were extracted from needles and the fractions were added to soil samples and incubated at 14°C for 6 weeks. CO₂ evolution, mineralisation of N and nitrification rates, concentrations of DON and amounts of microbial biomass C and N were measured.

Spruce soil seemed to be slightly more active than pine soil was. Main effects of the fractions were similar in both soils. The effects caused by low molecular weight tannin fractions were mainly contrary to the effects caused by heavy molecular weight fractions. Soil respiration and DON concentrations were higher with light fractions, while light fractions decreased net N mineralisation. There were not clear differences between light and heavy fraction effects on microbial biomass. Light fractions strongly enhanced the respiration indicating higher immobilization of N to microbial biomass. On the contrary, heavy fractions reduced respiration. Hence it seems apparent that light fractions have acted as a C source to microbes while heavy fractions have been inhibitors.