



Role of lignin for litter decay and production of dissolved organic matter

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Lignin is considered as a control in litter decomposition but its role for the production of dissolved organic matter (DOM) from litter is not well understood. We, therefore, examined relations between decomposing litter, lignin degradation and amounts and properties of leached DOM. The objective was to describe the role of lignin degradation for litter decay and the production of DOM in decomposing litter. We exposed litter of five different tree species (Sycamore maple, Mountain ash, European beech, Norway spruce, Scots pine) in litterbags at two neighbouring sites. Litterbags were sampled 8 times during 27 months of exposure in the field. We determined mass loss and characterised the lignin fraction by the van Soest procedure (acid-detergent lignin: ADL) and by CuO oxidation. Litter samples were irrigated in the laboratory and leachates analysed for dissolved organic carbon (DOC) and by UV and fluorescence spectroscopy. We did not find strong effects of lignin on litter decay except for that the mass loss was smallest for the litter with the largest ADL content (beech). In the early phase of litter decomposition, no effects of lignin degradation on DOM production were found. ADL and CuO oxidation revealed stronger degradation and oxidation of lignin in beech, spruce and pine litter. The degree of lignin degradation, yet, did not correlate with litter decay. The production of DOM from litter with stronger lignin degradation (beech, spruce and pine) increased in the second phase of decomposition, when mass loss exceeded 10 to 20%. In contrast, DOM production from litter characterised by weak lignin degradation (maple, ash) did not re-increase in the second phase of decomposition. In the leachates of litter with strong lignin degra-

dation (beech, spruce, pine), UV absorbance and fluorescence spectroscopy indicated an increasing contribution of lignin-derived compounds to DOM with increasing mass loss than for litter species with relatively stable lignin. We conclude that the increasing production of DOM during the second phase of litter decomposition results from strong degradation of lignin whereas litter decay itself does not depend on lignin.