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IMPACT OF N AVAILABILITY ON HETEROTROPHIC MICROBIAL DYNAMIC DURING DECOMPOSITION OF MISCANTHUS X GIGANTEUS LEAVES IN A SOIL.

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Carbon and N cycles are intimately associated during the residue decomposition process in soils. The overall N availability (residue + soil N) controls the rate of residue decomposition under N limiting conditions. Therefore studies have demonstrated low N availability reduced C mineralization rate on short term by reducing opportunist microbial biomass growth. However the effect of N availability on C mineralization and microbial biomass growth and composition on longer term, are still poorly understood. In the context of biofuel perennial plant production with Miscanthus, in which N amendments are limited, we investigated the effects of N availability on C and N dynamics, microbial dynamics and enzymatic functions on the short and long terms. Miscanthus leaves were incubated in an agricultural soil for > 500 days at two levels of soil N availability by adding inorganic N or not. C and N mineralization, microbial biomass C, ergosterol, xylanase and laccase activities and 18S-rRNA and 16S-rRNA were determined at several dates during the experiment. Results showed that a high N availability increased the rate of residue C mineralized in the short term (< 1 year) together with an increase in microbial C, fungal ergosterol, and enzymatic activities related to C degradation (xylanase). However, the high N availability suppressed laccase activity while it has no significant effect on 18S- and 16S r-RNA microbial communities. On longer term (> 1 year), high N availability slightly decreased C mineralization compared to low N treatment demonstrating the antagonist effect of N on residue decomposition.