Acacia mangium affects soil nitrogen and microbial community and activity in mixed plantations with *Eucalyptus urograndis*.

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Mixed-species plantations of *Eucalyptus* spp. and *Acacia mangium* which can symbiotically associate with nitrogen-fixing bacteria have potential to improve the soil quality and biomass productivity in comparison with a conventional eucalyptus monoculture. An experiment was established in Southeast region of Brazil to study the effects of mixed plantation (50E:50A, 1,111 trees ha^{-1} and 100E:100A, double density) and tillage intensity over soil quality and microbial diversity in comparison of *Eucalyptus urograndis* monoculture (E100 and E100+N). Superficial soil layer (0-10cm) showed an increase of the soil nitrate content in both *A. mangium* (acacia) and mixed stands. The soil microorganisms (fungi and bacteria) have been significantly impacted by the treatments, with mixed area showing an integration of the microbial population present in the pure plantations. The molecular study of the soil microbiology demonstrated that the introduction of the acacia in the eucalyptus plantation significantly increased the number of fungi genera and the diversity index introducing or changing the frequency of several genera that could not be found in the monoculture cultivation. The C associated to microbial biomass and β - glucosidase activity were reduced under intensive the tillage. Our results suggest an increase of the soil quality in the mixed plantation compared to the *Eucalyptus* monoculture, especially in minimal tillage.

Keywords: microbial diversity, N cycling genes, soil quality, enzymes