

Title: SOIL MICROBIOLOGICAL INDICATORS IN COAL MINING AREAS REVEGETATED WITH BRACATINGA (*Mimosa scabrella*) ON SOUTH OF SANTA CATARINA

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Abstract:

The mining activity in the state of Santa Catarina created many changes in the environment, especially in the physical, chemical and biological characteristics of the soil, taking revegetation as an alternative for the recovery of these areas. This study aimed to evaluate microbiological attributes of soil associated with mining areas in the south of Santa Catarina, taking into account different time of revegetation with bracatinga (*Mimosa scabrella* Benth). Under the canopy cover of bracatinga, soil samples were collected at a depth of 0-20 cm in permanent protection areas with different times of revegetation (2, 4, 6 and 12 years), as in a control area (preserved), with natural occurrence of that species. Five soil samples were collected by area from six subsamples. The microbiological indicators evaluated were colony forming units (CFU) of bacteria and fungi, microbial biomass carbon and nitrogen (C_{mic} and N_{mic}), basal soil respiration (BSR) and metabolic quotient (qCO_2). Additionally, the soil pH was determined in water and KCl (1 mol L^{-1}) and the Delta pH calculated. The pH in water ranged from 3.8 to 4.9 in recovery areas, and was 4.0 in the control area, characterizing the soils as extremely acids. The Delta pH was negative in all areas, determining the predominance of negative charges, which potentially assists in the retention of trace elements commonly found in contaminated areas. The UFC of fungi and bacteria did not differ statistically between the recovered and preserved areas. C_{mic} and N_{mic} increased with recovery time, but represented only 10% C_{mic} and 8% N_{mic} of the values found in the preserved area. The same pattern was observed for BSR. The qCO_2 was significantly higher in areas with less recovery time than in the reference. The qCO_2 is an important attribute to infer about the actual amount of carbon incorporated into biomass or lost as CO_2 . Higher rates can indicate that microbial communities are in initial stages of development or that the microbial populations are under some kind of metabolic stress. Thus, it is possible to observe a gradual improvement in the biological characteristics over time. Microbiological attributes C_{mic} , N_{mic} and qCO_2 were sensitive to detect differences between areas in recovery and preserved, but not reaching levels near the reference area.

Keywords: environmental recovery, microbial biomass carbon, microbial biomass nitrogen, metabolic quotient

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