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EFFECT OF SOIL PHYSICO-CHEMICAL PROPERTIES ON SOIL MICROBIAL BIOMASS CARBON OF COAL MINE OVER BURDEN DUMPS

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ABSTRACT: Investigation was undertaken to assess the effect of soil physico-chemical properties on soil microbial biomass carbon of coal mine over burden dumps. The study revealed that there was no significant difference observed between the study sites and physio-chemical parameters. Positive correlation with the sites Overburden dumps showed the sign of restoration accumulating available N, soil moisture, organic matter, soil temperature to support the vegetation and soil biodiversity. It is concluded that there is a need of restoration of soil microbial properties.

Key words: physico-chemical properties, over burden dump, soil, carbon

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Microbial biomass is a measure of the weight of microorganisms in soil, comprising mostly of bacteria, fungi and other microbes. Microbial biomass is both an agent of biochemical changes in soil and repository of plant nutrient that is more labile than the bulk of soil organic matter (Patra, 1994). When microorganism dies, these nutrients are released in forms that can be taken up by plants. The microbial biomass is affected by factors that changes soil water, temperature or carbon content, and includes soil type, climate and management practices. Measures of microbial biomass usually quantify either the weight of carbon or nitrogen in soil microorganisms. Microbial biomass is the characteristics of microorganisms, which participate in the biochemical cycles and are the living part of soil organic matter. The conversion of forest into other land uses resulted in a remarkable decline in the amounts of soil nutrients and soil microbial biomass. In dry tropical environment, the microbial biomass proved to be a sensitive indicator of land use change (Srivastava and Singh, 1991). The relationship between microbial biomass and plant growth rate was found to be reciprocal, soil microbial biomass acts both as sink and source of nutrients in the dry tropical environment Microbial immobilization may be the main source of nutrients for plants that may lead to nutrient conservation (Singh et al., 1989).

Microbial biomass is a useful indicator of soil quality. Soil microorganisms are involved in several processes that influence soil quality and microbial biomass changes rapidly in response to changes in soil properties. Single measurements of microbial biomass can be difficult to interpret, but trends over time are a relatively simple way of assessing the effect of management on soil microorganisms. Increase in microbial biomass over time is considered beneficial. They may indicate an increase in beneficial biological functions in soil and a future increase in organic carbon content in the soil. In contrast, a decline over time is considered to have a negative effect on soil quality. The role of the microbial fraction in mediating soil process and their relatively high rate of turnover, logically suggested that the microbial fraction could be a sensitive indicator and an early predictor of other changing soil organic matter (Jenkinson and Ladd, 1981; Stout et al., 1981; O'Brien, 1984).

Soil microbial biomass is a key determinant of carbon dynamics in the soil. Soil microorganisms influence many ecosystem processes related to the maintenance of soil fertility (Yao et al., 2000) and the regulation of biogeochemical cycles (Cleveland and Liptzin, 2007; Schimel and Schaeffer, 2012). The amount of soil microbial biomass carbon plays a major role in driving the balance between the release of soil carbon (respiration) and its sequestration in soil organic matter in terrestrial ecosystems (Miltner et al., 2011; Lange et al., 2015). Plants serve as a carbon source for microbial community and in turn microbes provide