CHANGES IN SOIL MICROBIAL POPULATIONS AS AFFECTED BY SOIL AMENDMENTS

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Increasing the coconut production by increasing land productivity of existing coconut land is one of the major challenges at present. Rehabilitation of degraded coconut growing soils by giving more consideration to the enhancement of soil carbon and soil microbial population is one of the promising options to address the issue. A pot experiment was conducted to test the changes in the soil organic carbon and microbial populations in a coconut growing Sandy Regosol with the application of inorganic fertilizers alone and inorganic fertilizers with carbonized planting materials (CPM) and organic manure supplemented with ash. The treatments were T1- No fertilizer (Control), T2- Inorganic fertilizers as recommended by CRISL, T3- 2.5 % (w/w) CPM produced from Gliricidia sticks with inorganic fertilizers as in T2, T4-2.5 % (w/w) CPM produced with king coconut husk with inorganic fertilizer as in T2, T5- Poultry manure supplemented king coconut husk ash as a potassium supplement. The treatments were laid in a Completely Randomized Design (CRD) with three replicates under natural illumination. The soil samples were collected prior to the treatment application and at 1st, 3rd, 7th, 14th, 28th days after treatment application, the soil samples were analyzed for soil pH, soil organic carbon (SOC), soil bacterial and fungal population. Initial soil pH of 4.89 significantly increased to a range of 5.21- 8.7 on the 1stday after treatment application and remained constant and was significantly different ($p<0.05$) throughout the experiment. The application of CPM and organic manure has significantly increased the initial SOC while the increase were highest in treatments with CPM produced with Gliricedia and king coconut husk and followed by organic manure at the end of the experiment. During the first week, bacterial population responded positively to the application of CPM and organic manure addition, however the fungal populations have been affected negatively. The drastic increase of soil pH by the CPM addition has shown slight relationship with the drop of fungal population in soil. Thus this study shows that the soil amendments increase SOC that has an influence on soil microbial population, but differences in the responses of soil bacterial and fungal populations needs to be investigated further in future studies.

Keywords: Carbonized planting materials, Inorganic fertilizer, King coconut husk ash, Soil bacterial and fungal population