

# Effect of Biochar on Soil Biological Properties and Growth of Groundnut in Red Sandy Loams of North Coastal Andhra Pradesh

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## ABSTRACT

A field experiment was conducted in red sandy loam soils of North Coastal Andhra Pradesh to study the effect of bio char on soil microbial population, enzymatic activity and growth of groundnut crop (variety K-6) during *rabi*, 2018-19. Biochar application to soil significantly increased soil bacterial, fungal and actinomycetes population. In general the bacterial population increased from peg penetration to pod development. At pod development stage the highest number of bacterial count ( $39.0 \times 10^6$  CFU  $g^{-1}$  soil) was observed in  $T_5$  (100% RDF + biochar @ 6 t  $ha^{-1}$ ) which was on par with all the biochar applied treatments ( $T_3$ ,  $T_4$ ,  $T_6$ ,  $T_7$ ,  $T_8$ ) and biochar applied @ 6 t  $ha^{-1}$  ( $T_5$  &  $T_8$ ) significantly increased the bacterial population as compared non-biochar applied treatments ( $T_1$  &  $T_2$ ). Fungal and actinomycetes population followed the similar trend of bacterial count. Soil urease activity was significantly superior in biochar applied treatments ( $T_3$ ,  $T_4$ ,  $T_5$ ,  $T_6$ ,  $T_7$ ,  $T_8$ ) as compared to non-biochar applied treatments ( $T_1$  and  $T_2$ ). With increased rates of biochar application the urease activity markedly increased in soil. Similar trend was noticed with respect to dehydrogenase, acid phosphatase and alkaline phosphatase enzymes in soil in response to addition of biochar. Slight increase in plant height was observed with bio char application but the increase was not significant. At pod development stage the highest leaf area index (3.16) was recorded in  $T_5$  treatment (100% RDF + biochar @ 6 t  $ha^{-1}$ ) which was significantly higher than  $T_1$  (control),  $T_2$  (100% RDF) and  $T_6$  (75% RDF + biochar @ 2 t  $ha^{-1}$ ). In general the dry matter accumulation increased from peg penetration to harvest. The highest dry matter accumulation of 2950.90 kg  $ha^{-1}$  and 6427.54 kg  $ha^{-1}$ , respectively at peg penetration and pod development stage was observed in  $T_5$  (100% RDF + biochar @ 6 t  $ha^{-1}$ ) which was on par with  $T_3$  (100% RDF + biochar @ 2 t  $ha^{-1}$ ),  $T_4$  (100% RDF + biochar @ 4 t  $ha^{-1}$ ),  $T_8$  (75% RDF + biochar @ 6 t  $ha^{-1}$ ) treatments. Groundnut pod yield was highest (4019.58 kg  $ha^{-1}$ ) in  $T_5$  treatment receiving 100% RDF + biochar @ 6 t  $ha^{-1}$ , which was on par with  $T_4$  (100% RDF + biochar @ 4 t  $ha^{-1}$ ) and  $T_8$  (75% RDF + biochar @ 6 t  $ha^{-1}$ ).

**Key words:** *bio char, sandy loams, soil enzymes, groundnut.*