

## Biochar Assisted Municipal Wastewater Treatment and Nutrient Recycling

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**Abstract :** Pyrolysis can be used for energy production from waste biomass of agriculture and forestry. Biochar is the solid byproduct of pyrolysis and its cascading use can offset the cost of the process. A wide variety of research on biochar has highlighted its ability to absorb nutrients, metal and complex compounds; filter suspended solids; enhance microorganisms' growth; retain water and nutrients as well as to increase carbon content of soil. In addition, sustainable biochar systems are an attractive approach for carbon sequestration and total waste management cycle. Commercially available biochar from Sigma Aldrich was studied for adsorption of nitrogen from effluent of municipal wastewater treatment plant. Adsorption isotherm and breakthrough curve were determined for the biochar. Similarly, biochar's effects in aerobic as well as anaerobic bioreactors were also studied. In both cases, the biomass was increased in presence of biochar. The amount of gas produced for anaerobic digestion of fruit mix (apple and banana) was similar but the rate of production was significantly faster in biochar fed reactors. The cumulative goal of the study is to use biochar in various wastewater treatment units like aeration tank, secondary clarifier and tertiary nutrient recovery system as well as in anaerobic digestion of the sludge to optimize utilization and add value before being used as a soil amendment.

**Keywords :** biochar, nutrient recycling, wastewater treatment, soil amendment

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