

## Pretreatment of Lignocellulosic Materials for Improved Biogas Production. A Review

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The increase in Population and industrialization has resulted to an increase in energy demand and consumptions. Currently fossil fuels are the major source of staple energy to meet this demand. Over relying on non-renewable energy forms that are expensive, depletable and emitting large amounts of greenhouse gases hence causing adverse effects to both humans and environment. Due to these effects, there is an urgent need to explore and develop alternative and sustainable energy technologies.

Use of renewable energy sources are not only sustainable but friendly both for the user and the environment and offers the best solution to address these global energy challenges. One of the sustainable energy sources is biogas that is produced by anaerobic digestion (AD) using different wastes such as agricultural residues, animal manure, and other organic wastes. Despite the availability of large amounts of agricultural waste, the use of lignocellulosic biomass for biogas production by anaerobic digestion has not been widely adopted due to the complicated structure of the plant cell wall making it resistant to microbial attack. This therefore calls for pretreatment of the lignocellulosic biomass in order to achieve the high biogas yields.

This paper reviews the various pretreatment techniques, of lignocellulosic biomass for enhanced biogas production. It also highlights the limitations of these pretreatment technologies and the need to develop environmentally friendly technologies using locally available materials.

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