

Research Article

Effect of high energy ball milling on particle size and surface area of adsorbents for efficient loading of fertilizer

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Summary

The effect of high energy ball milling (HEBM) on adsorbents was studied to develop nano-fertilizer for agriculture. Biochar and zeolite possess an alkaline pH, negative Electrical Conductivity (EC), high Cation Exchange Capacity (CEC), and are microporous to mesoporous in nature. Laboratory study was conducted under three different revolutions per minute (rpm) speeds and varying time up to six hours. Homogenous powder was produced by ball milling technique with four different hours. The particle size distribution has been found that reduced size (260, 203 nm) was observed and surface area increased one fold ($185 \text{ m}^2\text{g}^{-1}$) and three fold ($110 \text{ m}^2\text{g}^{-1}$) with decreased particle size after six hours ball milling of biochar and zeolite respectively and it reduces the particle size to nano-scale level. High speed and long duration improved the nanoparticle production. This study suggests that natural adsorbents have less specific surface area initially which increases significantly after ball milling.

Key words : Biochar, Zeolite, Surface area and Slow release fertilizer

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