

# EFFECT OF PROCESS PARAMETER ON THE EXTRACTION OF NANO CaO POWDER FROM EGGSHELLS

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In recent years, the use of nanoparticles as fertilizers has gained significant attention due to their unique physicochemical properties and their ability to enhance plant growth and productivity. The extraction of nano CaO from eggshells waste to synthesize nano fertilizer represents a pioneering advancement in sustainable development, agriculture, and nano technology. As waste reduction and sustainable resource management emerge as crucial priorities for an environmentally conscious and resource-efficient society, the effective utilization of waste materials becomes imperative, offering opportunities to extract valuable resources while minimizing environmental impact.

In this study, CaO nanoparticles were synthesized by the thermal decomposition and grinding of eggshell waste. The effect of synthesis process variables, namely, the grinding method (dry milling, wet milling), the grinding time, the calcination time, and the calcination temperature was investigated. Egg shell powder as well as synthesized CaO were characterized using TGA, SEM, XRD and FTIR. The highest CaO yield, and reduced particle size were given with wet milling for 1 hour followed by calcination at 900°C for 3 hours.

**Keywords:** Nano Calcium Oxide, Eggshell, Wet Milling, Dry Milling