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Horn Snail (Telescopium telescopium) Shells Waste as an Alternative for Ceramic Tile Manufacturing

Authors : Patricia N. Baguio, Angel Amy M. Buñag, Paul Bryan E. Ornopia, John Paul C. Suel

Abstract : This research investigates the viability and efficiency of employing ceramic tile additives derived from horn snail shell material, specifically calcium carbonate ($CaCO_3$). The study aims to evaluate the mechanical properties of ceramic tiles with calcium carbonate with varying amounts of $CaCO_3$, focusing on breaking and flexural strength. The research employs a comprehensive methodology, including material collection, slurry forming, shaping, drying, firing, and statistical analysis using paired sample T-tests. The result indicates a positive correlation between calcium carbonate ($CaCO_3$) application and ceramic tile strength, revealing increased breaking strength from 29.41 N (non-calcium carbonate) to 46.02 N (70g $CaCO_3$) and a substantial enhancement to 82.61 N with 150g $CaCO_3$. Comparative analyses show higher breaking and flexural strength in tiles calcium carbonate with 150g $CaCO_3$ analysis ($p = 0.011$), indicating its feasibility for ceramic tile manufacturing, while 70g $CaCO_3$ shows no significant difference from non-calcium carbonate tiles ($p = 0.135$). The addition of horn snail shells shows potential for improving ceramic tile quality and contributes positively to waste management in standard tile production processes.

Keywords : horn snail shell, calcium carbonate, breaking strength, flexural strength
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