Revolutionizing Coconut Waste: Transforming Waste Into Resource

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Our research aims to develop an innovative process for utilizing coconut mesocarp, which constitutes about 80% of the coconut fruit, transitioning from a linear to a circular economic model. We've explored various properties of coconut fiber, including its metal adsorption capabilities and water softening effects. This has led to the extraction of tannins and enriching coconut fibers with calcium and magnesium for agricultural use. Tannins, abundant in plants, offer diverse functions, including defense against parasites and applications in industries like tanning and pharmaceuticals. Our experiments demonstrate the potential to extract around 11% w/w of tannins from treated coconut mesocarp. We envision establishing an industrial-scale process to produce tannin-rich extracts and utilizing residual coconut fiber to create substrates enriched with essential macronutrients for agriculture. We've evaluated the industrialization process and plant selection through Life Cycle Assessment (LCA) to optimize performance and minimize resource consumption. Preliminary assessments show a favorable environmental impact, emitting approximately 0.2 Kg equivalent of CO_2 per Kg of treated mesocarp, significantly lower than conventional incineration methods. In summary, our "End of Waste" revolution offers a sustainable solution, reducing CO_2 emissions while producing valuable resources. It has the potential to yield 110 g of tannins and about 890 grams of coconut fiber enriched with calcium and magnesium per Kg of treated waste, contributing to sustainability in agriculture and beyond.