GRANT PROPOSAL

PROJECT TITLE: PILOT SCALE PRODUCTION OF ACTIVATED CHARCOAL FROM NIFOR BIOMASS

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Location Nigerian Institute for oil Palm Research! Benin City.

Duration 24 months

SUMMARY

This project needs funding in order to establish a pilot - scale commercial facility for the production of high quality activated charcoal from Biomass of NIFOR mandate crops. We want to develop a cost effective method to convert NIFOR Biomass to high quality activated charcoal through Steam Activation. So far we have produced activated charcoal from Palm kernel shells and coconut shells. With the rapid industrial growth in Nigeria, there is great and increasing demand for activated charcoal in industries such water purification, food processing, mining, pharmaceuticals and environmental managements. Nigeria currently imports the majority of its activated charcoal despite the abundant availability of Biomass resources. This project aligns with Nigeria's national goal of promoting Waste-to-Wealth. Nigeria generates millions of tons agricultural waste annually, much of which is underutilized or discarded, leading to environmental pollution. This project aims to turn NIFOR Biomass into a valuable commodity through Steam Activation technology.

PROJECT OBJECTIVES

1. To establish a pilot scale facility for the production of steam activated charcoal technology.
2. To reduce Nigeria's dependence on imported activated charcoal.
3. To utilise NIFOR mandate crops Biomass waste (coconut shells, palm kernel shells, Oil palm tree trunk, shea tree stalk) for sustainable industrial production.

METHODOLOGY

Raw Material Procurement: collection of NIFOR mandate crops Biomass and Pretreatment of them.

Carbonization: A carbonization kiln will be constructed using steel which will have insulator to help conserve heat furring carbonization of the different biomass.

Activation: A Steam Activation kiln will also be constructed using steel that will have a high temperature to develop high porosity and high surface area of the activated charcoal produced.

Product Development and Packaging: The Activated charcoal produced will be characterized that is iodine number determination, BET and Surface area, pore volume will be done. Packaging of the activated charcoal into different forms like Granular and powdered forms of 5kg, 10kg, and 25kg sterile bags, kraft paper sacks with polyethylene liners and reseallable pouches.

Despite Nigeria having access to carbon /charcoal rich agricultural by products like palm kernel, coconut shells, there is evidence of little to no local production of activated charcoal to meet the country's demand. In 2023 Nigeria imported approximately $4.81 million worth of activated charcoal.

EXPECTED OUTCOMES OF THIS PROJECT

Establishment of a profitable value chain for oil palm biomass utilization.

Skills development and technology transfer in waste -to- wealth processing.

Reduction in production cost for Nigerian industries by replacing imported charcoal with cheaper, high quality local alternatives.

4. Scientific publications, patents, and knowledge sharing on biomass based charcoal technologies.

CUSTOMERS READINESS

Industries (water treatment, mining, food and beverage, pharmaceuticals) are already familiar with activated charcoal actively use it. Customers are actively seeking cheap, reliable and sustainable local alternatives.

INNOVATION STAGE

A small scale processing Steam Activation kiln and A carbonization kiln were done in order to improve the existing practices employed by many local people in the carbonization of different Agricultural biomass. These kilns successfully carbonized and also activated the charcoal derived from coconut shells and palm kernel shells. These were packaged in 5 kg bags and resealable pouches in granular and powdered forms.

CONCLUSION

This project, the pilot scale production of activated charchoal from NIFOR Biomass using steam activation provides an opportunity for Nigeria's Agro – industrial and environmental sustainability. We aim to create a viable, sustainable and commercially competitive activated charchoal industry. This will empower local farmers and communities with steady income streams from biomass supply. It will also help in price reduction in using this locally made alternative compared to the imported activated charchoal used by industries pharmacitical companies etc.