Project Title

Pilot Scale Production of Activated Charcoal from NIFOR Biomass

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Location: Nigerian Institute for Oil Palm Research (NIFOR), Benin City

Duration: 24 Months

Slide 2: Project Summary

- **Objective**: Establish a pilot-scale commercial facility to produce high-quality activated charcoal from NIFOR biomass (palm kernel shells, coconut shells, oil palm tree trunks, etc.).
- **Technology**: Using **Steam Activation** to convert biomass waste into valuable activated charcoal.
- **Market Demand**: Rapid industrial growth in Nigeria is increasing demand for activated charcoal across industries like **water purification, food processing, mining, pharmaceuticals**, and **environmental management**.
- **Current Problem**: Nigeria imports over **$4.81 million** worth of activated charcoal annually despite the abundance of local biomass resources.
- **Alignment with National Goals**: Promotes **Waste-to-Wealth**, reducing environmental pollution caused by underutilized agricultural waste.

Slide 3: Project Objectives

1. **Establish a Pilot-Scale Facility**: Implement steam activation technology to produce activated charcoal.
2. **Reduce Import Dependency**: Replace imported charcoal with locally produced, cost-effective alternatives.

3. **Sustainable Biomass Utilization**: Leverage NIFOR biomass (palm kernel, coconut shells, oil palm trunks, etc.) for industrial production.

Slide 4: Methodology

1. **Raw Material Procurement**: Collect biomass from NIFOR mandate crops (palm kernel, coconut shells, etc.) and pre-treat them.
2. **Carbonization**: Construct a **steel carbonization kiln** with insulation to conserve heat and carbonize various biomass materials.
3. **Activation**: Build a **steam activation kiln** to develop high porosity and surface area for activated charcoal.
4. **Product Development & Packaging**:
    - **Iodine number, BET surface area, and pore volume testing**.
    - Package products in **5kg, 10kg, 25kg bags**, kraft paper sacks with polyethylene liners, and resealable pouches.

Slide 5: Market Opportunity

- **Nigeria's Import Dependency**: In 2023, Nigeria imported **$4.81 million** worth of activated charcoal, despite having abundant local agricultural by-products.
- **Growing Demand**: Industries like **water treatment**, **mining**, **pharmaceuticals**, and **food processing** already rely heavily on activated charcoal and are actively seeking **cheaper, reliable local alternatives**.

Slide 6: Expected Outcomes

1. **Value Chain Creation**: Establish a profitable value chain for oil palm biomass.

2. **Skills Development & Knowledge Transfer**: Empower local communities and industries with waste-to-wealth technologies.
3. **Cost Reduction for Industries**: Offer **high-quality, cost-effective local alternatives** to imported charcoal, lowering industrial production costs.
4. **Scientific Impact**: Publication of scientific papers, potential patents, and sharing knowledge on biomass-based charcoal technologies.

Slide 7: Customer Readiness

- **Industries Familiar with Activated Charcoal**: Water treatment, mining, food & beverage, and pharmaceuticals already use activated charcoal and are **actively seeking cheaper, local alternatives**.
- **Market Demand**: There is an ongoing search for **sustainable, high-quality**, locally sourced activated charcoal.

Slide 8: Innovation Stage

- **Prototype Success**: A small-scale steam activation kiln and carbonization kiln have been successfully built and tested.
    - Carbonized and activated **coconut shells** and **palm kernel shells**.
    - Packaged in **5 kg bags and resealable pouches** (granular and powdered forms).
- **Improved Local Practices**: Upgraded traditional carbonization methods, showing **significant improvement** in product quality and efficiency.

Slide 9: Conclusion

- **Environmental Sustainability**: This project aligns with Nigeria's goal of turning agricultural waste into valuable commodities.

- **Economic Opportunity**: Creates a **commercially competitive industry** that empowers local farmers, provides steady income, and reduces dependency on imported activated charcoal.
- **Impact on Industries**: Provides **affordable, locally made alternatives**, cutting costs for industries like pharmaceuticals, food processing, and water treatment.

Slide 10: Call to Action

We are seeking funding to establish the **pilot-scale production facility** and scale this innovative project, creating jobs, promoting sustainability, and supporting Nigeria's industrial growth.

Join us in turning NIFOR Biomass into valuable activated charcoal—driving economic and environmental impact in Nigeria.

Contact Information

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