

We are a Nigerian exporter specializing in Palm Kernel Shell biochar—a renewable, carbon-negative product used in industrial fuel substitution, soil enrichment, and carbon sequestration projects. Our biochar offers high calorific value, low ash content, and proven sustainability benefits. We currently supply to Europe and are expanding into the Middle East and Asia, partnering with companies that value clean energy and sustainable agriculture. With reliable supply chains and competitive pricing, we are committed to powering industry while sustaining nature.

Palm kernel shell biochar is a carbon-rich material produced through pyrolysis of palm kernel shells, offering high stability in soil, excellent carbon sequestration potential, and improved water and nutrient retention — making it valuable for agriculture and climate mitigation.

What is Palm Kernel Shell Biochar?

- **Palm kernel shells** are the hard endocarp of oil palm fruits, usually considered agricultural waste.
- Through **pyrolysis** (heating in the absence of oxygen at 400–600°C), these shells are converted into **biochar**.
- The resulting biochar is a porous, black material with high carbon content and alkaline pH.



Key Characteristics

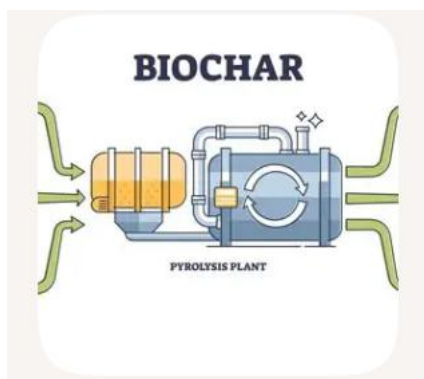
- **Carbon content:** Increases from ~46% (raw shells) to ~73% after pyrolysis.
- **Stability:** Low hydrogen-to-carbon (H/C) and oxygen-to-carbon (O/C) ratios (0.32–0.54 and 0.08–0.21), indicating long-term stability in soil.
- **Surface area:** Expands from 106 m²/g (raw) to 329 m²/g at 600°C, enhancing adsorption capacity.
- **pH:** Strongly alkaline (9.3–12.0), useful for neutralizing acidic soils.
- **Water retention:** Improves significantly, holding up to 6.21 g water per 10 g biochar at 500°C.
- **Nutrient retention:** Increases cation exchange capacity (CEC), particularly at lower pyrolysis temperatures (400°C).



- [Academia.edu jopr.mpob.gov.my](http://Academia.edu/jopr.mpob.gov.my)
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Applications

- **Soil amendment:** Enhances fertility, water retention, and microbial activity in low-quality soils.
- **Carbon sequestration:** Stores carbon long-term, reducing greenhouse gas emissions.
- **Waste management:** Provides a sustainable use for palm oil industry residues.
- **Energy co-products:** Pyrolysis also yields syngas and bio-oil, which can be used as renewable energy sources.



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⚠ Challenges & Considerations

- **Production cost:** Requires controlled pyrolysis equipment, which may be expensive for small-scale farmers.
- **Soil compatibility:** High alkalinity may not suit all soil types; careful application rates are needed.
- **Scalability:** Large-scale adoption depends on palm oil industry waste management policies and farmer awareness.

📊 Quick Comparison

Property	Raw Palm Kernel Shells	PKS Biochar
Carbon content	~46%	~73%
Surface area	106 m ² /g	329 m ² /g
pH	Neutral	9.3–12.0 (alkaline)
Water retention	2.23 g/10 g	6.21 g/10 g
CEC	3.00 cmol/kg	4.44 cmol/kg (at 400°C)

Would you like me to focus more on agricultural benefits, climate impact, or production methods? ➡ **Process of Making Palm Kernel Shell Biochar**

1. **Palm kernel shells** – collected as waste from palm oil mills.
2. **Drying** – moisture is reduced to prepare for pyrolysis.
3. **Pyrolysis** – shells are heated at 400–600°C in a low-oxygen environment.
4. **Biochar formation** – carbon-rich, porous material is produced.

5. **Cooling and storage** – biochar is stabilized and stored for use.



● Palm Kernel Shell Biochar

- **Appearance:** Black, porous, lightweight material.
- **Properties:** High carbon content (~73%), alkaline pH (9–12), large surface area (up to 329 m²/g).
- **Uses:** Soil amendment, water retention, nutrient adsorption, and long-term carbon storage.

Sustainable Approach and Safe Use of Biochar and Its Possible Consequences

