

SELF-SUSTAINED CONTROLLED OXIDATIVE FLASH DEVOLATILIZATION SYSTEM FOR BIOCHAR SYNTHESIS

IITM Technology Available for Licensing

Problem Statement

- Current commercial biochar production methods, such as mud-pit carbonization, face environmental concerns and have been banned due to soil and water pollution caused by underground operations.
- Alternative technologies like pyrolysis and gasifier methods offer lower yields or increased complexity, deterring manufacturers from adopting them for biochar production.
- Gasifier technology yields around 25% biochar but is economically unfavorable due to high tar release and maintenance expenses.
- Further, slow and fast pyrolysis methods offer higher yields but are energy-intensive and require complex downstream handling, making them less feasible for biochar production.

Intellectual Property

- IITM IDF Ref. 2146
- IN 408924 - Patent Granted
- NBA Appl No. INBA2302203878

Technology Category/ Market

Category- Sustainable Biomass Processing

Applications- Biochar Production for Agriculture

Industry- Renewable Energy, Waste Management

Market - Global biochar market size is projected to grow from \$204 million in 2023 to \$450 million by 2030 with a **CAGR of 11.9%**.

TRL (Technology Readiness Level)

TRL - 4: Technology validated in lab scale.

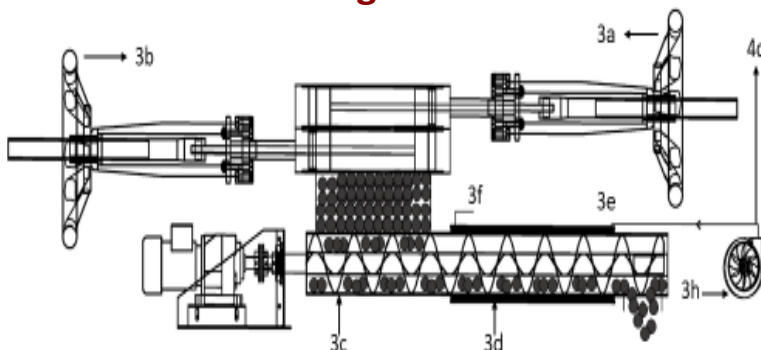


FIG. 1. Graphical representation of the biochar collecting unit (3) of the self-sustained controlled oxidative flash de-volatilization system for biochar synthesis.

Technology

The invention presents a self-sustained controlled oxidative flash de-volatilization system for biochar synthesis, addressing the need for an improved combustion system and method for processing biomass/agro residues

The system comprises key components such as a feeding system, vertical kiln, biochar collecting unit, cleaning and cooling system, flow controlling unit, and burner, offering flexibility in design configurations to suit different operational requirements.

Various embodiments, including open and closed top vertical kilns, highlight the versatility of the system in pre-heating biomass efficiently, utilizing excess heat from flue gas, and incorporating scrubbers for producer gas cleaning, enhancing its feasibility for commercial biochar production.

Research Lab

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Key Features / Value Proposition

- The self-sustained controlled oxidative flash de-volatilization system offers a cutting-edge solution for biochar synthesis, aligning with the market's demand for environmentally friendly and efficient biomass processing methods.

**Innovative
Technology
Adoption**

- With adaptable design configurations and the ability to utilize excess heat from flue gas, the system provides operational versatility, catering to diverse biomass processing needs and maximizing resource utilization.

**Enhanced
Operational
Flexibility**

- By addressing environmental concerns associated with traditional methods and optimizing energy usage, the system promises cost-efficient biochar production, appealing to manufacturers seeking sustainable yet economically

**Cost-Efficient
Production**

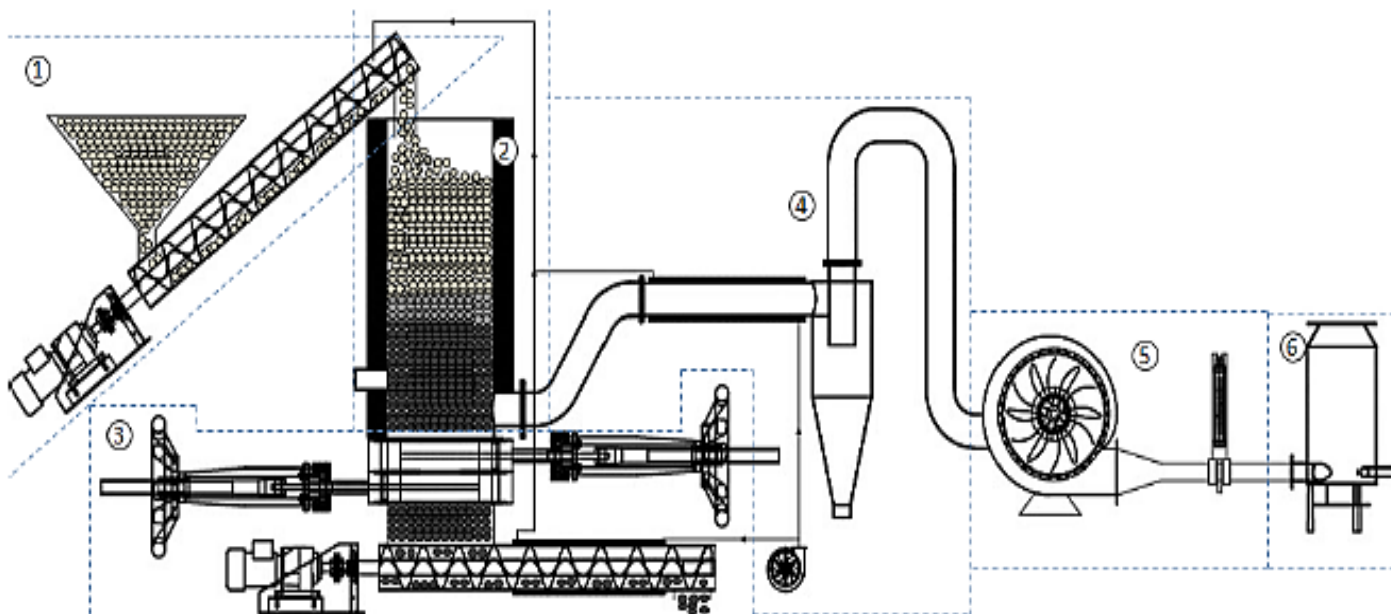


FIG. 2. A graphical representation of a self-sustained controlled oxidative flash de-volatilization system for biochar synthesis.

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