

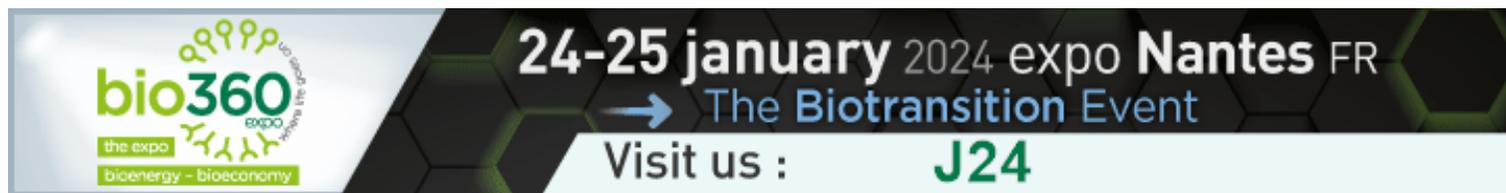


This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036401



SteamBioAfrica

A Novel Approach to Torrefaction



Overview



Context

Our Technology
Prior Work
SteamBioAfrica

What we are doing (The project plan)

Technology (& Challenges)
Material Supply
Social Impact
Market Opportunities
Ecology & the Environment

Next Steps



Superheated Steam Processing

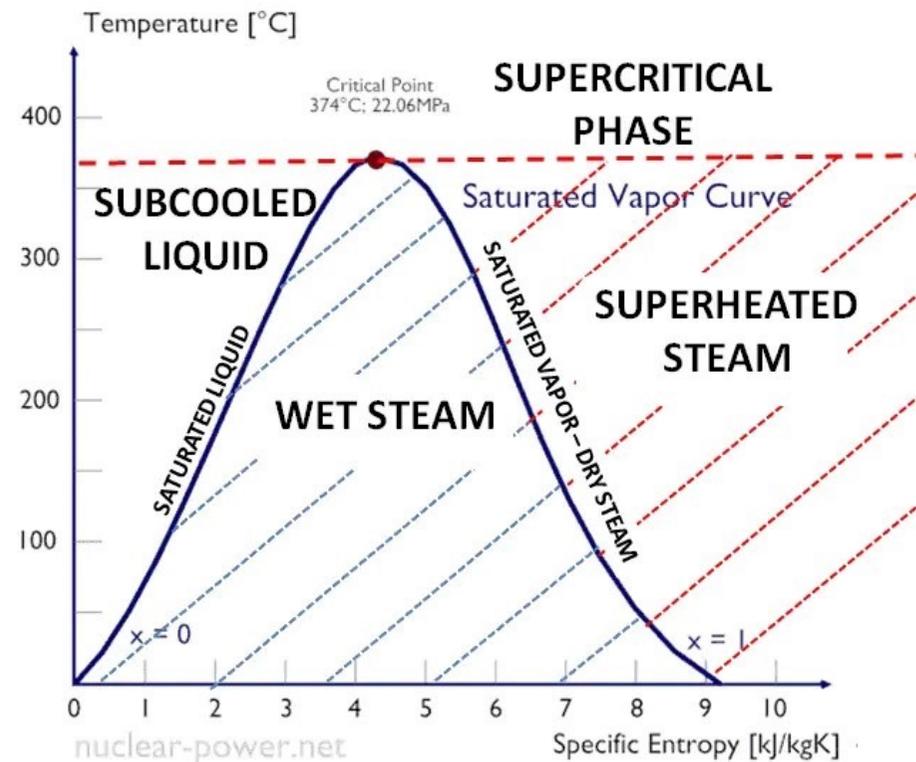


Superheated steam has excellent thermophysical properties. This facilitates its use as a drying technology. For instance, in lumber mills in 1906 Pacific North-West.

Higher heat capacity and thermal conductivity than air enables efficient heat transfer.

Moisture is drawn out of substrate with no crust formation leads to quicker more uniform drying.

Superheated Steam presents a relatively inert atmosphere. This avoids oxidative or combustion reactions with substrates.



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Our Innovative Technology



Our Approach:

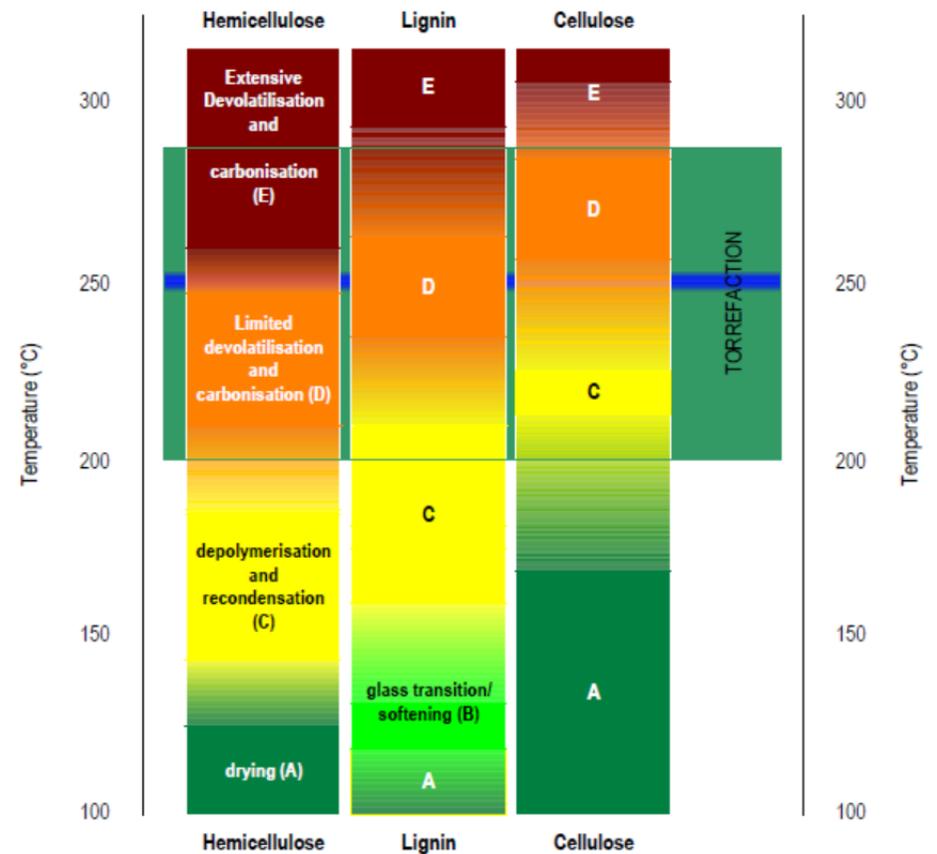
Steam released from substrate, once steam saturated drying stops, we continually remove moisture to maintain superheated state, enabling continuous process.

Our Innovations:

Raising process temperature up to 260°C
Clean and stable torrefaction conditions.

We can control outputs; clean burning fuels and biochemicals in removed condensate

This is all novel.



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Previous Work



SteamBio project
2014-2017 Grant No: 636865

Following pilot scale tests, technology demonstrated in rural Spain: hard and soft woods, vineyard and olive prunings.

Mild torrefaction at 220°C-230°C.
Produced clean burning fuel with coal like properties and biochemical rich condensate.
Initial business case prepared.



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SteamBioAfrica: the Rationale & the Opportunity

Encroachment & invasives degrade land across
Southern Africa and elsewhere
Over 45 million ha of land degraded just in Namibia
Over 120 million ha across Southern Africa

Assume 10 tonnes biomass per ha
450 million tonnes of unused biomass in Namibia
Over 1200 million tonnes across Southern Africa

Global wood pellet market is 55 million tonnes pa
Global coal market is 7000 tonnes pa

Need to create value from this unwanted biomass
Turn it into a valued resource
This will stimulate its sustainable harvesting



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SteamBioAfrica: Project Focus

Where we are now?

Energy insecurity
Climate impacts
Encroachment
Rural Unemployment
Gender inequality
Social exclusion
**No technology
addressing these
issues on a large scale**



Where do we want to be?

Clean, secure, and
affordable energy
Rural Employment
Land Restoration
Gender & Social Inclusion
Local Manufacturing
Local Wealth Creation
Large Scale Impact



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SteamBioAfrica: Project Scope



Advance on the original SteamBio project:
Turn this unwanted woody biomass into clean
burning fuel with coal like handling and
combustion properties.

Affordable and usable by industry and
household consumers: No loss in performance
or need for capital investment.

Holistic reach
Robust design
Techno-economic viability
Enable scale up and replication
Address social and climate change impacts



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SteamBioAfrica Work Plan



Work Package 1 Management

Coordination / Project Management / Risk Management / Gender, Equality & Social Inclusion / EU Communication

Work Package 2
Design & Construction

Work Package 3
Installation & Commissioning

Work Package 4
Plant Operation

Work Package 6
Commercial Manufacturing
Pathway
Establish delivery post project of
commercial industrial scale processes

Work Package 5
Process
Optimisation

Work Package 9 Market Assessment
Determine market potential of the solid biofuel with
domestic consumers

Work Package 10
Value Chain Development
Building capacity to enable post project roll out in the
market across Botswana, Namibia and South Africa

Work Package 7
Logistics & Land Management
Ensuring long term sustainable supply of biomass to
produce clean burning fuel

Work Package 8 Ecosystem Services
Creating long term approach to ensure improved
ecosystem when harvesting bush and invasive woody
biomass

Work Package
11
Life Cycle
Studies
Assess the
sustainability from
a life cycle
perspective

Technology

Work Package 2– 6

Land & Ecosystems

Work Package 7 & 8

Market & Value Chain

Work Package 9 & 10

Life Cycle Studies

Work Package 11

Project Impact

Work Package 12 & 13

Work Package 12 Project Impact (Exploitation & Dissemination)

Enabling large scale post project replication and scale up of the project results to deliver significant positive economic, social and environmental change across Southern Africa

Work Package 13 Ethics

Verify ethical compliance of project work and impacts, the participation of humans, data protection, health & safety, environmental compliance, and benefit sharing between EU and non-EU countries



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Demonstration Unit at Cheetah Conservation Fund in Namibia



Project Ambition: Progress to Date



**Build
on prior
work**

**Design
Robust & Resilient
Temperature up
to 260°C**

**Process being
optimised to
feedstocks
and market
demand**

Confirming Benefits For Africa & In Africa

Profit & Value
Clean burning high value fuel
Industry & households
Social & environmental sustaining
Stimulate bush clearance
Soil restoration
Optimising logistics
Job creating

**Preparing &
progressing
post project
Planning**

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What Next?



Operation & Optimisation:

Processing 250kg/hour
24/7 Operation
Producing over 500 tonnes of torrefied clean burning fuel from bush

Demonstrating & Validating:

Technology & economics
Market acceptance
Sustainable impact

Developing Plans for Large Scale Post-Project Roll-Out

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15 partners
2 continents
8 countries
Researchers & Academia
Industry & Entrepreneurs



STEAM
BIO
AFRICA



carbon capital

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Any questions: visit us here today:



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