Bamboo Biochar

The Environmental and Economic Benefits of Bamboo Biochar

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Main Topic Area

- What is Biochar
- Biochar and You
- How is Biochar Made
- Economics of Biochar

What is Biochar Technology

- Biochar technology is centered around 5 main techniques of reducing biomass to a high carbon material
  - Pyrolysis
  - Hydrothermal carbonization
  - Gasification
  - Flash carbonization
  - Torrefaction

What is Biochar

Biochar is a charcoal-like substance that is made by burning organic material from agricultural and forestry wastes (also called biomass) in a controlled process called pyrolysis. Although it looks similar to common charcoal, biochar is produced using a specific process to reduce contamination and safely store carbon.

Physical attributes of Biochar:

- Black, highly porous, lightweight, fine-grained and has a large surface area.
- 70 percent of its composition is carbon.
- The remaining percentage consists of nitrogen, hydrogen, and oxygen among other elements.
- The chemical composition varies depending on the feedstocks used and methods used to heat it

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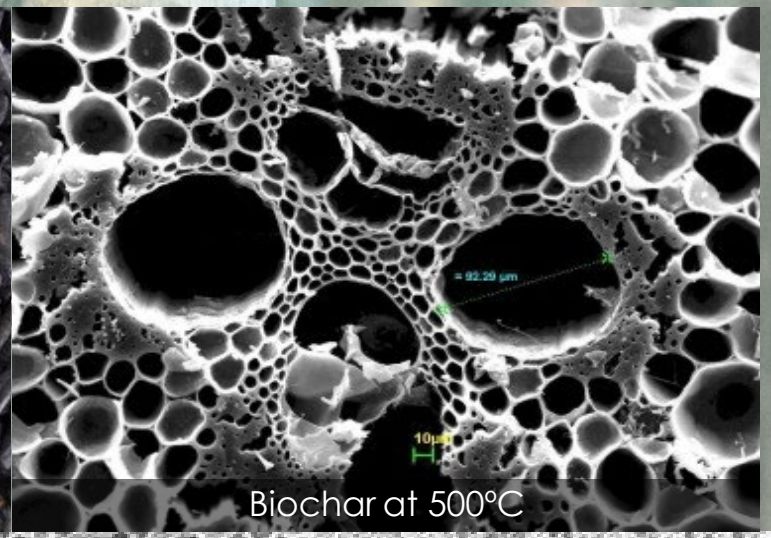
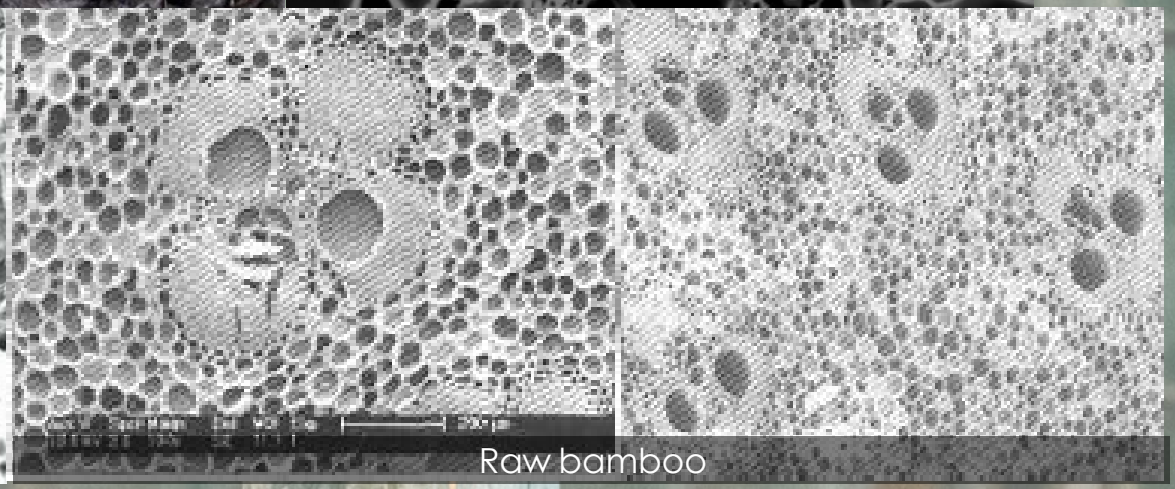
OnlyMoso's Biochar Project

- The project of utilizing bamboo for the production of a high-grade Biochar was initially conceived by Roberto Seminara over 3 years ago
- The project took its first major step forward in April of 2020 as the first test on bamboo supplied by OnlyMoso was converted into biochar and studied by the Spallanzani institute
- The results of this testing were exceptional and demonstrated the superiority of Bamboo Biochar in comparison to all other feedstocks.

Why use bamboo to produce biochar



Biochar at 500°C



Raw bamboo

The Biochar Test Analysis

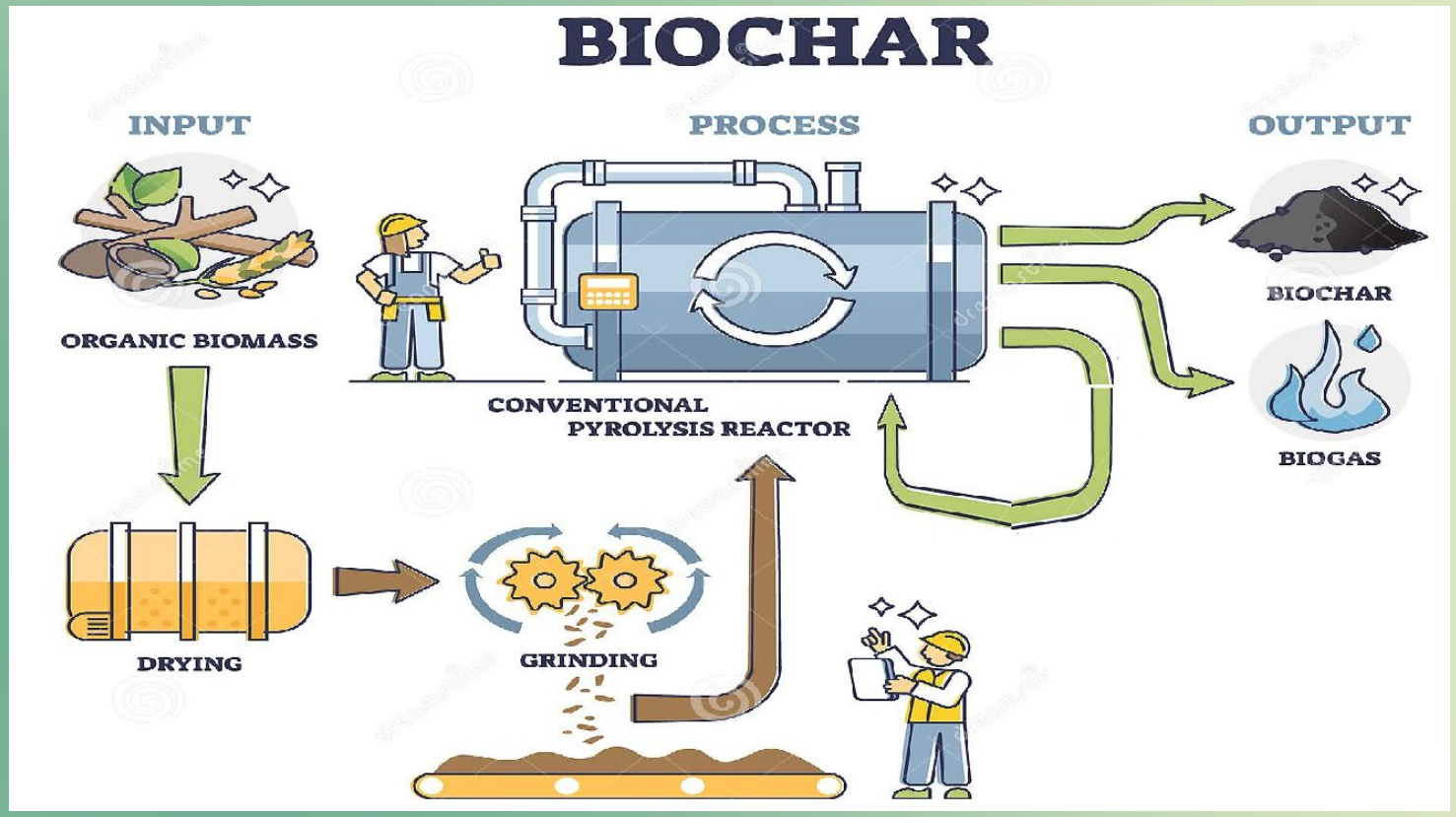
Matrix: By-product (Bamboo Biochar)		
UNI EN 13657:2004 + EPA 200.8 1994-EPA 3545 A 2007 + EPA 8270 E 2018-EPA 8280 B 2007		
Parameter	Analytical results	Result
Method	U.M.	
Aluminum (Al)	mg/kg	111
Antimony (Sb)	mg/kg	< 1
Arsenic (As)	mg/kg	< 1
Barium (Ba)	mg/kg	15
Beryllium (Be)	mg/kg	< 1
Boron (B)	mg/kg	< 10
Cadmium (Cd)	mg/kg	< 1
Cobalt (Co)	mg/kg	< 1
Hexavalent chromium (Cr)	mg/kg	< 1,0
Total chromium (Cr)	mg/kg	13
Iron (Fe)	mg/kg	5575
Manganese (Mn)	mg/kg	146
Mercury (Hg)	mg/kg	< 1
Molybdenum (Mo)	mg/kg	2
Nickel (Ni)	mg/kg	13
Lead (Pb)	mg/kg	3
Copper (Cu)	mg/kg	34
Selenium (Se)	mg/kg	< 1
Tin (Sn)	mg/kg	16
Thallium (Tl)	mg/kg	< 1
Tellurium (Te)	mg/kg	< 1
Vanadium (V)		< 2
Zinc (Zn)	mg/kg	< 7

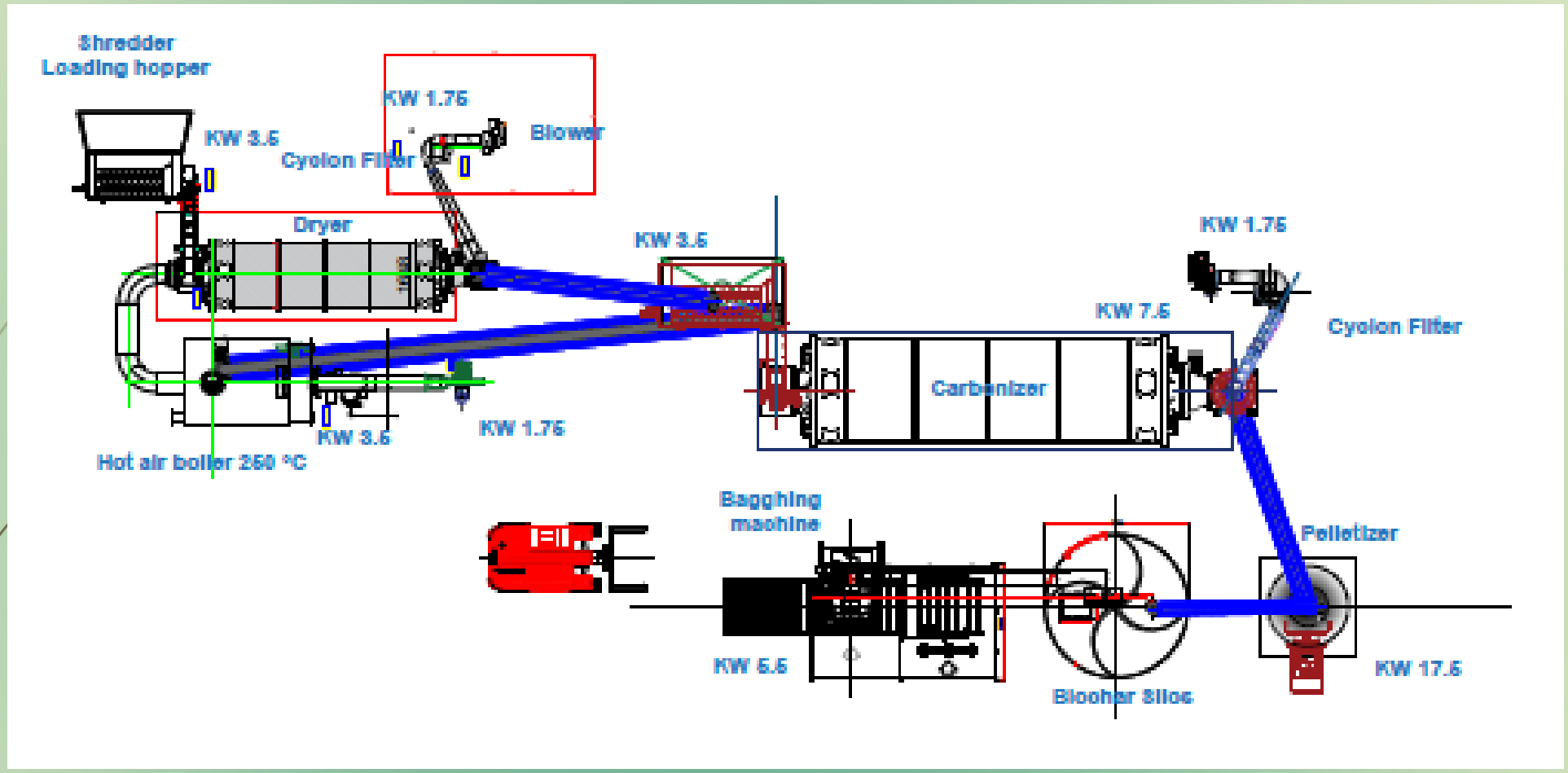
DIOXINS AND FURANS PCDD:		
2,3,7,8 TCDD	µg/kg	< 0,0010
1,2,3,7,8 PCDD	µg/kg	< 0,0050
1,2,3,4,7,8 HxCDD	µg/kg	< 0,0050
1,2,3,7,8,9 HxCDD	µg/kg	< 0,0050
1,2,3,6,7,8 HxCDD	µg/kg	< 0,0050
1,2,3,4,6,7,8 HpCDD	µg/kg	< 0,0050
OCDD	µg/kg	< 0,0100

PCDF:		
2,3,7,8 TCDF	µg/kg	< 0,0010
2,3,4,7,8 PCDF	µg/kg	< 0,0050
1,2,3,7,8 PCDF	µg/kg	< 0,0050
1,2,3,4,7,8 HxCDF	µg/kg	< 0,0050
1,2,3,7,8,9 HxCDF	µg/kg	< 0,0050
1,2,3,6,7,8 HxCDF	µg/kg	< 0,0050
2,3,4,6,7,8 HxCDF	µg/kg	< 0,0050
1,2,3,4,6,7,8 HpCD	µg/kg	< 0,0050
1,2,3,4,7,8,9 HpCDF	µg/kg	< 0,0050
OCDF	µg/kg	< 0,0100
Sum of DIOXINS and FURANI	µg WHO-TEQ/kg	0,0057
Acrylamide	mg/kg	< 1

POLYCYCLIC AROMATIC HYDROCARBONS		
Naphthalene	mg/kg	< 10
Phenanthrene	mg/kg	< 0,5
Anthracene	mg/kg	< 0,5
Fluoranthene	mg/kg	< 0,5
Pyrene	mg/kg	< 0,5
Benzo (a) anthracene	mg/kg	< 0,5
Chrysene	mg/kg	< 0,5
Benzo (b) fluoranthene	mg/kg	< 0,5
Benzo (j + k) fluoranthene	mg/kg	< 0,5
Benzo (and) pyrene	mg/kg	< 0,5
Benzo (a) pyrene	mg/kg	< 0,5
Indeno (1,2,3-c, d) pyrene	mg/kg	< 0,5
Dibenzo (a, h) anthracene	mg/kg	< 0,5
Benzo (g, h, i) perylene	mg/kg	< 0,5
Dibenzo (a, e) pyrene	mg/kg	< 0,5
Dibenzo (a, i) pyrene	mg/kg	< 0,5
Dibenzo (a, l) pyrene	mg/kg	< 0,5
Dibenzo (a, h) pyrene	mg/kg	< 0,5

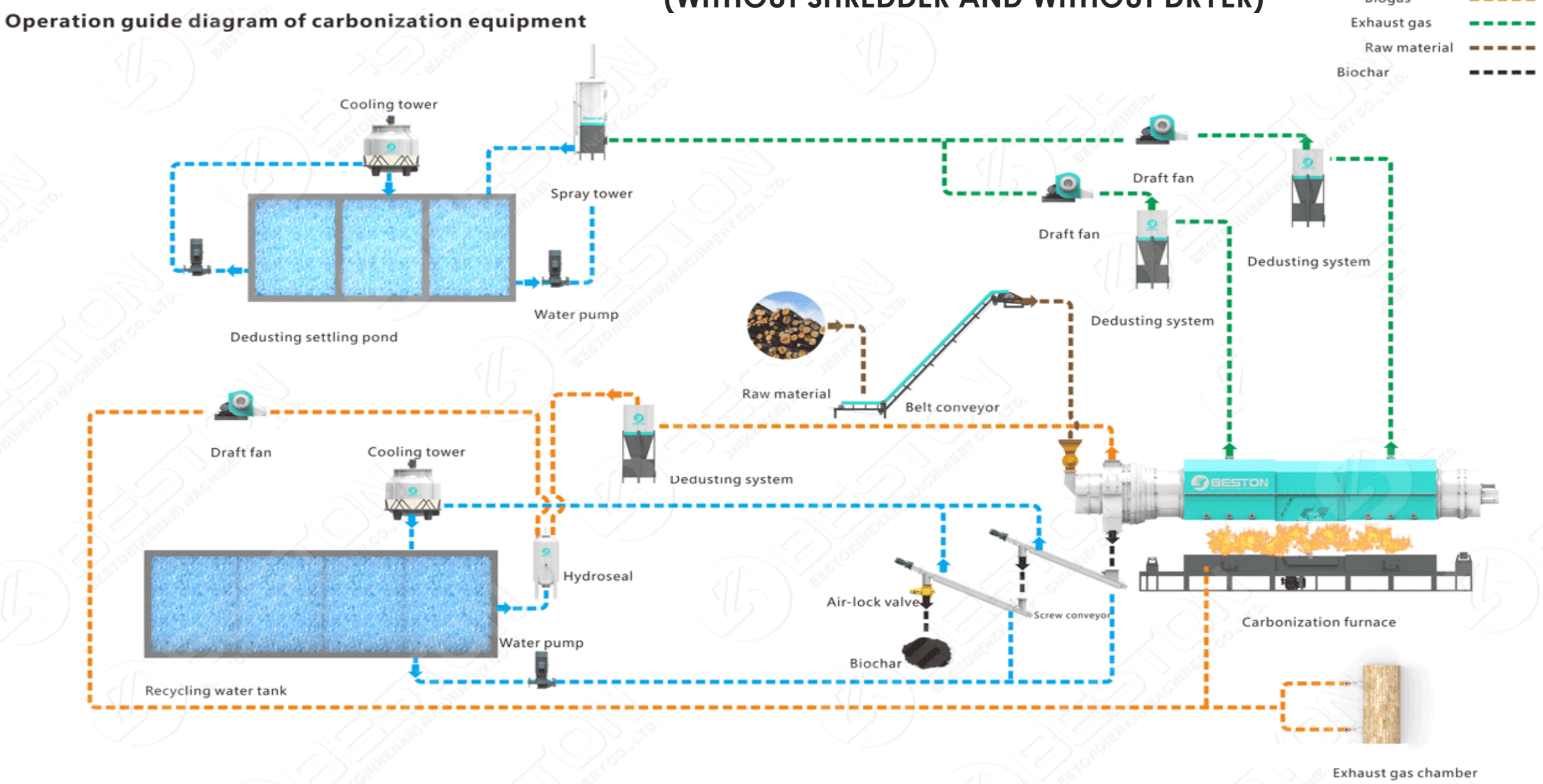
How to produce BIOCHAR





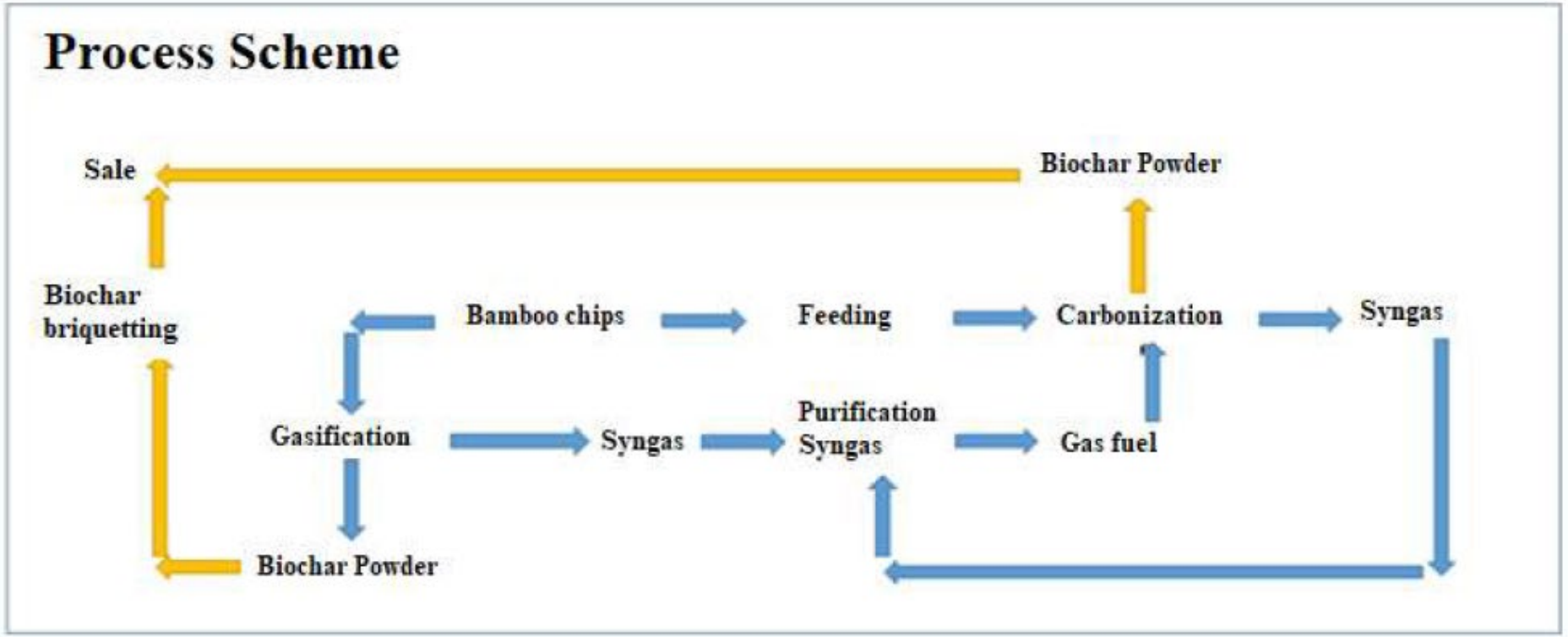
BIOMASS CARBONIZATION PLANT(WITH SHREDDER AND WITHOUT DRYER)

PROCESS OF BIOMASS CARBONIZATION PLANT (WITHOUT SHREDDER AND WITHOUT DRYER)

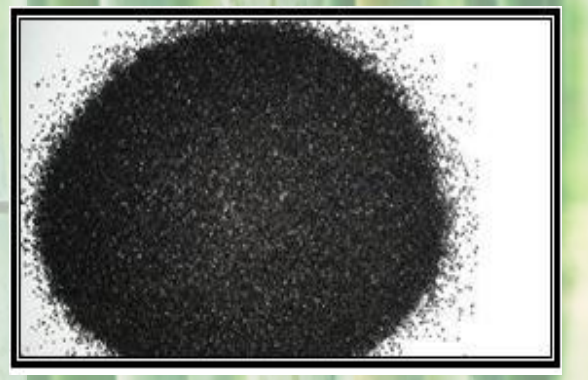


Process

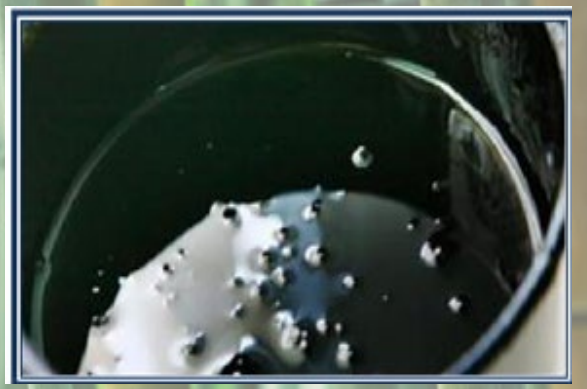
PROCESS relating to patent WO2010029591A3



Final Products



Biochar : 33%



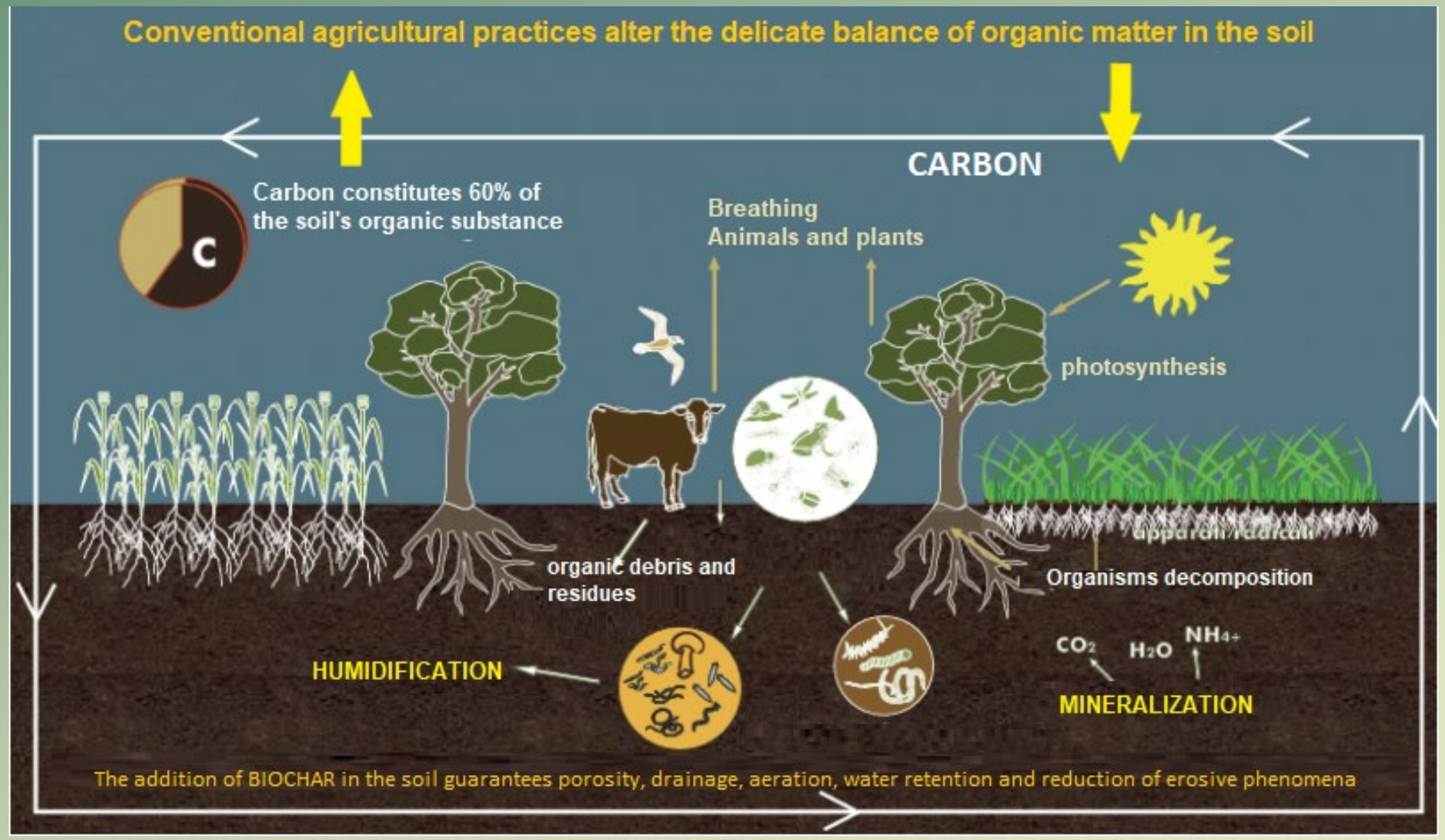
Tar :

Wood vinegar

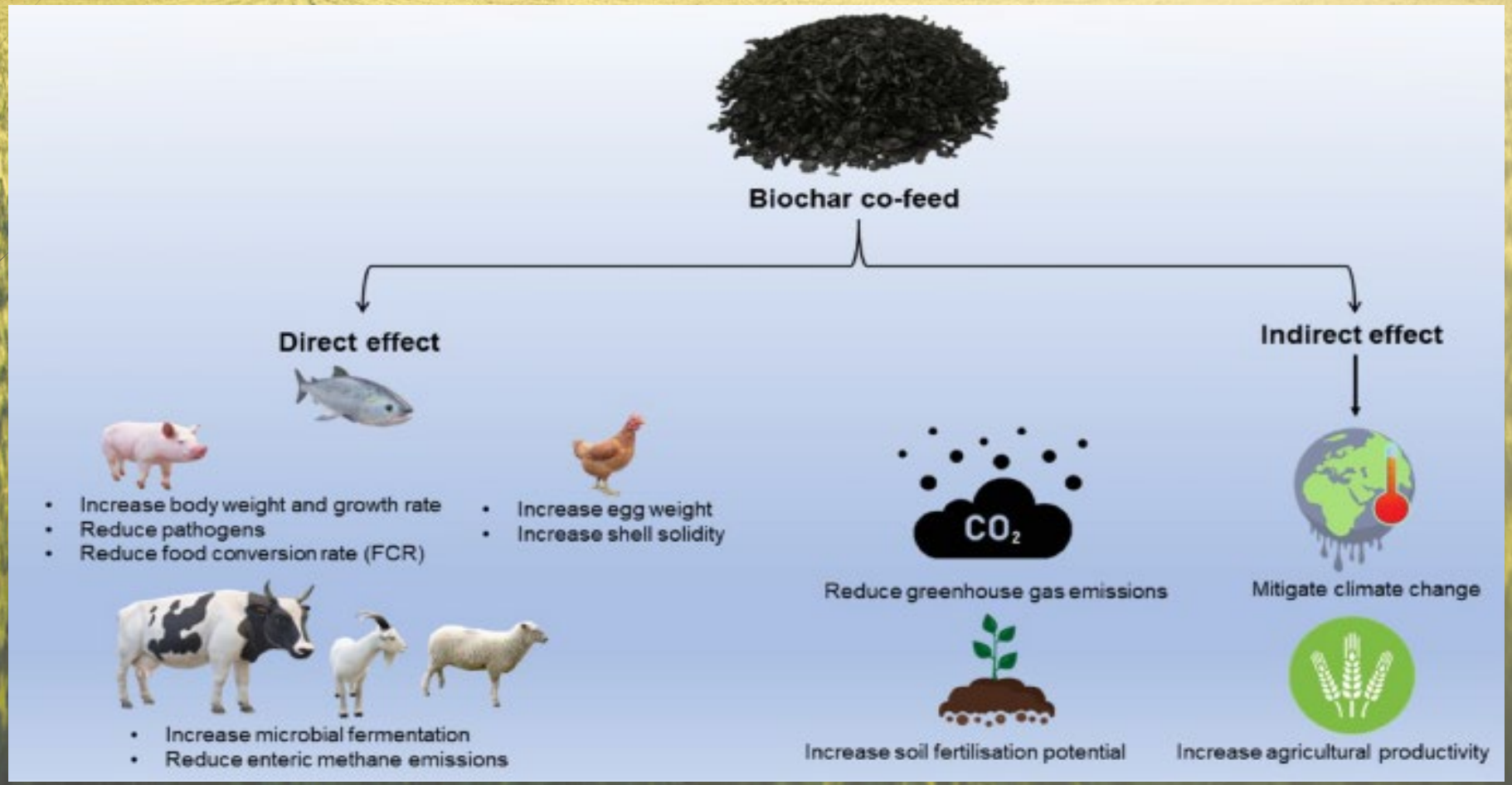
Biogas

What is Biochar Used For

What is the Role of Biochar



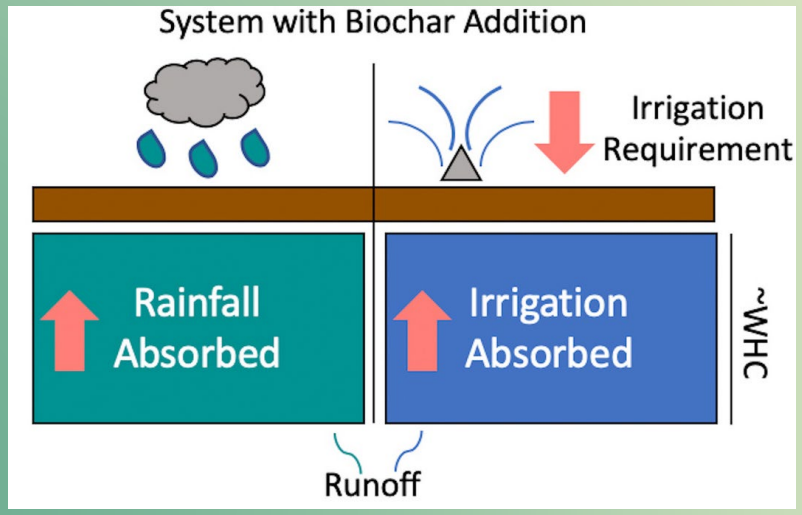
Benefits of Biochar s A Feed Additive

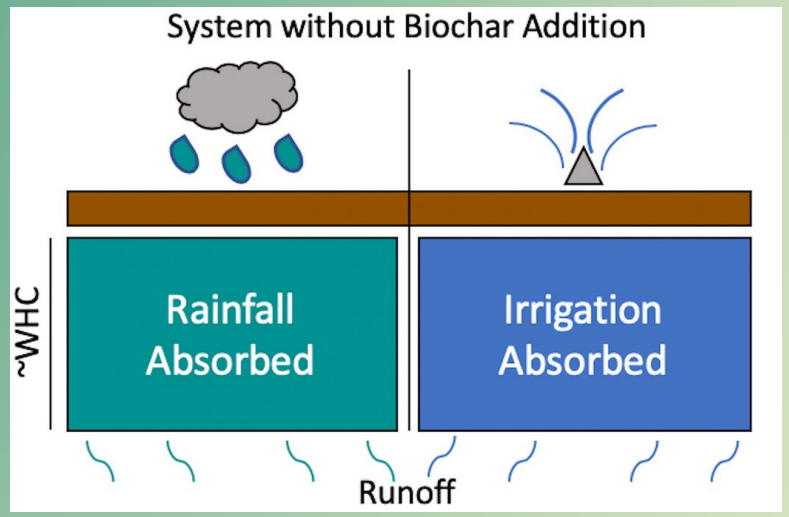


Use of biochar Mitigate Water Crisis

Use of biochar
Mitigate
Water Crisis

How Biochar Midigates Water Crisis



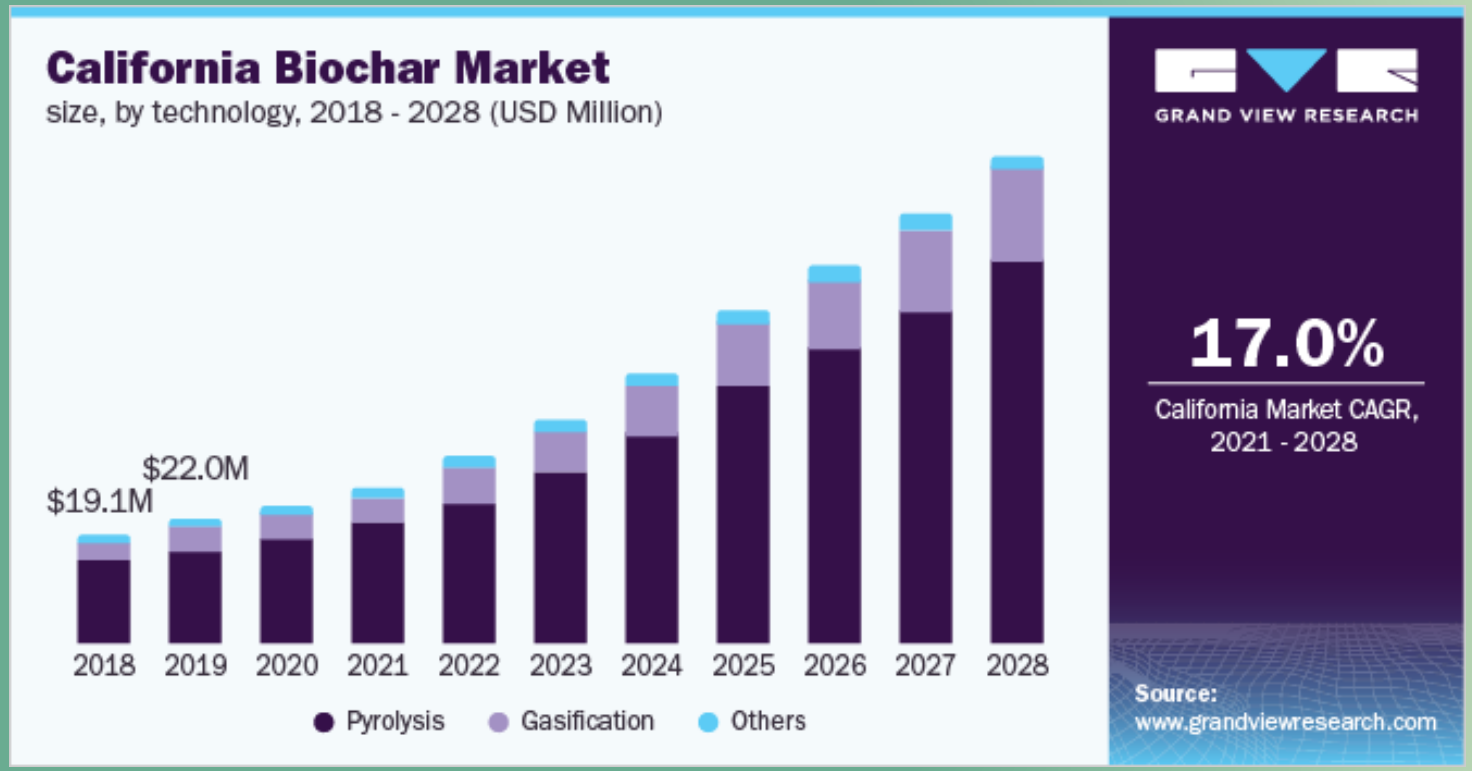


Biochar Quality Certifications

- The sales value of the Biochar increases if it is certified. The certification prevents post-sales risks and builds consumer confidence
- THE EUROPEAN BIOCHAR CERTIFICATE (EBC)
  - The EBC was developed to limit the risks of biochar usage to the best of our scientific knowledge and to help the users and producers of biochar to prevent or at least reduce any hazard to the health and for the environment while producing and using biochar.
- IBI CERTIFICATION
  - Certification of a biochar product is valid for one year from the time of issue of the formal notification. Certification lapses at the end of the period unless renewed in accordance with the procedures in the IBI Certification Program Manual.

USA BIOCHAR Market

- U.S. Biochar Market Size, Share & Trends Analysis Report By Technology (Pyrolysis, Gasification), By Application (Agriculture, Animal Feed, Health & Beauty Products), By State, And Segment Forecasts, 2021 - 2028



USA BIOCHAR Market

Annual production (nutrient x agriculture) in the USA (2012-2019 average)								
Nation	Product	ProductionTon/year	% Biochar to be added	Ton/year of Biochar	% market to be won	Ton/year of Biochar	Promotional Unit Selling Price $/ton	Possible annual revenue $/ton
USA	N	11.075.650	5%	553.783	1%	5538	$1.000,00	$5.537.825,00
USA	K_2O	1.104.000	5%	55.200	1%	552	$1.000,00	$552.000,00
USA	P_2O_5	7.040.300	5%	352.015	1%	3520	$1.000,00	$3.520.150,00
TOTAL		**19.219.950**	**5%**	**960.998**	**1%**	**9610**	**$1.000,00**	**$9.609.975,00**

SOURCE: https://www.statista.com/statistics

USA BIOCHAR Market

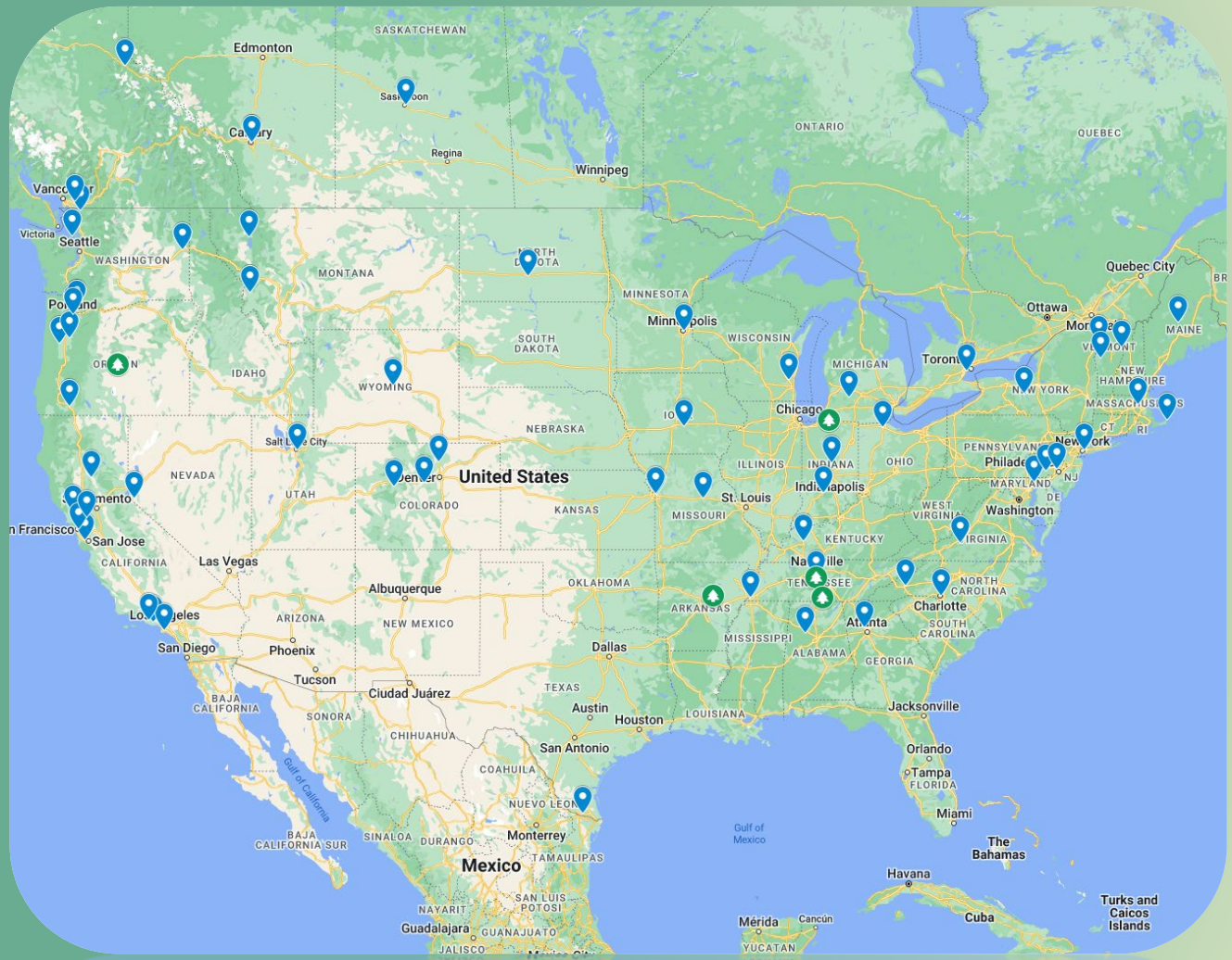
Animals on the farm in USA	Average daily feed in lbs	Daily quantity of feed in ton / day	% of Biochar in the feed	Ton Biochar x day	% market to be won	Ton biochar x day	Sell Price $/ton	Daily Revenue	Month Revenue	Year Revenue
Cattle										
94.000.000	50	2.136.364	1,5%	32.045	1%	320,5	$ 1.000	$ 320.455	$ 9.613.636	$ 115.363.636
Horses										
9.600.000	40	174.545	1,5%	2.618	1%	26,2	$ 1.000	$ 26.182	$ 785.455	$ 9.425.455
Hogs and pigs										
75.000.000	30	1.022.727	1,5%	15.341	1%	153,4	$ 1.000	$ 153.409	$ 4.602.273	$ 55.227.273
Sheeps/goats										
48.000.000	15	327.273	1,5%	4.909	1%	49,1	$ 1.000	$ 49.091	$ 1.472.727	$ 17.672.727
TOTAL						**549,1**		**$ 549.136**	**$16.474.091**	**$ 197.689.091**

- **SOURCE: https://www.statista.com/statistics**

USA - BIOCHAR Market

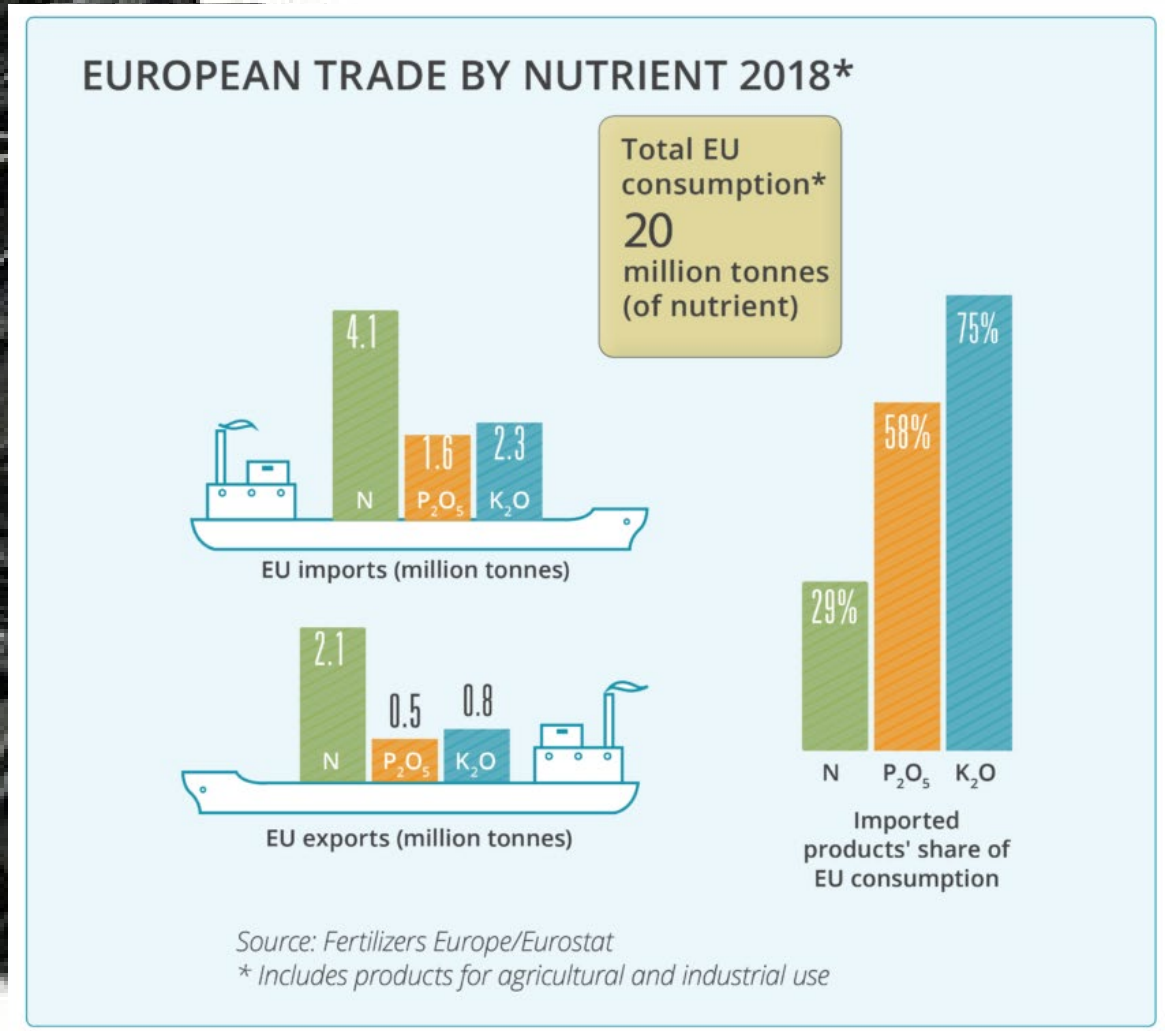
U.S. Biochar Market Report Scope	
Report Attribute	Details
Market size value in 2021	USD 141.0 million
Revenue forecast in 2028	USD 433.4 million
Growth rate	CAGR of 16.8% from 2021 to 2028
Base year for estimation	2020
Historical data	2017 – 2019
Forecast period	2021 – 2028
Quantitative units	Volume in kilotons, revenue in USD million, and CAGR from 2021 to 2028
Report coverage	Volume forecast, revenue forecast, company ranking, competitive landscape, growth factors, and trends
Segments covered	Technology, application, state
Country scope	U.S.
State scope	California; Texas; Kansas; Oklahoma; Idaho; Arizona; Other States
Key companies profiled	BioCharWorks; Biochar Supreme; Avello Bioenergy; Black Owl Biochar; Aries Clean Energy LLC; Pacific Biochar Benefit Corporation
Customization scope	Free report customization (equivalent to up to 8 analysts' working days) with purchase. Addition or alteration to country, regional, and segment scope.

Biochar Producers, Equipment Providers, and Retailers



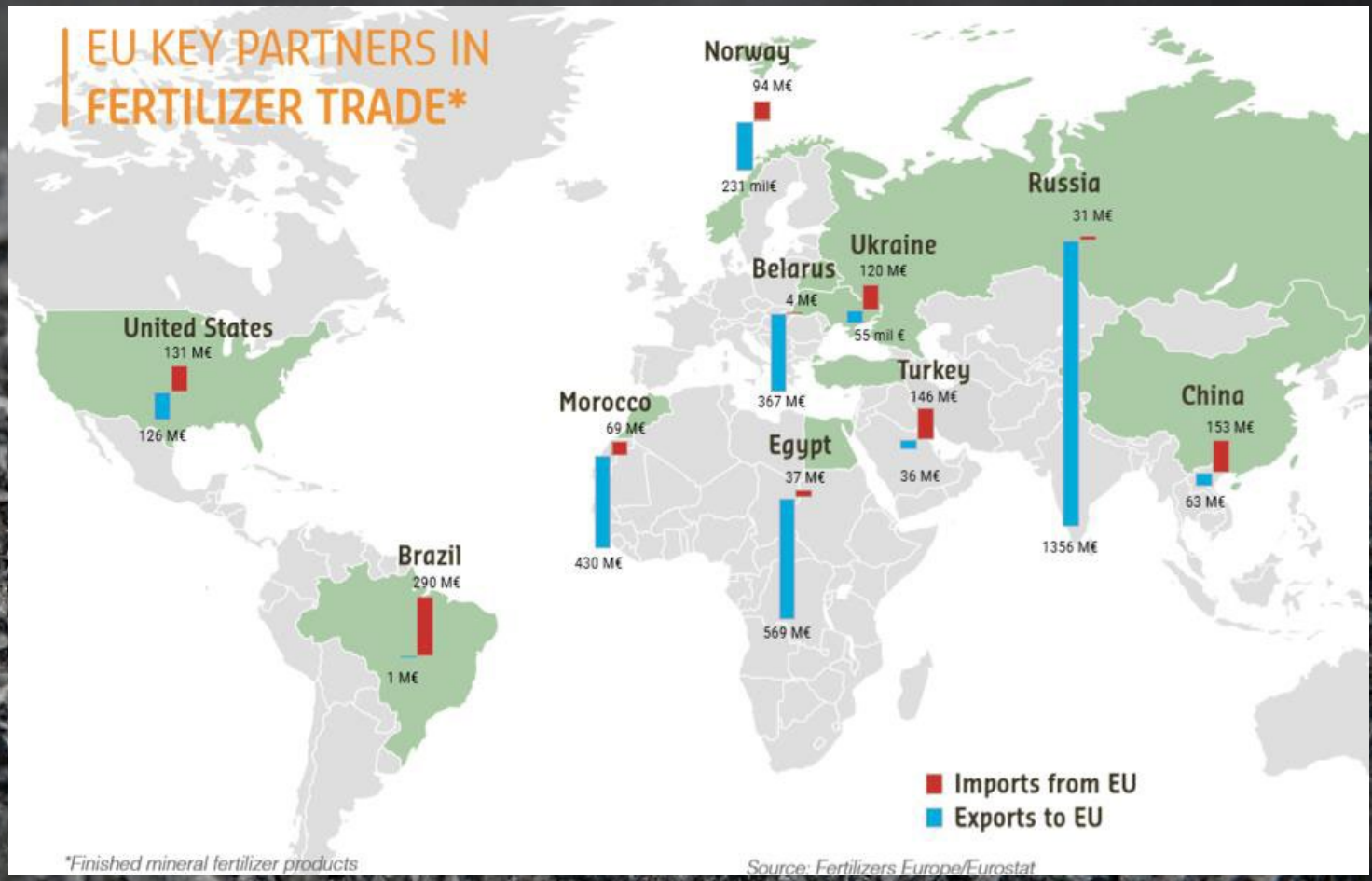
IBI Certified

EUROPE - BIOCHAR Market

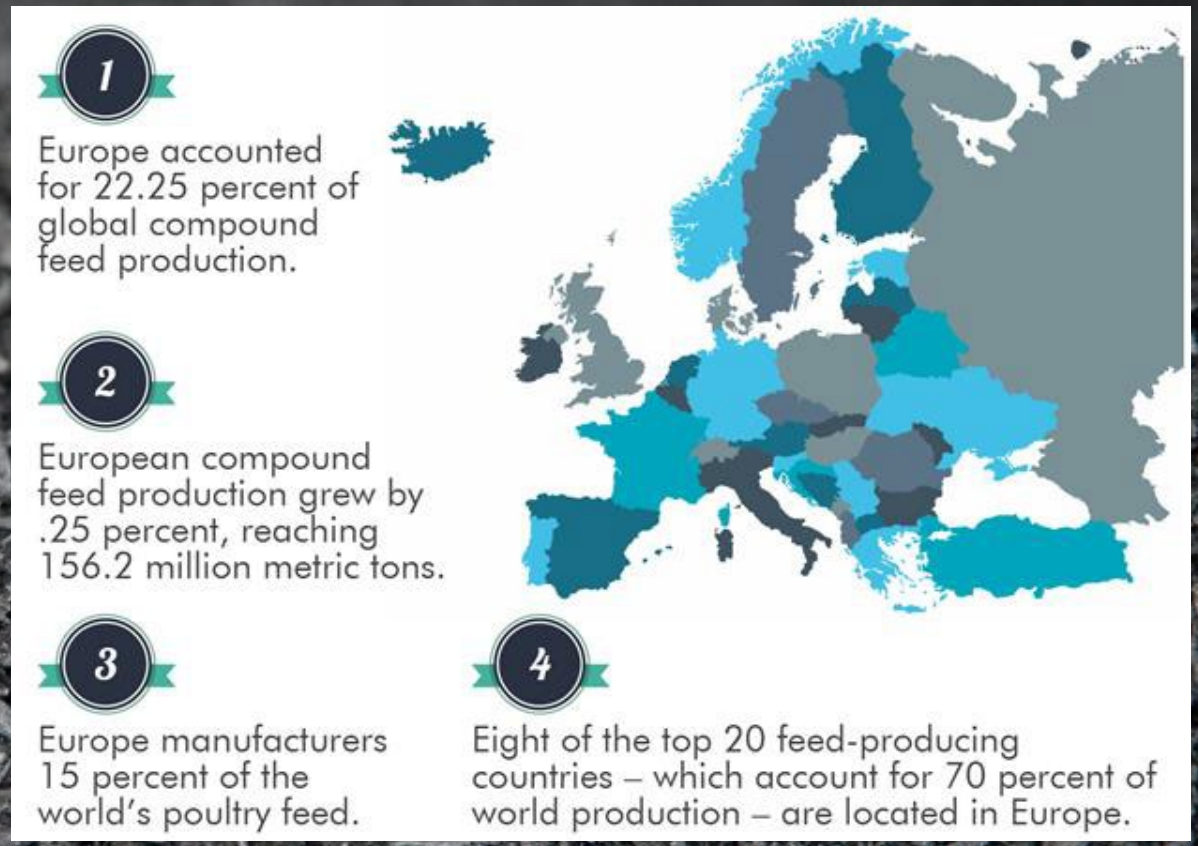


EUROPE - BIOCHAR Market

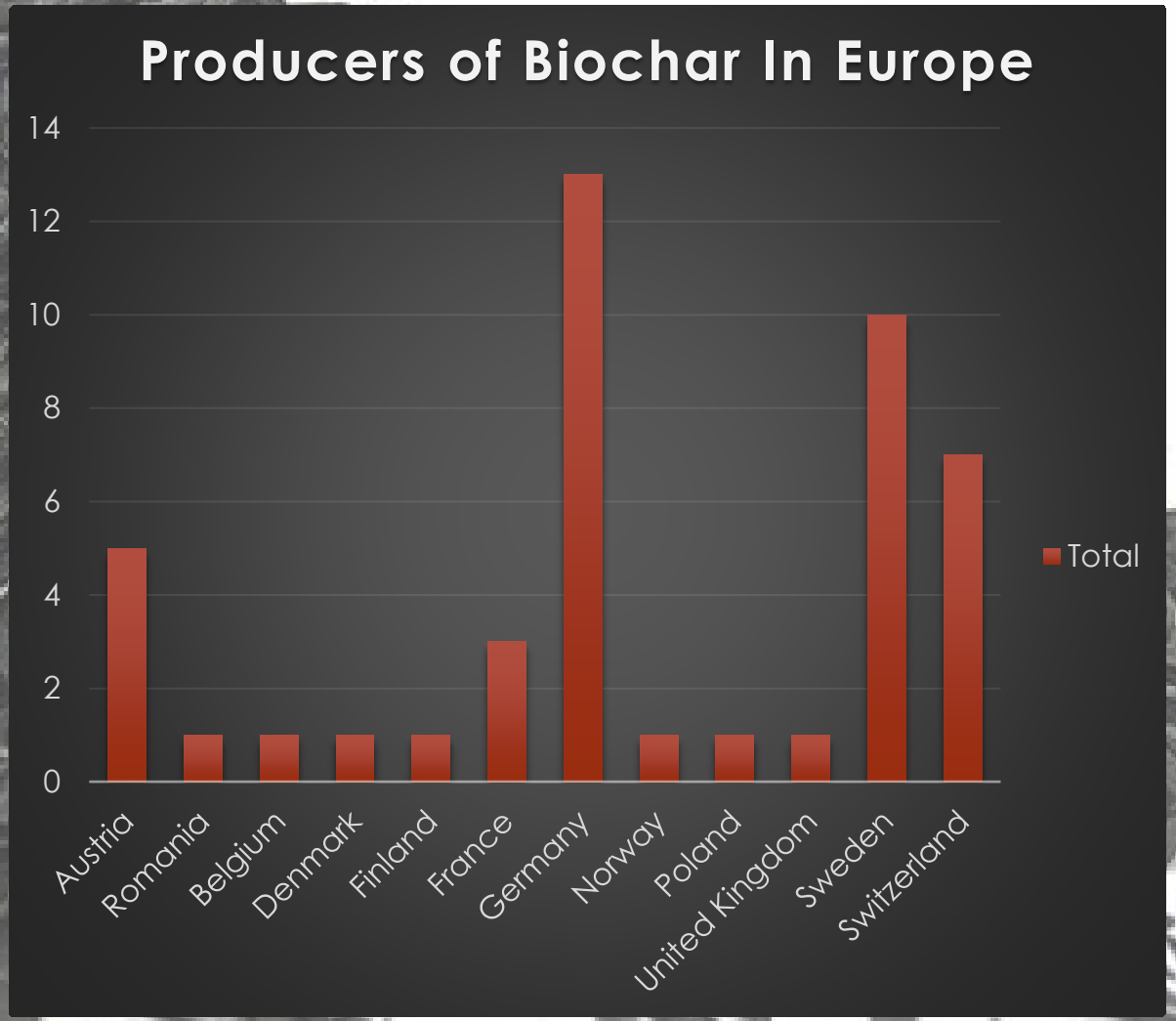
- Biochar, once certified, can be marketed in Europe both in the fertilizer sector and in the animal feed sector.



EUROPE - BIOCHAR Market



BIOCHAR EUROPE Competitors Market



How Biochar is sold

Bags of 10-20 lbs

Qty 1 Liter	
Cost €/Lt	$ 10,00
Density Kg/Lt	0,254
Cost x Kg	$ 39,37
Cost x ton	$ 39.370,08

Wholesale big bag of biochar about 260 kg

It produces 3.5 tons of super compost.
Average cost = $ 545.53
Average cost per ton = $ 2100 / ton

Thank you for your time

Do you have any questions?