



Made in Africa with Swiss precision: Congo's Carbon removals from climate-friendly biochar

Swiss-based INTERHOLCO (IHC) generates high quality Carbon dioxide removals 'Made in Africa' from 100% FSC-certified hardwood turned into biochar. We support the scaling up of the carbon removal market with additionality and co-benefits in the Global South.



INTERHOLCO, the project developer, is a Swiss company managing a natural tropical forest in the Republic of Congo, keeping gorillas and their habitats protected. It is the first forestry company in the Congo Basin to hold double FSC® certification (Forest Stewardship Council® C122325) for Forest Management (more than 10 years) and Ecosystem Services (since March 2023).

Our essentials



ESG transparency performance



CSI Carbon sink certificate



EBC profile page

Biochar is produced from industrial residues of FSC-certified biomass from a sawmill that has been in place for more than 20 years, guaranteeing a stable supply. Originally, the biowaste was partly donated to the local inhabitants, partly burned which caused CO₂ to be released into the atmosphere.

Anticipated volumes (not exclusive) already planned:

about 5'000 tCO₂eq in 2022

about 10'000 tCO₂eq in 2023

about 15'000 tCO₂eq in 2024

about 30'000 tCO₂eq in 2025

+ further expansion already in the pipeline



IHC developed a scientifically proven methodology for industrial biochar production. The resulting biochar is used for soil application inside their forest. The biochar is stored in the tropical soil and serves as a permanent carbon removal. Local facilities count on a manpower of more than 1'000 local hire to carry out their core activity: responsible forest management. Wood harvesting and processing take place on site, with a competitive package for workers (fair wages, medical insurance, paid leave, etc.) and plenty of benefits for 18'000 local inhabitants, including access to a company-run hospital, library and schools. On top, clean drinking water, electricity and housing are provided.



SUSTAINABLE HARDWOOD
MADE IN AFRICA

Headquarters

Baar, Switzerland (Headquarters) with a subsidiary in Ngombé/Ouesso, Republic of Congo ([Link to Google maps](#)).



Nature is our core business

INTERHOLCO is a Swiss company founded in 1962 working in the international timber trade by harvesting and processing hardwood products sourced from forests managed in an ecologically, socially and financially responsible manner. Learn more at www.interholco.com

For the seventh year in a row, INTERHOLCO ranks first in an independent, NGO-led worldwide assessment of 100 timber and pulp companies. Ranking is based on the transparency of their ESG performance. Learn more on [this link](#).

Tech Details

Our company uses an internally developed technology with an annual production capacity of about 5'000t of biochar (dry weight) with about 15'000t of CO₂eq. increasing to about 50'000t of biochar (dry weight) with about 150'000t of CO₂eq.

Our biochar is for soil application/enrichment projects and further applications in construction, metallurgy, urban and agricultural use.

Type of biomass: FSC certified African tropical hardwood species holding a very high density and therefore a large carbon-sink- capacity.

Audit information: European Biochar Certificate - for a sustainable production of biochar EBC Urban (number: 71221); [CSI](#)

Carbon sink certificate: cs-8xlw-ejna-xxbj-qe1k-2. Learn more on [this link](#).

Sustainability and benefits

In the Congo Basin, INTERHOLCO sustainably manages a 1.16 million hectares of natural tropical forest (1/4 of Switzerland) that have been FSC® certified (FSC® C122325) for more than 10 years, keeping gorillas and their habitats protected.

Our local facilities count on a manpower of 1'000 local hire to carry out our core activity: forest management. Wood harvesting and processing take place on site, with a competitive package for our workers and plenty of benefits for 18'000 local inhabitants, including access to our company-run hospital, library and schools. On top, we provide clean drinking water, electricity and housing.

Ecological Integrity

The tropical hardwood harvested by INTERHOLCO is certified according to the principles and criteria of the Forest Stewardship Council® (FSC® 022952) Forest Management certification.

In March 2023, INTERCOLCO's daughter company, IFO, became the first forestry company in the Congo Basin to acquire FSC® Ecosystem Services (ES) certification for ecological integrity.



Status Quo & Outlook

INTERHOLCO'S carbon removal solution is up and running since 2022 with proven production processes in place. The long-lasting (more than 1'000 years) removal capacity is expected to increase on short-term due to further investments already under way.

Potential Risks

Potential production risks are presumed to be very low as the production is already proven and up and running.

Our biomass comes from a sawmill that has been in place for more than 20 years with a good track-record, guaranteeing a stable supply (even exceeding by far the needed volumes for the existing project).

Tailored to Swiss Corporations

With more than 60 years of experience managing projects and businesses in Central Africa, INTERHOLCO is a provider of C-sink solutions with a uniquely direct control over each step of its projects. From its home in Switzerland, INTERHOLCO is a reliable sparring partner for international corporates that look for carbon offsetting solutions with high levels of traceability and integrity.

Shaping the world, together

SUSTAINABLE DEVELOPMENT GOALS





Biochar Based Removal Credits

at INTERHOLCO₂

Last updated: September 2023

FAQ – OVERVIEW :

1/ PROJECT BACKGROUND

- **Project location?**
- **Project start date?**
- **Project activities, including reversal risk mitigation?**
- **Registry link?**

2/ SOCIAL LANDSCAPE

- **Any local social or environmental risks of the project?**
- **Does your project have any known or anticipated local social or environmental benefits?**
- **What is the role of local communities in the project?**

3/ ENVIRONMENTAL LANDSCAPE

- **What are the anticipated water/land/energy/other natural resource needs of the project in the first few years, and how will these resource needs evolve in the coming decade?**
- **What would be the most likely counterfactual/baseline scenario without the presence of this project?**

4/ ECONOMIC LANDSCAPE

- **Are there any additional sources of revenue for the project?**
- **Total volumes the project will produce (not exclusive), based on the existing project or project's plan for scaled expansion?**

5/ REGULATORY LANDSCAPE

- **Will the tonnage you are offering be verified by a third-party standard?**
- **Will you be using third party verification for any ecosystem or social benefits beyond carbon sequestration?**

1/ PROJECT BACKGROUND



Sowing the future.



Biochar based Carbon Sinks at INTERHOLCO₂
Contact us: carbonremoval@interholco.com

Project location?

Global South / Africa. Republic of Congo (Congo Brazzaville).

Project start date?

01/06/2022.

Project activities, including reversal risk mitigation?

Swiss-based INTERHOLCO (IHC) generates high quality Carbon dioxide removals 'Made in Africa' from 100% FSC-certified hardwood as well as biochar. We support the scaling up of the carbon removal market with additionality and co-benefits in the Global South.

Founded in 1962, IHC delivers African, European and North American hardwood products (lumber, logs, decking, laminated scantlings) to B2B customers in more than 40 countries worldwide. Recognized as a [sustainability leader](#), IHC [responsibly](#) manages 1.16 million hectares of natural rainforest in the Republic of Congo, turning harvested wood into high-value timber products that serve customer needs, as well as improving our climate and increasing social justice. IHC is the first forestry company in the Congo Basin to have acquired [FSC® Ecosystem Services certification](#) for biodiversity protection, on top of FSC® Forest Management certification (Forest Stewardship Council®, FSC® C022952). In its forest concession, only 69% of the forest area is utilized for timber harvesting, 27% is untouched for conservation/protection and 4% is reserved exclusively for the rural development needs of the local population.

Carbon dioxide (CO₂) can be removed from the Earth's atmosphere and be stored in natural and technological ways.

IHC produces and certifies all those currently available:

1. Nature-based solutions, such as restoring forests, soils, and innovative farming practices.
Verified via: FSC® Ecosystem Services and Forest Management certificate.
2. Technology, such as bioenergy with carbon capture and storage.
Verified via: European Biochar Certification (EBC) ensured by Carbon Standards International (CSI).
3. Long-lasting products and materials, such as wood-based products.
Verified via: FSC Ecosystem Services and Forest Management.

IHC developed its own carbon removal technology inhouse, in the Republic of Congo. It is based on large-scale open flame pyrolysis, which is the best researched technology for biochar production.

The resulting biochar is currently used for soil restoration and rejuvenation on site, inside the forest concession. The biochar is stored in the tropical soil and serves as a permanent carbon removal. The annual production of CO₂eq. is approximately 15'000 tons of CO₂eq. IHC is investing to increase capacity to 150'000 tons of CO₂e within the next 3 to 5 years.

The safety and security of all workers is ensured through clearly defined processes, tasks and responsibilities, coupled with ongoing monitoring, education and regular trainings.

The biomass originates from residues of the sawmill operated by IHC, such as, slabs and other cut-off wood. The wood is from Congo's tropical tree species responsibly harvested by IHC's subsidiary IFO (Industrie Forestière de Ouesso) in a natural forest concession, characterized by very high density and therefore holding a large carbon-sink capacity. The tropical hardwood harvested and processed by IHC, hence all wood off-cuts used for biochar production, are certified according to the principles and criteria of the Forest Stewardship Council (FSC).



Registry link?

EBC C-Sink certificates for IHC are available for sharing upon request. The current certificate is for certification from 2023-2024. The link to the registry entry for the IHC project can be provided upon request.

Each packaging unit of biochar receives a unique identifier, which allows for tracking of the biochar to its end usage. Carbon Removal Credits issued by CSI are based on the packaging unit and hence unique and traceable to the point the biochar is applied. One Carbon Removal Credit consists of a share of several packaging units of biochar, which can be tracked in CSI's registry, which is also linked directly to Carbonfuture's tracking system. The issued Carbon Removal Credits are therefore unique, their origin is traceable and double selling of credits not possible in the registry.

2/ SOCIAL LANDSCAPE

Social Landscape over 18'000 inhabitants



Any local social or environmental risks of the project?

IHC is a [recognized sustainability leader](#) proudly ranking amongst the [most sustainable](#) forestry companies worldwide. Environmental risks of IHC's operations have been thoroughly assessed as a legal obligation and as part of voluntary FSC certification. 18,000 forest inhabitants (local communities and Indigenous Peoples) are involved in risk mapping and benefit sharing according to a participatory approach, respecting the Precautionary Principle and Free, Prior and Informed Consent (FPIC) process.

Potential biochar production risks are presumed to be very low as the production is already proven and up and running. The biomass comes from a sawmill that has been in place for more than 20 years with a good track-record, guaranteeing a stable supply (even exceeding by far the needed volumes for the existing project).

Does your project have any known or anticipated local social or environmental benefits?

In the North of the Republic of the Congo, IHC's subsidiary IFO currently manages 1.16 million hectares responsibly, 100% compliant with FSC certification. With a workforce of over 1,200 local workers, the following activities are carried out: forest management and wood harvesting fostering natural regeneration and growth, industrial processing at nearby facilities within the forest area, running a hospital for employees and a local population of 11,000 inhabitants in the village of Ngombé alone (over 10,000 consultations per year), managing a library with free IT and English courses, providing for local schools, giving access to clean drinking water, supplying electricity, protecting animals against poaching and, supervising logistics. There is an existing revenue sharing program in place with the local communities. This refers to timber harvesting, biochar production and carbon projects.



What is the role of local communities in the project?

IHC's operations generate employment opportunities for local communities in a secure workplace, with entry-level salaries paid well above the country minimum wage and competitive social welfare packages (pension scheme, medical insurance, housing allowance, paid leave, parental leave, etc.). As of September 2023, IHC's biochar production employs about 40 people from the local communities and workforce will increase. Established profit-sharing programs ensure 18'000 forest inhabitants (including Indigenous Peoples) benefit, not just via access to quality essential facilities in one of the most landlocked regions of Congo Brazzaville, but also via knowledge transfer and direct revenue, feeding into development projects of their choice.

3/ ENVIRONMENTAL LANDSCAPE

Environmental Landscape 1.159 mill. ha of natural capital



What are the anticipated water/land/energy/other natural resource needs of the project in the first few years, and how will these resource needs evolve in the coming decade?

Biochar production takes place on the existing industrial sawmill site, visible on Google maps [here](#).

Water and energy needs are very limited. Total water volume needed in one year linked to IHC's biochar production: about 45'000 m³. Total electricity consumption per year: about 5'300 kWh.

The project uses waste biomass from the sawmill operations, which, in the baseline scenario, is burned open air to dispose of waste. Avoiding this open-air burning, significantly reduces air pollution and the risk of uncontrolled fires.

What would be the most likely counterfactual/baseline scenario without the presence of this project?



The biomass used for biochar production, such as wood slabs and cutoffs, is a residue of industrial processing at the facilities operated by IHC. In the absence of this project, wood debris, although controlled, would expose more than 1,000 local workers and the adjoining community (about 11,000 inhabitants) in nearby Ngombé village, with its medical facilities, schools, local shops and houses, to fire hazards (during storage) and air pollution (when finally disposed of through open air burning). This project also helps reduce GHG emissions (biomass pyrolysis is carbon negative) whilst making it possible for IHC's wood products to compete on demanding markets, thanks to its 'closing the loop' approach mindful of the circular economy. This is a win-win for the

environment and communities, locally and globally, with more jobs created, better living conditions and more development opportunities, while delivering immediate climate impact.

4/ ECONOMIC LANDSCAPE

Economic Landscape 250'000 m³ Sustainable Hardwood – Made in Africa



Are there any additional sources of revenue for the project?

IHC's biochar production project does not generate any revenues besides the carbon removal credits. Biochar is applied to IHC's forest soil and is not sold elsewhere.

Total volumes the project will produce (not exclusive), based on the existing project or project's plan for scaled expansion?

VOLUME

abt. 5'000 tCO₂eq in 2022
abt. 10'000 tCO₂eq in 2023
abt. 15'000 tCO₂eq in 2024
abt. 30'000 tCO₂eq in 2025
+ further expansion already anticipated.

The long-lasting (more than 1'000 years) removal capacity is expected to expand in the immediate future thanks to further investment already under way.

5/ REGULATORY LANDSCAPE

Regulatory Landscape



Will the tonnage you are offering be verified by a third-party standard?

Yes, it will.

CSI / Global C-Sink Guidelines.

Will you be using third party verification for any ecosystem or social benefits beyond carbon sequestration?

Yes, we will.

In March 2023, INTERCOLCO became the first forestry company in the Congo Basin to acquire [FSC® Ecosystem Services \(ES\) certification](#) for ecological integrity.

The Production and Quality of Biochar based Carbon Sinks at INTERHOLCO AG

A report by Hans-Peter Schmidt, Ithaka Institute

Arbaz, 22nd January 2022

Biochar Production

Biochar is the product of heating biomass in the absence of air at temperatures in the range of 400 to 800 °C. The process is called pyrolysis and many different technical methods from highly industrial to artisanal exist. Depending on the technology, heat, electricity, and pyrolysis oil are produced beside the biochar. The process heat is usually generated from the biomass feedstock and only very low, controlled emissions occur.

At Interholco the biochar is produced with flame curtain pyrolysis which is the globally most widespread basic biochar technology (Cornelissen et al., 2016). The biochar quality that can be produced with this proven technology is excellent which was demonstrated with many EBC-accredited analyses and also shown in several scientific publications (Cornelissen et al., 2016; Flesch et al., 2019; Kalderis et al., 2020; Schmidt et al., 2017; Smebye et al., 2017). Also, emissions are low (Cornelissen et al., 2016), and it has no negative impact for worker safety and ecosystems.

Biochar and Forest Stewardship

Interholco's biochar production site is a responsibly managed forest concession in the North of the Republic of Congo, certified according to the principles and criteria of the Forest Stewardship Council® (FSC® C022952). The forest sits close to two national parks under state protection: all three together cover a large forest stretch (29,672km²), roughly the size of Belgium (30,700km²). Inhabited by 16,000 people in more than 80 villages, the Ngombe forest is a natural hotspot harboring some of the last surviving gorilla and forest elephant populations (Strindberg et al., 2018). Reduced Impact Logging (RIL) practices are carefully observed and verified by regular on-site audits ensuring that the forest remains healthy. The forestry operations provide a livelihood for more than 1200 workers and their families – including indigenous peoples, who benefit from access to company-run medical facilities, schools, a library with free IT and language courses as well as clean, drinking water

and electricity. At the end of 2022, Interholco was awarded the FSC Ecosystem Services certification. Biochar production will enable Interholco to enhance ecosystem services in the Ngombe forest by increasing the soil carbon stock of the forest stand.

Thanks to the biochar production, around 30 local workers previously involved in artisanal charcoal making were hired by Interholco to produce biochar in Interholco's facilities. The team rapidly grows with plans to hire and train additional manpower. The workers of the biochar facilities receive a living wage including rental allowance, medical insurance, and other benefits.

Biochar Feedstock

Only wood residues from the timber sawmill are used for the biochar production at Interholco. All wood entering the sawmill and serving as biochar feedstock is FSC certified ([FSC-FM-CoC](#), [FSC-CoC-IFO](#) and [FSC-CoC-IHC](#)). Sustainable Business and finance monitoring initiatives such as [SPOTT](#), led by conservation NGO ZSL (the Zoological Society of London), acknowledged the high transparency level of Interholco's ESG performance and sustainability of forestry activities. The [recognition as first ranked company](#) in the Hållbars' list of "[Best in the World for Timber/Forest Management](#)" is further evidence. The wood waste used for the biochar production was certified by the European Biochar Certificate (EBC, <https://www.european-biochar.org/en/home>) as climate neutral.

Biochar Quality

Interholco's biochar is certified by the European Biochar Certificate as EBC-Materials (EBC, 2022). It presents a high carbon content of 90%, a high water-holding capacity and can store twice its own weight in the form of water. With a pH of 8.7, the biochar has a positive alkaline effect when applied to tropical soil. Nutrients like potassium, phosphorus, nitrogen, and magnesium that were naturally contained in the wood residues are efficiently recycled in the biochar and will become plant available after soil application. No relevant heavy metal or organic contaminants such as PCB or dioxins are revealed in the biochar analysis. The PAH content is well below the thresholds for EBC-Materials.

There are no environmental or health related risks to be feared when applying this biochar (c.f. EBC biochar analysis in Annex 1).

Emission accounting

All GHG-emissions that occur during the feedstock preparation, biochar production, biochar product preparation, transport, and application were assessed. They are entirely compensated through retiring 3% of the total biochar carbon sink as described in the Global Artisan C-Sink guidelines (CSI, 2022).

Following the same C-sink standard, a CH₄ emissions factor of 30 kg CH₄ per ton of biochar (DM) was applied for the company's flame curtain pyrolysis technology (CSI, 2022). All methane emissions were compensated through the avoidance of uncontrolled burning of the same amount of wood waste which would have caused at least the same amount of methane emissions as caused by the flame curtain pyrolysis technology (c.f., EBC C-sink certificate in Annex 2). The methane emissions of the waste wood pyrolysis will be reduced through technical improvements and compensated following the CSI requirements for C-sink registration.

Biochar Use

The biochar produced at Interholco is not sold but entirely used to improve regrowth and regeneration conditions of the tropical forest at nearby sites within Interholco's concession. A very innovative use of the biochar is its blending with laterite clay for the renaturation of deserved forest roads accelerating regrowth of trees and canopy closure. Blended to the laterite clay, the biochar is preserved from oxidation. The high water-holding capacity, the low bulk density, and the alkalinity of the biochar as well as its nutrient content improve the tree regrowth and accelerate the recapture of CO₂ from the atmosphere.

Biochar Tracking and C-Sink Registration

The biochar is produced at Interholco's production site in Ngombe in the North of the Republic of Congo (<https://goo.gl/maps/ya2DbXPG7y7oovh8A>). The dry weight and density of the biochar is regularly measured following the EBC Carbon Sink guidelines (Certification of the Carbon Sink Potential of Biochar, 2020) and controlled by the EBC accredited inspection service [q.inspecta/bio.inspecta](#). After the production process, the biochar is loaded on company owned trucks and weighted on a truck balance before leaving factory site.

When the biochar truck arrives at the application site (< 50 km distance), the GPS location and the biochar amount are registered. For every truck load at least two photographs with geo-localization document the application of the biochar to the forest.

The biochar is then registered in the International Carbon Sink Register at [Carbon Standards International AG](#). Only registered C-sinks can be traded for CO₂ compensation and global cooling services. The register information contains:

- Amount of biochar on a dry matter base,
- Carbon content, H/C ratio, EBC-certificate,
- Type, date, GPS-localization of application,
- Persistence and fractions of PAC and SPC,
- Guaranty of compensation of all GHG-emission caused by the establishment of C-sink,
- Owner of C-sink and C-sink certificate,
- Status of C-sink (e.g., retired if used for CO₂-compensation or climate services).

Biochar Persistence

The biochar produced by Interholco has a high carbon content of 90% and a very low H/C ratio below 0.1 indicating high aromaticity and thus persistence. At least 75% of the carbon contained in the biochar is considered persistent for more than 1'000 years and can thus be compared to geological storage (Schmidt et al., 2022). The remaining 25% of biochar carbon is degraded very slowly over several hundred years and has a mean residence time of more than 50 years. While 75% of the biochar carbon (persistent aromatic carbon) can be used to compensate CO₂-emissions, the semi-persistent carbon provides valuable global cooling services for the entire time that the carbon is preserved in the road surfaces. Assessing only 75% as long-term carbon sink (> 1'000 years) is conservative and a lower figure than used by other carbon sink traders but given the limited long-term scientific data it would be irresponsible to sell higher fractions of persistent carbon (for a more detailed reasoning, see Schmidt et al., 2022).

Control and Certification procedures

The biochar and C-sink production was audited and controlled by the Swiss inspection service [q.inspecta/bio.inspect](#) (following the [Guidelines](#) of the European Biochar Certificate (and the [EBC Carbon Sink Guidelines](#)). The EBC certificate is issued by Carbon Standards International AG.

The EBC biochar certification is the global standard for sustainable biochar production. The EBC is recognized by authorities of most European countries.

In Switzerland and Austria, for example, only EBC certified biochar is authorized for soil application in agriculture.

The EBC Carbon Sink Certification was developed in 2020 and was the world's first independent Carbon Sink certification scheme. The EBC C-Sink methodology is science based and updated every year to comply with newest scientific developments. The authors of the EBC guidelines are among the leading biochar scientists with extensive records of scientific publications.

The company [Puro Earth](#) established a carbon crediting platform for engineered carbon removal including biochar. The company developed their own life cycle assessment method to calculate biochar-based carbon sinks.

The non-profit organization [Verra](#) who manages the world's leading voluntary carbon markets program, recently published a new [methodology](#) for biochar-based carbon sink assessment but did not yet implement a certification system.

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Certificate

Carbon sink certificate – for CO₂eq potential

ID of C-sink certificate: cs-8xlw-ejna-xxbj-qe1k-2
(replacement of cs-8xlw-ejna-xxbj-qe1k)

Interholco AG
Neuhofstrasse 25
6340 Baar
Switzerland

EBC Producer ID: co-cg-244
GPS of production: 1.428571,16.174816

The Carbon sink potential of the mentioned batch is certified according to the following standard:



BIOCHAR BASED CARBON SINKS

Data of batch:

EBC Batch ID	ba-cg-244-1-2
Amount of produced biochar (dry matter)	2006 t
C-sink potential of biochar (dry matter)	86.4 %
C-sink potential per ton of biochar (dry matter)	3.17 t CO ₂ eq
C-sink potential of total amount of produced biochar (dry matter)	6353.05 t CO ₂ eq

Frick, 19.09.2023



Peter Jossen
President of board of
directors



Ueli Steiner
Director

Certification details of Carbon sink potential

Biomass	Type of biomass (EBC feedstock ID)	F01,F02,F03 (A1)
	Total amount of biomass (DM) used for the certified batch	6363 t
	Emissions due to fertilization	0.00 t CO ₂ eq
	Transportation of biomass to pyrolysis site	0.43 t CO ₂ eq
	Preparation of feedstock	110.15 t CO ₂ eq
	Emissions for drying of feedstock	0.00 t CO ₂ eq
	Feedstock storage emissions	0.00 t CH ₄
	Total biomass related GHG emissions without CH₄ per batch	110.58 t CO₂eq
Pyrolysis	Source of electric energy used on site	Non-renewable
	Emissions due to electricity consumption for entire pyrolysis plant incl. post pyrolysis treatment	0.00 t CO ₂ eq
	Emissions due to LPG and other external fuel for reactor heating	0.38 t CO ₂ eq
	Emissions due to carrier gas	0.00 t CO ₂ eq
	CH ₄ -emissions of pyrolysis unit	60.18 t CH ₄
	Total pyrolysis related GHG emissions without CH₄ per batch	0.38 t CO₂eq
Methane	Total methane emissions	60.18 t CH ₄
	Amount of compensated methane emissions	60.18 t CH ₄
	Type of methane compensation	Avoiding open wood burning
	Total non-compensated CH ₄ emissions per batch	0.00 t CH ₄
	Total non-compensated CH₄ emissions in CO₂eq per batch (@GWP20 of 86)	0.00 t CO₂eq
Margin of security	3% of the total amount of biochar contained carbon per batch	199.9 t CO₂eq
Total emissions	Total GHG emissions in CO₂eq per batch	310.9 t CO₂eq
Energy	Total GHG emissions in C per ton of biochar (DM)	0.042 t C
Biochar	Carbon neutral thermal energy per batch	0.00 MWh
	Carbon neutral electricity per batch	0.00 MWh
	Amount of biochar (DM) produced per certified batch	2006 t
	H/Corg ratio	0.20
	C-content	90.60 %
	C-sink potential	86.4 % of DM
Data per ton of biochar	Total GHG emissions per t biochar (DM)	0.15 t CO ₂ eq
	CO ₂ eq content per t of biochar (DM) [gross C-sink]	3.32 t CO ₂ eq
	C-sink potential in t CO ₂ eq per t of biochar (DM) [net C-sink]	3.17 t CO ₂ eq
Data of batch	C-sink potential in t CO ₂ eq of total amount of produced biochar (DM)	6353.05 t CO₂eq

EBC producer ID: co-cg-244

ID of C-sink certificate: cs-8xlw-ejna-xxbj-qe1k-2

The biochar batch ba-cg-244-1-2 produced by Interholco AG has carbon sink potential of 86.4 %. Each ton of biochar from the certified batch has a carbon sink potential of 3.17 t CO₂eq.

The carbon sink potential of 86.4 % provides the percentage of a mass unit of biochar that, on a dry matter base, can be considered as a temporal carbon sink. For example, a big bag containing 131 kg biochar (dry matter) has a carbon sink potential of (131 kg * 86.4 % CS) = 113.18 kg C which is the equivalent of 415 kg CO₂eq per big bag.

The 113.18 kg carbon of a 1 m³ big bag of biochar is the amount of carbon that can be considered a carbon sink once the biochar is applied to soil, to compost, to digestate, to animal feed or to any other durable product or protective matrix. Depending on the intended use of the biochar, the amount of persistent carbon varies after 100 years. If the biochar applied to soil the persistent Carbon of the sink after 100 years is 74 % (@P100=74%).

The production of 1 t of biochar (dry matter) caused emissions of 154 kg CO₂eq (42 kg C) due to feedstock production, transportation, storage, preparation and operation of the pyrolysis plant and methane emissions during both biomass storage and the combustion of the pyrolysis gases. These emissions were deduced from the carbon sink value of the biochar. A security margin of 3% of the C content of the biochar is levied to account for emissions such as the diminution of the biomass feedstock, the provision and pumping of quenching water, and the collection of biochar as well as for uncertainties and analytical deviation regarding dry matter and carbon content due to the heterogeneity of the feedstock.

The CO₂ emissions of the combustions of the pyrolysis gases used for energy production are considered as carbon neutral as the feedstock for the pyrolysis originated from forest management residues.

CH₄ emissions resulting from biochar production are offset by the prevention of equivalent CH₄ emissions previously caused by the unregulated burning of wood waste, a common practice prior to the initiation of forest residue pyrolysis. The time frame to account for this emission offset is three years. The feedstock is processed within 30 days, thus eliminating the risk of CH₄ emissions due to self-heating.

Neither the carbon expenditures necessary to transport the biochar from the production site to the location of the final C-sink (via a merchant and/or processor) nor the carbon expenditures when manufacturing or blending the biochar into a carbon sink product are considered so far. These emissions must be deducted as soon as a C-sink certificate or an offset service is generated for an end customer based on this C-sink potential certificate. Equally, when applied to soil, only the carbon fraction that is persistent after 100 years (Csink100) or any other EBC-defined sequestration period should be traded as C-sink certificate.

The present EBC carbon sink certificate for CO₂eq potential at factory gate is valid for the biochar batch ba-cg-244-1-2 and can be used for carbon sink certification and trade procedures.

Certificate

Carbon sink certificate – for CO₂eq potential

ID of C-sink certificate: cs-8xlw-ejna-xxbj-qe1k-2
(replacement of cs-8xlw-ejna-xxbj-qe1k)

Interholco AG
Neuhofstrasse 25
6340 Baar
Switzerland

EBC Producer ID: co-cg-244
GPS of production: 1.428571,16.174816

The Carbon sink potential of the mentioned batch is certified according to the following standard:



BIOCHAR BASED CARBON SINKS

Data of batch:

EBC Batch ID	ba-cg-244-1-2
Amount of produced biochar (dry matter)	2006 t
C-sink potential of biochar (dry matter)	86.4 %
C-sink potential per ton of biochar (dry matter)	3.17 t CO ₂ eq
C-sink potential of total amount of produced biochar (dry matter)	6353.05 t CO ₂ eq

Frick, 19.09.2023



Peter Jossen
President of board of
directors



Ueli Steiner
Director

Certification details of Carbon sink potential

Biomass	Type of biomass (EBC feedstock ID)	F01,F02,F03 (A1)
	Total amount of biomass (DM) used for the certified batch	6363 t
	Emissions due to fertilization	0.00 t CO ₂ eq
	Transportation of biomass to pyrolysis site	0.43 t CO ₂ eq
	Preparation of feedstock	110.15 t CO ₂ eq
	Emissions for drying of feedstock	0.00 t CO ₂ eq
	Feedstock storage emissions	0.00 t CH ₄
	Total biomass related GHG emissions without CH₄ per batch	110.58 t CO₂eq
Pyrolysis	Source of electric energy used on site	Non-renewable
	Emissions due to electricity consumption for entire pyrolysis plant incl. post pyrolysis treatment	0.00 t CO ₂ eq
	Emissions due to LPG and other external fuel for reactor heating	0.38 t CO ₂ eq
	Emissions due to carrier gas	0.00 t CO ₂ eq
	CH ₄ -emissions of pyrolysis unit	60.18 t CH ₄
	Total pyrolysis related GHG emissions without CH₄ per batch	0.38 t CO₂eq
Methane	Total methane emissions	60.18 t CH ₄
	Amount of compensated methane emissions	60.18 t CH ₄
	Type of methane compensation	Avoiding open wood burning
	Total non-compensated CH ₄ emissions per batch	0.00 t CH ₄
	Total non-compensated CH₄ emissions in CO₂eq per batch (@GWP20 of 86)	0.00 t CO₂eq
Margin of security	3% of the total amount of biochar contained carbon per batch	199.9 t CO₂eq
Total emissions	Total GHG emissions in CO₂eq per batch	310.9 t CO₂eq
Energy	Total GHG emissions in C per ton of biochar (DM)	0.042 t C
Biochar	Carbon neutral thermal energy per batch	0.00 MWh
	Carbon neutral electricity per batch	0.00 MWh
	Amount of biochar (DM) produced per certified batch	2006 t
	H/Corg ratio	0.20
	C-content	90.60 %
	C-sink potential	86.4 % of DM
Data per ton of biochar	Total GHG emissions per t biochar (DM)	0.15 t CO ₂ eq
	CO ₂ eq content per t of biochar (DM) [gross C-sink]	3.32 t CO ₂ eq
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EBC producer ID: co-cg-244

ID of C-sink certificate: cs-8xlw-ejna-xxbj-qe1k-2

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The present EBC carbon sink certificate for CO₂eq potential at factory gate is valid for the biochar batch ba-cg-244-1-2 and can be used for carbon sink certification and trade procedures.

Eurofins Umwelt Ost GmbH - Lindenstraße 11 - Gewerbegebiet Freiberg Ost -
D-09627 Bobritzsch-Hilbersdorf

INTERHOLCO AG
Neuhofstrasse 25
6340 Baar
SCHWEIZ

Titel: **Prüfbericht zu Auftrag 12326317**

Prüfberichtsnummer: **AR-23-FR-033424-01**

Auftragsbezeichnung: **ba-cg-244-1-2**

Anzahl Proben: **1**

Probenart: **Pflanzenkohle**

Probenehmer: **keine Angabe, Probe(n) wurde(n) an das Labor ausgehändigt**

Probeneingangsdatum: **20.06.2023**

Prüfzeitraum: **20.06.2023 - 20.07.2023**

Die Prüfergebnisse beziehen sich ausschließlich auf die untersuchten Prüfgegenstände. Sofern die Probenahme nicht durch unser Labor oder in unserem Auftrag erfolgte, wird hierfür keine Gewähr übernommen. Die Ergebnisse beziehen sich in diesem Fall auf die Proben im Anlieferungszustand. Dieser Prüfbericht enthält eine qualifizierte elektronische Signatur und darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen in jedem Einzelfall der Genehmigung der EUROFINS UMWELT.

Es gelten die Allgemeinen Verkaufsbedingungen (AVB), sofern nicht andere Regelungen vereinbart sind. Die aktuellen AVB können Sie unter <http://www.eurofins.de/umwelt/avb.aspx> einsehen.

Das beauftragte Prüflaboratorium ist durch die DAkkS nach DIN EN ISO/IEC 17025:2018 DAkkS akkreditiert. Die Akkreditierung gilt nur für den in der Urkundenanlage (D-PL-14081-01-00) aufgeführten Umfang.

Anhänge:

[XML_Export_AR-23-FR-033424-01.xml](#)

Annett Rietschel
Prüfleitung
+49 3731 2076 532

Digital signiert, 20.07.2023
Annett Rietschel
Prüfleitung



Parameter	Lab.	Akkr.	Methode	Vergleichswerte							Probenbezeichnung		sp-cg-244-1-2-1		
				EBC-Futter-Plus	EBC-Futter	EBC-AgroBio	EBC-Agro	EBC-Urban	EBC-Gebräuchs-material	EBC-Rohstoff	BG	Einheit		anl	wf
Eigenschaften der Pflanzenkohle															
Schüttdichte < 3 mm	FR		in Anlehnung an VDLUFA-Methode A 13.2.1									kg/m³	-	-	393
Wasserhaltekapazität (WHC) < 2 mm	FR		DIN EN ISO 14238, A: 2014-03									%	-	-	222.9
Gesamtwassergehalt	FR	F5	DIN 51718: 2002-06								0.1	Ma.-%	-	35.9	-
Aschegehalt (550°C)	FR	F5	DIN 51719: 1997-07								0.1	Ma.-%	-	2.3	3.5
Kohlenstoff gesamt	FR	F5	DIN 51732: 2014-07								0.2	Ma.-%	-	58.2	90.8
Kohlenstoff, organisch	FR		Berechnung									Ma.-%	-	58.2	90.6
Wasserstoff	FR	F5	DIN 51732: 2014-07								0.1	Ma.-%	-	0.9	1.4
Stickstoff, gesamt	FR	F5	DIN 51732: 2014-07								0.05	Ma.-%	-	0.31	0.49
Schwefel (S)	FR	F5	DIN 51724-3: 2012-07								0.03	Ma.-%	-	0.04	0.06
Sauerstoff	FR	F5	DIN 51733: 2016-04									Ma.-%	-	2.7	4.2
TIC	FR	F5	DIN 51726: 2004-06								0.1	Ma.-%	-	< 0.1	0.2
Carbonate-CO2	FR	F5	DIN 51726: 2004-06								0.4	Ma.-%	-	< 0.4	0.6
H/C Verhältnis (molar)	FR		Berechnung										-	0.18	0.18
H/Corg Verhältnis (molar)	FR		Berechnung	< 0.4	< 0.4	< 0.7	< 0.7	< 0.7	< 0.7				-	0.18	0.18
O/C Verhältnis (molar)	FR		Berechnung										-	0.035	0.035
pH in CaCl2	FR		DIN ISO 10390: 2005-12										-	8.9	-
Salzgehalt	FR		BGK III. C2: 2006-09								0.005	g/kg	-	1.91	-
Salzgehalt	FR		BGK III. C2: 2006-09								0.005	g/l	-	0.752	-
Leitfähigkeit bei 1,2 t Druck	FR		SAA-H-Lf-Pflanzenkohle.040								0.01	mS/cm	-	-	360
Leitfähigkeit bei 2 t Druck	FR		SAA-H-Lf-Pflanzenkohle.040								0.01	mS/cm	-	-	470
Leitfähigkeit bei 3 t Druck	FR		SAA-H-Lf-Pflanzenkohle.040								0.01	mS/cm	-	-	640
Leitfähigkeit bei 4 t Druck	FR		SAA-H-Lf-Pflanzenkohle.040								0.01	mS/cm	-	-	670
Leitfähigkeit bei 5 t Druck	FR		SAA-H-Lf-Pflanzenkohle.040								0.01	mS/cm	-	-	800

Parameter	Lab.	Akkr.	Methode	Vergleichswerte							Probenbezeichnung		sp-cg-244-1-2-1	
				EBC-Futter-Plus	EBC-Futter	EBC-AgroBio	EBC-Agro	EBC-Urban	EBC-Gebräuchs-material	EBC-Rohstoff	BG	Einheit		anl
Rohprotein	FR	F5	VDLUFA Methodenbuch Band III: 2014-09								Ma.-% TS	nicht bestimmbar	-	-
Rohfett	FR	F5	VDLUFA Methodenbuch Band III: 2014-09								Ma.-% TS	nicht bestimmbar	-	-
Rohfaser	FR	F5	VDLUFA Methodenbuch Band III: 2014-09								Ma.-% TS	nicht bestimmbar	-	-
Rohasche	FR	F5	DIN 51719: 1997-07							0.1	Ma.-%	-	2.3	3.5
HCl-unlösliche Asche	ES005 A/f		VDLUFA III 8.2								Ma.-% OS	0.88	-	-
Fluor, gesamt	ES005 A/f	WV	VDLUFA III, 17.3.2: 2006	150	150						mg/kg 88% TS	< 10	-	-
Polychlorierte Dibenzodioxine/-furane (17 PCDD/F) mittels GC-HRMS														
2,3,7,8-TetraCDD	SCT6/f	A04	Verordnung (EG) Nr. 152/2009							0.03	ng/kg 88% TS	< 0.03	-	-
1,2,3,7,8-PentaCDD	SCT6/f	A04	Verordnung (EG) Nr. 152/2009							0.03	ng/kg 88% TS	< 0.03	-	-
1,2,3,4,7,8-HexaCDD	SCT6/f	A04	Verordnung (EG) Nr. 152/2009							0.04	ng/kg 88% TS	< 0.04	-	-
1,2,3,6,7,8-HexaCDD	SCT6/f	A04	Verordnung (EG) Nr. 152/2009							0.04	ng/kg 88% TS	< 0.04	-	-
1,2,3,7,8,9-HexaCDD	SCT6/f	A04	Verordnung (EG) Nr. 152/2009							0.04	ng/kg 88% TS	< 0.04	-	-
1,2,3,4,6,7,8-HeptaCDD	SCT6/f	A04	Verordnung (EG) Nr. 152/2009							0.13	ng/kg 88% TS	< 0.13	-	-
OctaCDD	SCT6/f	A04	Verordnung (EG) Nr. 152/2009							0.44	ng/kg 88% TS	2.2	-	-
2,3,7,8-TetraCDF	SCT6/f	A04	Verordnung (EG) Nr. 152/2009							0.04	ng/kg 88% TS	0.04	-	-
1,2,3,7,8-PentaCDF	SCT6/f	A04	Verordnung (EG) Nr. 152/2009							0.03	ng/kg 88% TS	< 0.03	-	-

Parameter	Lab.	Akkr.	Methode	Vergleichswerte							Probenbezeichnung		sp-cg-244-1-2-1		
				EBC-Futter-Plus	EBC-Futter	EBC-AgroBio	EBC-Agro	EBC-Urban	EBC-Gebräuchs-material	EBC-Rohstoff	BG	Einheit		anl	wf
2,3,4,7,8-PentaCDF	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.03	ng/kg 88% TS	< 0.04	-	-
1,2,3,4,7,8-HexaCDF	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.04	ng/kg 88% TS	< 0.04	-	-
1,2,3,6,7,8-HexaCDF	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.04	ng/kg 88% TS	< 0.04	-	-
1,2,3,7,8,9-HexaCDF	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.04	ng/kg 88% TS	< 0.04	-	-
2,3,4,6,7,8-HexaCDF	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.04	ng/kg 88% TS	< 0.04	-	-
1,2,3,4,6,7,8-HeptaCDF	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.22	ng/kg 88% TS	< 0.22	-	-
1,2,3,4,7,8,9-HeptaCDF	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.22	ng/kg 88% TS	< 0.22	-	-
OctaCDF	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.44	ng/kg 88% TS	< 0.44	-	-
WHO(2005)-PCDD/F TEQ exkl. BG	SCT6/f	A04	Verordnung (EG) Nr. 152/2009									ng/kg 88% TS	0.00	-	-
WHO(2005)-PCDD/F TEQ inkl. BG	SCT6/f	A04	Verordnung (EG) Nr. 152/2009	0.75	0.75						0.11	ng/kg 88% TS	0.11	-	-
WHO(2005)-PCDD/F+PCB TEQ inkl. BG	SCT6/f	A04	Verordnung (EG) Nr. 152/2009	1.25	1.25						0.17	ng/kg 88% TS	< 0.17	-	-

Parameter	Lab.	Akkr.	Methode	Vergleichswerte							Probenbezeichnung		sp-cg-244-1-2-1		
				EBC-Futter-Plus	EBC-Futter	EBC-AgroBio	EBC-Agro	EBC-Urban	EBC-Gebräuchs-material	EBC-Rohstoff	BG	Einheit		anl	wf
Polychlorierte Biphenyle (12 WHO PCB) mittels GC-HRMS															
PCB 77	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								4.4	ng/kg 88% TS	4.5	-	-
PCB 81	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.40	ng/kg 88% TS	< 0.40	-	-
PCB 105	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								15	ng/kg 88% TS	15	-	-
PCB 114	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								4.0	ng/kg 88% TS	< 4.0	-	-
PCB 118	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								44	ng/kg 88% TS	< 4.0	-	-
PCB 123	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								4.0	ng/kg 88% TS	< 4.0	-	-
PCB 126	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.40	ng/kg 88% TS	< 0.40	-	-
PCB 156	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								4.0	ng/kg 88% TS	5.0	-	-
PCB 157	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								4.0	ng/kg 88% TS	< 4.0	-	-
PCB 167	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								4.0	ng/kg 88% TS	< 4.0	-	-
PCB 169	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.40	ng/kg 88% TS	< 0.40	-	-
PCB 189	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								4.0	ng/kg 88% TS	< 4.0	-	-
WHO(2005)-PCB TEQ inkl. BG	SCT6/f	A04	Verordnung (EG) Nr. 152/2009								0.06	ng/kg 88% TS	< 0.06	-	-
WHO(2005)-PCB TEQ exkl. BG	SCT6/f	A04	Verordnung (EG) Nr. 152/2009									ng/kg 88% TS	0.00	-	-

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				EBC-Futter-Plus	EBC-Futter	EBC-AgroBio	EBC-Agro	EBC-Urban	EBC-Gebräuchs-material	EBC-Rohstoff	BG	Einheit		anl	wf
Polychlorierte Biphenyle (7 PCB) mittels GC-HRMS															
Summe 6 ndl-PCB exkl. BG	SCT6/f	A04	DIN EN 16215: 2020-05								μg/kg 88% TS	0.50	-	-	
Summe 6 ndl-PCB (inkl. BG)	SCT6/f	A04	DIN EN 16215: 2020-05	10	10					1.1	μg/kg 88% TS	1.2	-	-	
PCB 28	SCT6/f	A04	DIN EN 16215: 2020-05							0.18	μg/kg 88% TS	0.28	-	-	
PCB 52	SCT6/f	A04	DIN EN 16215: 2020-05							0.18	μg/kg 88% TS	0.22	-	-	
PCB 101	SCT6/f	A04	DIN EN 16215: 2020-05							0.18	μg/kg 88% TS	< 0.18	-	-	
PCB 138	SCT6/f	A04	DIN EN 16215: 2020-05							0.18	μg/kg 88% TS	< 0.18	-	-	
PCB 153	SCT6/f	A04	DIN EN 16215: 2020-05							0.18	μg/kg 88% TS	< 0.18	-	-	
PCB 180	SCT6/f	A04	DIN EN 16215: 2020-05							0.18	μg/kg 88% TS	< 0.18	-	-	

Parameter	Lab.	Akkr.	Methode	Vergleichswerte							Probenbezeichnung		sp-cg-244-1-2-1		
				EBC-Futter-Plus	EBC-Futter	EBC-AgroBio	EBC-Agro	EBC-Urban	EBC-Gebräuchs-material	EBC-Rohstoff	BG	Einheit		anl	wf

Bestimmung aus dem Mikrowellendruckaufschluss nach DIN 22022-1: 2014-07

Arsen (As)	FR	F5	DIN EN ISO 17294-2 (E29): 2017-01			13	13	13	13		0.8	mg/kg	-	-	< 0.8
Blei (Pb)	FR	F5	DIN EN ISO 17294-2 (E29): 2017-01			45	120	120	120		2	mg/kg	-	-	< 2
Cadmium (Cd)	FR	F5	DIN EN ISO 17294-2 (E29): 2017-01			0.7	1.5	1.5	1.5		0.2	mg/kg	-	-	< 0.2
Kupfer (Cu)	FR	F5	DIN EN ISO 17294-2 (E29): 2017-01	70	70	70	100	100	100		1	mg/kg	-	-	10
Nickel (Ni)	FR	F5	DIN EN ISO 17294-2 (E29): 2017-01	25	25	25	50	50	50		1	mg/kg	-	-	2
Quecksilber (Hg)	FR	F5	DIN 22022-4: 2001-02			0.4	1	1	1		0.07	mg/kg	-	-	< 0.07
Zink (Zn)	FR	F5	DIN EN ISO 17294-2 (E29): 2017-01	200	200	200	400	400	400		1	mg/kg	-	-	102
Chrom (Cr)	FR	F5	DIN EN ISO 17294-2 (E29): 2017-01	70	70	70	90	90	90		1	mg/kg	-	-	< 1
Bor (B)	FR	F5	DIN EN ISO 17294-2 (E29): 2017-01								1	mg/kg	-	-	5
Mangan (Mn)	FR	F5	DIN EN ISO 17294-2 (E29): 2017-01								1	mg/kg	-	-	200
Silber (Ag)	FR	F5	DIN EN ISO 17294-2 (E29): 2017-01								5	mg/kg	-	-	< 5

Bestimmung aus dem Druckaufschluss nach DIN EN 13805: 2014-12

Arsen (As)	ES005 A/f	WV	DIN EN ISO 17294-2 (E29): 2017-01	2	2							mg/kg 88% TS	0.10	-	-
Blei (Pb)	ES005 A/f	WV	DIN EN ISO 17294-2 (E29): 2017-01	10	10							mg/kg 88% TS	0.46	-	-
Cadmium (Cd)	ES005 A/f	WV	DIN EN ISO 17294-2 (E29): 2017-01	0.8	0.8							mg/kg 88% TS	0.010	-	-
Quecksilber (Hg)	ES005 A/f	WV	DIN EN 15763:2010-04	0.1	0.1							mg/kg 88% TS	0.0034	-	-

Parameter	Lab.	Akkr.	Methode	Vergleichswerte						Probenbezeichnung		sp-cg-244-1-2-1		
				EBC-Futter-Plus	EBC-Futter	EBC-AgroBio	EBC-Agro	EBC-Urban	EBC-Gebräuchs-material	EBC-Rohstoff	BG	Einheit		anl

Elemente a. d. Borataufschluss d. Asche 550°C nach DIN 51729-11: 1998-11 (AS)

Calcium als CaO	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	Ma.-%	-	-	18.7
Eisen als Fe2O3	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	Ma.-%	-	-	12.3
Kalium als K2O	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	Ma.-%	-	-	6.5
Magnesium als MgO	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	Ma.-%	-	-	4.0
Natrium als Na2O	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	Ma.-%	-	-	0.4
Phosphor als P2O5	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	Ma.-%	-	-	1.9
Schwefel als SO3	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	Ma.-%	-	-	1.0
Silicium als SiO2	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	Ma.-%	-	-	33.7

Makronährstoffe

Stickstoff, gesamt	FR	F5	DIN 51732: 2014-07								0.5	g/kg	-	3.1	4.9
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Makronährstoffe-LiBO2/Li2B4O7/LiBr-Schmelze d. A550°C [DIN 51729-11:1998-11](OS)

Phosphor als P2O5	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	g/kg	-	-	0.7
Kalium als K2O	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	g/kg	-	-	2.3
Calcium als CaO	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	g/kg	-	-	6.6
Magnesium als MgO	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	g/kg	-	-	1.4
Natrium als Na2O	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	g/kg	-	-	0.1
Schwefel als SO3	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	g/kg	-	-	0.4

Elemente a. d. Borataufschluss d. Asche 550°C nach DIN 51729-11: 1998-11 (OS)

Eisen (Fe)	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	g/kg	-	-	3.0
Silicium (Si)	FR	F5	DIN EN ISO 11885 (E22): 2009-09								0.1	g/kg	-	-	5.5

Parameter	Lab.	Akkr.	Methode	Vergleichswerte							Probenbezeichnung		sp-cg-244-1-2-1		
				EBC-Futter-Plus	EBC-Futter	EBC-AgroBio	EBC-Agro	EBC-Urban	EBC-Gebräuchs-material	EBC-Rohstoff	BG	Einheit		anl	wf
Organ. Schadstoffe a. d. Toluolextrakt n. DIN EN 16181:2019-08(Extrakt.-verf. 2)															
Naphthalin	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	6.6
Acenaphthylen	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	< 0.1
Acenaphthen	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	0.2
Fluoren	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	0.2
Phenanthren	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	1.4
Anthracen	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	0.4
Fluoranthen	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	0.5
Pyren	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	0.4
Benzo[a]anthracen	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	0.1
Chrysen	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	0.1
Benzo[b]fluoranthen	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	< 0.1
Benzo[k]fluoranthen	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	< 0.1
Benzo[a]pyren	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	< 0.1
Indeno[1,2,3-cd]pyren	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	< 0.1
Dibenzo[a,h]anthracen	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	< 0.1
Benzo[ghi]perolen	FR	F5	DIN EN 16181:2019-08								0.1	mg/kg	-	-	< 0.1
Summe 8 EFSA-PAK exkl. BG	FR	F5	DIN EN 16181:2019-08	1	1	1	1	1	1	4		mg/kg	-	-	0.2
Summe 16 EPA-PAK exkl. BG	FR	F5	DIN EN 16181:2019-08	6 ¹⁾		6 ¹⁾	6 ¹⁾					mg/kg	-	-	9.9
Benzo(e)pyren	FR	F5	DIN EN 16181:2019-08	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.1	mg/kg	-	-	< 0.1
Benzo[jj]fluoranthen	FR	F5	DIN EN 16181:2019-08	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.1	mg/kg	-	-	n.b.

Erläuterungen

BG - Bestimmungsgrenze

anl - Anlieferungszustand

wf - wasserfreier Zustand

Lab. - Kürzel des durchführenden Labors

Akkr. - Akkreditierungskürzel des Prüflabors

n.b. – nicht bestimmbar, chromatographische Trennung < 0,8 (unvollständig aufgelöste Signale durch Peaküberlappung)

nicht bestimmbar -

Diese Methoden gelten für Futtermittel herkömmlicher Art.

Für die Matrix Pflanzenkohle sind diese Methoden nicht validiert und können zu unplaublichen Ergebnissen führen. "Die Angabe der Rohprotein-, Rohfaser- und Rohfettgehalte sind vorgeschriebene Standardwerte der Futtermittelverordnung. Rohprotein, Rohfaser und Rohfett werden im Verlauf der vollständigen Pyrolyse komplett zersetzt und sind folglich in Pflanzenkohle nicht mehr vorhanden. Eine Pflanzenkohle gilt als vollständig pyrolysiert, sofern das H/Corg < 0.7 ist, was die Grundvoraussetzung für jede EBC Zertifizierung ist. Damit erübrig sich die Analyse von Rohprotein, Rohfaser und Rohfett und ihre Gehalte werden per Definition mit 0 g kg⁻¹ angegeben." [1]

[1] - EBC (2012-2023) 'European Biochar Certificate – Richtlinien für die Zertifizierung von Pflanzenkohle', Ithaka Institute, Arbaz, Switzerland. <http://www.european-biochar.org> Version 10.3G vom 05. April 2023

Die mit ES005A gekennzeichneten Parameter wurden von der SGS Analytics Germany GmbH (Jena) (Orlaweg 2, Jena) analysiert. Die Bestimmung der mit WV gekennzeichneten Parameter ist nach DIN EN ISO/IEC 17025:2018 DAkkS D-PL-14004-10-00 akkreditiert.

Die mit FR gekennzeichneten Parameter wurden von der Eurofins Umwelt Ost GmbH (Lindenstraße 11, Gewerbegebiet Freiberg Ost, Bobritzsch-Hilbersdorf) analysiert. Die Bestimmung der mit F5 gekennzeichneten Parameter ist nach DIN EN ISO/IEC 17025:2018 DAkkS D-PL-14081-01-00 akkreditiert.

Die mit SCT6 gekennzeichneten Parameter wurden von der Zentrum für Dioxinanalytik (ZfD) GmbH (Berneckerstraße 17-21, Bayreuth) analysiert. Die Bestimmung der mit A04 gekennzeichneten Parameter ist nach DIN EN ISO/IEC 17025:2018 DAkkS D-PL-19418-01-00 akkreditiert.

/f - Die Analyse des Parameters erfolgte in Fremdvergabe.

Erläuterungen zu Vergleichswerten

Untersuchung nach Richtlinien für die nachhaltige Produktion von Pflanzenkohle - EBC, Version 10.2G – Stand 08.12.2022.

Ho,V / Hu,p: Brenn. bzw. Heizwert bei konstantem Volumen / Druck

AS: bezogen auf die Asche

OS: bezogen auf die Originalsubstanz

¹⁾ Die sehr niedrigen PAK-Grenzwerte erlauben nur eine analytische Genauigkeit von 50% für den Grenzwert: "Summe 16 EPA-PAK" von 6 mg/kg, was eine Genauigkeit von $\pm 2,4$ mg/kg (wf) bedeutet.

Bei der Darstellung von Vergleichswerten im Prüfbericht handelt es sich um eine Serviceleistung der EUROFINS UMWELT. Die zitierten Vergleichswerte (Grenz-, Richt- oder sonstige Zuordnungswerte) sind teilweise vereinfacht dargestellt und berücksichtigen nicht alle Kommentare, Nebenbestimmungen und/oder Ausnahmeregelungen des entsprechenden Regelwerkes.