EBC carbon sink value certification of Sonnenerde (Austria)

Batch Number ba-at-34-1-2

Arbaz, 27.10.2020

General information about the biochar producer	
A010- Name of the company	SONNENERDE GmbH
A020- Name of the responsible person	Elias Moisl
A030- Phone number	+43 3357 42198 7
A040- Email	e.moisl@sonnenerde.at
A060- Country	Austria
A070- Zip + Town	7422 Riedlingsdorf
A080- Street + No	Oberwarter Strasse 100

EBC-Certification	
B010- Producer ID of EBC-certificate	70402
B020- EBC Batch ID Number	ba-at-34-1-2
B030- Total biochar production of certified batch	113

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Biomass feedstock production and preparation	
C010- Type of feedstock	straw
C020- Feedstock ID from EBC positive list	ag-05
C050- Average water content of feedstock	30%
C060- Amount of feedstock (DM) processed for the certified batch	342 t
C070- Diesel consumption for feedstock preparation (chipping, pellets, ...) per t of final feedstock (DM)	9 liter
C080- Energy consumption in KW for feedstock preparation (chipping, pellets, ...) per t of final feedstock	0 kWh
C090- How is the electricity used in the production generated?	renewable
C100- Average transport distance of feedstock from source to pyrolysis	41 km
C110- Do you dry the feedstock before the pyrolysis?	yes
C120- How do you dry the feedstock?	waste heat from pyrolysis
C125- How much diesel equivalent is used for drying per t (DM) of feedstock?	0 liter
C130- Duration of biomass storage before pyrolysis or drying of feedstock	14 days
C140- C-consumption per t of processed feedstock	43 kg

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Pyrolysis	
D010- Type of pyrolysis	PYREG GmbH P500
D020- Highest Treatment Temperature	650 °C
D030- Carrier gas	none
D040- Average biochar yield in relation to feedstock DM	33%
D050- Type of quenching or post pyrolytic treatment	water
D060- Use of pyrolytic gases	thermal energy
D080- Storage of freshly produced biochar	other
D100- Who issued the emission certificate?	Pyreg GmbH / EBC
D110- CH4 emissions per t of feedstock (DM)	0.1 kg
D120- Particulate matter emission per t of feedstock (DM)	0.1 kg
D130- Electric energy consumption of pyrolysis unit per year	55,810 kWh
D135- How is the electricity generated that is used for the pyrolysis plant?	renewable
D136- CO2eq of electricity used for the pyrolysis plant	0 g CO2eq / kWh
D137- What fuel is used to preheat the pyrolysis	natural gas
D139- How much fuel is used to preheat the pyrolysis in t per year.	3 t/year
D140- CO2-expenditures due to methane emissions per t of biochar	26.1 kg
D143- CO2-expenditures due to electricity consumption per t of biochar	0 kg
D146- CO2-expenditures due to preheating of pyrolysis per t of biochar	77.1 kg
D148- CO2-expenditures due to pyrolysis per t of biochar	103.1 kg
D150- C-consumption due to pyrolysis per t of biochar	28.1 kg
D160- C-consumption of feedstock preparation per t of biochar	35.6 kg

Biochar analysis	
E010- C-content	77.2%
E020- H/Corg	0.27
E030- Water content	13.3%
E040- Bulk density	90 kg / m^3

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Carbon Sink	
F010- Total C-Sink per unit	70.8%

The carbon sink value of 70.8 % provides the percentage of a mass unit of biochar that, on a dry matter base, can be considered as a temporal carbon sink. A big bag containing 1 m^3 of biochar with a bulk density of 90 kg per m^3 would thus, at the factory gate, have a carbon sink value of 90 kg DM/m^3 * 70.8 % C = 64 kg C/m^3.

The 64 kg carbon of a 1m^3 big bag of biochar is the amount of carbon that can be considered a carbon sink when the biochar is applied to soil, to compost, to digestate, to animal feed or to any other carbon preserving product.

The carbon expenditures necessary to transport the biochar from the production site to a merchant or processor or applier are not included here nor are considered the carbon expenditures when manufacturing or blending the biochar into a carbon sink product that eventually is applied to soil. Moreover, the diminutions of the carbon sink value when biochar eventually decomposes after the application to soil are not included into the present assessment.

The production of 1 t (DM) of biochar caused on a dry matter base an emissions of 234 kg CO_2eq (63.7 kg C) due to feedstock production, transportation, preparation and methane emissions during the combustion of the pyrolysis gases. These emissions were deduced from the carbon sink value of the biochar.
The CO_2 emissions of the combustions of the pyrolysis gases used for energy production are considered as climate neutral as the feedstock for the pyrolysis originated from forest management residues.

The CH_4 emissions were measured repeatedly during regular operation on at least three pyrolysis plants of the same type. The methane values are thus subject to some uncertainty in regard to start-up and shut down of the process or possible problems during regular operation. For this reason a margin of 50% was added to the measured CH_4 emissions.

The present ***EBC carbon sink potential certification*** is part of the accredited EBC certification procedure and is valid for the entire biochar batch produced between 09/17/2019 and 09/16/2020 and can be used for carbon sink certification and trade procedures.

The present EBC carbon sink potential certification was issued by the Ithaka Institute (Switzerland) on 27th October 2020.

Hans-Peter Schmidt
Director of Ithaka Institute