

BIOMACON₂



DECARBO POWER

BIOGENIC SOLID FUEL REQUIREMENTS PYROLYSIS BOILER

HEAT THAT SAVES THE CLIMATE

Biomaccon pyrolysis boilers can be fired with many different biogenic solid fuels and produce high quality biochar.



BIOMACON GmbH,
Schmiedestr. 2,
D-31547 Rehburg/Germany,
Tel: +49 5023 9000254,

Mail: info@biomaccon.com,
Web: www.biomaccon.com
Register-Nr: HRB 100820, Amtsgericht Walsrode
Ust-IdNr.: DE230915278

CEO: Ulrich Suer
Copyright © 2021 BIOMACON GmbH.
All rights reserved.

Contact
us!





BIOGENIC SOLID FUEL RQMTS.

The biogenic solid fuels for our pyrolysis boilers must have the following properties:

WATER CONTENT < 30%
CHOP SIZE < 70mm
NO METAL &
NO PLASTICS

For the standard biomass boiler approval of our systems the following biogenic solid fuels should be used. All other solid fuels such as dried sewage sludge or digestate are usually subject to additional approval obligations.

Natural Wood

Wood, painted, varnished, coated, plywood, chipboard, fibreboard and their residues without halogen-organic coatings and wood preservatives

Straw and similar organic matter

With our pyrolysis boilers, high-quality biochar can be produced, which is approved for use in the soil or as animal feed. Nonetheless, the product of the pyrolysis, the biochar, can only be as good as the quality of the incoming solid fuel. Unless you can do magic. But our technology is unsuitable for wizards;)

If our pyrolysis boiler shall produce high-quality feed biochar in addition to useful carbon negative heat, it is necessary that the properties of the inorganic substances (ash) within the solid fuel is less than two percent.

Animal feed biochar:
Anorganischer Anteil < 2%

Different EU countries have different requirements for the production of biochar for animal feed and soil use.

Germany:	C-Content > 80% and biogenic solid fuel must be „woody“
Switzerland	<u>EBC Agro Bio +</u> and biogenic solid fuel must be „woody“
Sweden & Hungary	<u>EBC Agro Bio</u>



BIOGENIC SOLID FUEL QUALITY = BIOCHARQUALITY

It is understandable that there is the desire to produce a higher-quality biochar from a lower-quality input material, such as damaged wood or fermentation digestate. As mentioned above, this is not always possible. In order to produce a high quality biochar, the ash content should be low. Because biomass consists of the main components carbon (C), oxygen (O), water (H₂O), hydrogen (H), ash and various small amounts of nitrogen, sulfur, chlorine and phosphorus.

The organic part of the fuel is made up of cellulose, hemicellulose and lignin (Fig. 1) and only here carbon can be found. Depending on the boiler configuration, temperatures of 600–800°C are reached in the pyrolysis process. The water (H₂O) in the fuel evaporates completely and the bound oxygen (O) reacts to CO₂, CO, or H₂O. In addition, a large part of the hydrogen (H) burns. The main evaluation criterion for good quality biochar is usually the H/Corg and O/Corg ratio in the biochar produced. According to the EBC (European Biochar Certificate), this should be less than 0.7 and 0.4.

Cellulose and hemicellulose evaporate almost completely at temperatures above 500°C. Up to 50% of the lignin also volatilizes (glow losses) (Fig. 2). The volatile components consist mainly of different hydrocarbon compounds. These react with secondary air in the combustion chamber and the resulting heat is transferred to a heating circuit in a gas-water heat exchanger.

The pyrolysis then discharges only the fixed carbon (black carbon) from the lignin and the ashes in the form of biochar.

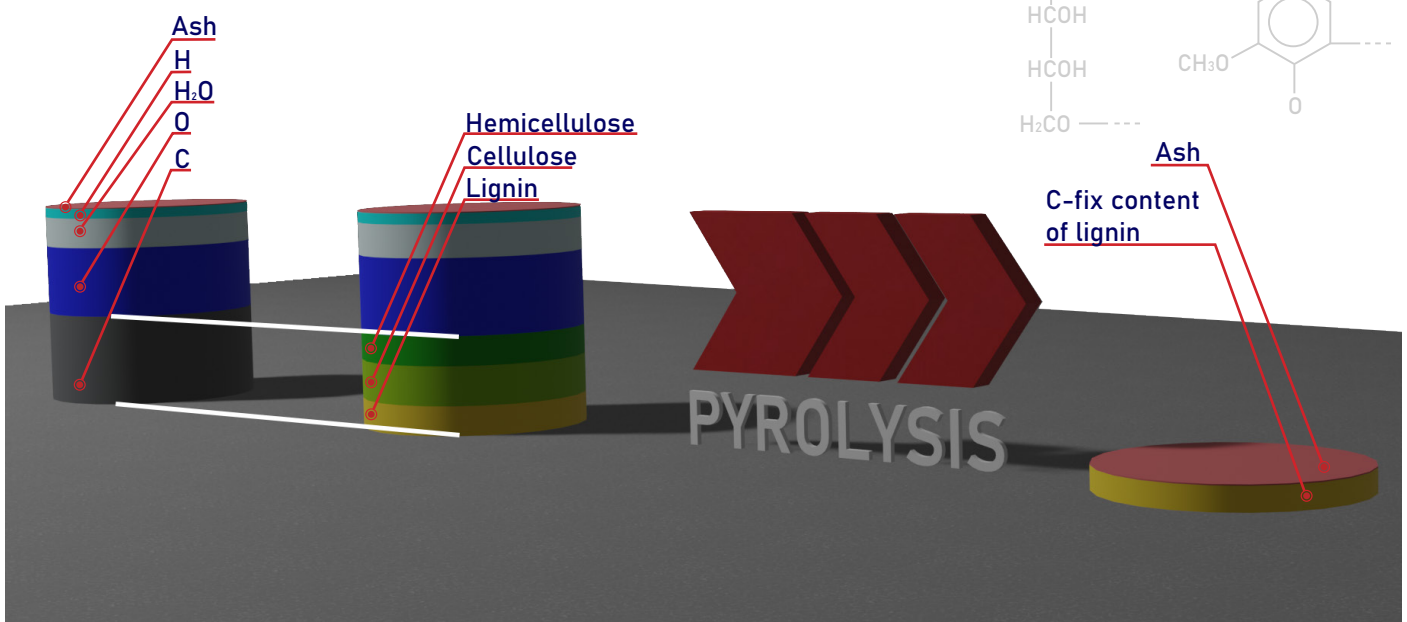


Figure 1: Biogenic solid fuel composition and biochar composition



BIOGENIC SOLID FUEL QUALITY = BIOCHARQUALITY CONTD.:

Small proportions of different heavy metals, such as cadmium, can also be found in the ash content of biochar.

These must be below the specified limit values in order to be approved for a corresponding application. In the case of biogenic waste materials, such as manure or sewage sludge, this can mean restrictions for the use of the biochar.

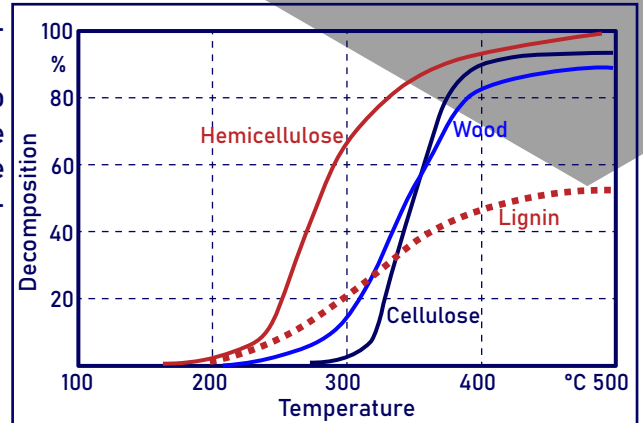


Figure 2: M. Kaltschmitt - Energy from Biomass (2009) - Biomass decomposition in relation to temperature

Two examples:

Sewage sludge:

Dried sewage sludge with a water content of 10% has a C content of 25% and an ash content of 50%. After pyrolysis, the char produced has a C_{fix} content of approx. 20%. The use of sewage sludge based biochar in agriculture is by now permitted in Sweden, Denmark and other European countries. Germany, Switzerland and other countries on the other hand do not yet permit this application. An alternative application as an additive in for example, the construction industry is currently being investigated.

Damaged timber:

Dried damaged timber with a water content of 20% has an ash content of 2% and a C-content of 45%. After pyrolysis, the biochar has a C_{fix} content of approx. 80% and would be approved for soil applications in Germany. All higher quality biogenic fuels such as wood chips achieve the same or better results. In this case we could speak of a refinement.

If you are interested in our pyrolysis boilers, please contact us using the contact form on our website (QR code) or directly by email.

We like to support you.
info@biomaccon.de

