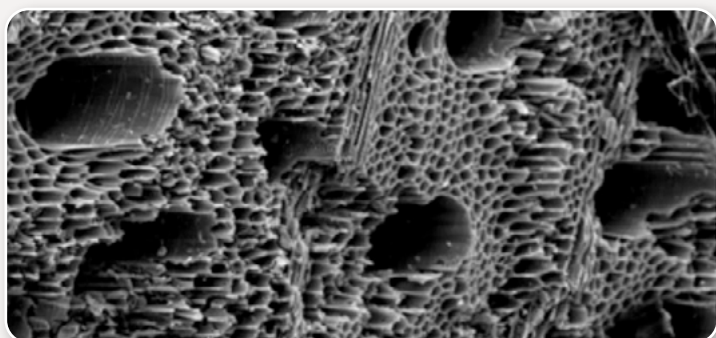
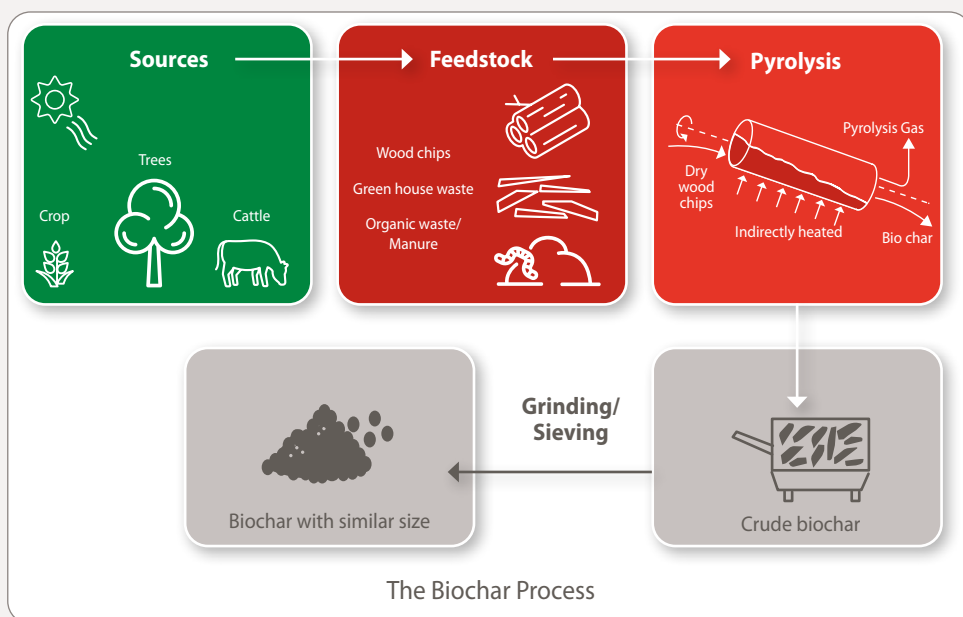


What is biochar?

Biochar is a black solid, high carbon content material that is highly porous resulting in a large surface area. It is extremely stable and is often referred to as being recalcitrant. It does not get broken down by microbial action in the same manner that the material used to make it would.

How is it made?

Biochar is created by the heating of biomass in the absence of oxygen in a process commonly known as **pyrolysis**. Pyrolysis involves the thermal conversion process that turns biomass into biochar at temperature ranges between 350°C to 1,000°C. During the process, excess renewable heat can be generated. Other by-products can include the generation of synthetic gas and bio-oil, two useful energy carriers in the provision of bioenergy. The pyrolysis process differs from combustion. Combustion utilises oxygen with the focus on heat production whereas pyrolysis focuses on the generation of the solid (biochar) liquid (bio-oil) and gas (syn-gas) products, in the absence of oxygen.



Biochar under a microscope, Brownsort, UK Biochar Research Centre

What are the feedstocks?

Biochar can be made from a wide variety of biomass streams ranging from agricultural sources such as manures and crop residues, to woodchip, nutshells, coconut husks and everything in between. The nature of the biochar created depends on the conditions at which it is processed as well as the type of biomass feedstock. Biochar production can utilise waste, residual, or low value biomass that would have been left to rot in situ or burnt, releasing its carbon to the atmosphere or costly treatment cycles. Pyrolysis enables the generation of value from biomass materials through the provision of beneficial products and services.

What can it be used for?

Biochar has a large range of potential uses due to the material's physical properties. It has a large surface area due to the presence of pores combined with what is known as Cation Exchange Capacity (positive/negative charge interactions) making it highly adsorbent, allowing a wide variety of substances to bind or stick to it.

These properties make it useful in the following sectors:

- Agriculture - slurry additive, feed additive, fertiliser ingredient
- Forestry sector - nutrient and water retention
- Waste water and potable water treatment - removal of pollutants
- Waste processing facilities - odour control
- Land and water remediation - immobilising pollutants
- Soil amendments - horticulture, landscaping, gardening, composting
- Construction sector - concrete, tarmac, composites
- Energy Production – enhanced biogas yield, CHP, district heating, bio-oil



Benefits of Biochar

- Biochar is an effective carbon sink. Each tonne of biochar fixes 2.5 - 3 tonnes of carbon dioxide (CO₂), although this figure can vary.
- Biochar can act as a filtration medium with the ability to improve air and water quality, depending on application.
- Biochar can be made from a wide variety of different biomass streams with the potential to integrate production with waste management.
- Biochar production can help generate value from a wide range of under-utilised biomass resources.
- Due to heat given off in the process, biochar production can also be used to provide useful thermal energy which can be used for district heating, process heat or other applications.
- Biochar can be very beneficial for soil quality, allowing for greater nutrient and water retention. It can also provide a place where beneficial microbes and fungi can colonise.



IrBEA's work in this area

IrBEA are involved in a number of national and transnational projects surrounding biochar. The Association is working on developing the sector here in Ireland, and sees it has potential for adding economic value, environmental improvements and development of carbon and waste management.

Many of the Irish biochar producers, start-ups and product developers are IrBEA members. They encompass production, sales, product development as well as technology providers. IrBEA works extensively in the area of lobbying, policy and advocacy for the biochar sector.



IrBEA is a partner on the Interreg funded THREE C project which is promoting biochar and circular carbon product development across North West Europe. For further information visit the project website www.threec.eu.