

Biochar

Biochar is a type of charcoal made by thermal decomposition of biomass, but without the use of oxygen. It is used as a soil conditioner for both carbon sequestration and soil health benefits.

Research is being carried out on how biochar can be used to mitigate the effects of climate change.

Details of biochar will be useful in the Environment and Ecology segment of the IAS Exam

Overview of Biochar

The word 'biochar' is derived from the Greek word 'bios' meaning life and 'char' short for charcoal. It is basically charcoal, but used in certain applications.

Biochar is a high-carbon, fine-grained residue produced through direct thermal decomposition of biomass without oxygen being used in the process. It produces a mixture of solids, liquid and gas products. The yields gained depend on conditions such as temperature and heating rate. These parameters can be used to produce energy as well.

The ideal temperature of biochar creation is at 400 - 500 °C while temperature above 700 °C favors the yield of liquid and gas fuel components.

Use of Biochar

The following are the use for Biochar

1. Carbon Sink: When biomass is burnt or naturally decomposed, large amounts of carbon dioxide and methane is released into the Earth's atmosphere. Biochar also similarly releases the same elements into the atmosphere but the carbon content is stable by comparison.

As such, biochar provides for a suitable storage of carbon in the ground, potentially reducing atmospheric greenhouse gases (ghg) while at the same time increasing soil fertility, and improved agricultural productivity.

2. Soil Amendment: The porous nature of biochar is ideal for soil enrichment as it retains both water and water-soluble nutrients. Biochar is recognized for its offering of a number of soil health benefits.

Thus, biochar is capable of improving quality of water, reduce nutrient depletion, reduce soil acidity and reduce irrigation and fertilizer requirements

3. Water Retention: Biochar is hygroscopic, as in able to absorb and hold water from the surrounding environment. This makes it ideal as a soil material where water shortages are common. Nutrients crucial for a plants benefits such as phosphate and nitrogen are retained, making the plants healthie and requiring far less fertilizer

Frequently asked questions regarding Biochar

What are the benefits of Biochar?

Benefits of biochar are as follows:

- The pyrolysis of forest- or agriculture-derived biomass residue generates a biofuel without competition with crop production.
- Biochar is a byproduct that may be ploughed into soils in crop fields to enhance their fertility and stability, and for medium- to long-term carbon sequestration in these soils.

What is the difference between charcoal and Biochar?

Biochar is a carbon-rich solid that is derived from biomass (organic matter from plants) that is heated in a limited oxygen environment. Charcoal is also a carbon-rich solid that is derived from biomass in a similar manner.

How are properties of Biochar determined?

The properties of biochar can be characterized by factors such as proximate, elemental composition, porosity etc.