

Biochar- Sustainable Material for a Green Future

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SUMMARY

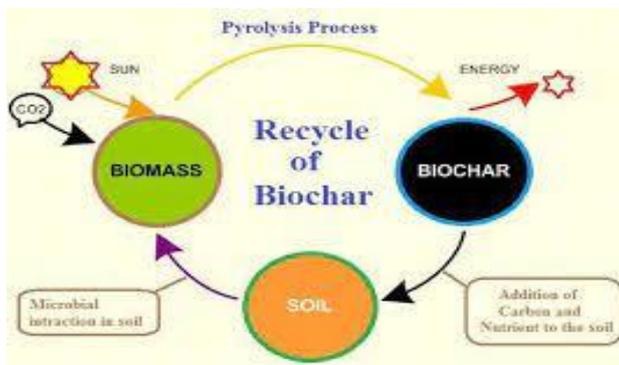
Biochar have made substantial breakthroughs in reducing greenhouse gas emissions and global warming, reducing soil nutrient leaching losses, sequester atmospheric carbon into the soil, increasing agricultural productivity, reducing bioavailability of environmental contaminants and subsequently, becoming a value added.

INTRODUCTION

Biochar can be defined as a carbon-rich material or charcoal produced for some biological purpose, generally to improve soil fertility or animal feed. It is created using a process known as pyrolysis, thermochemical decomposition of biomass with a temperature about $\leq 700^{\circ}\text{C}$ in a low oxygen environment. Byproducts of the process include syngas (H_2+CO), minor quantities of methane (CH_4), tars, organic acids, pyroligneous acid (wood vinegar) and excess heat.

Why is biochar good for the environment?

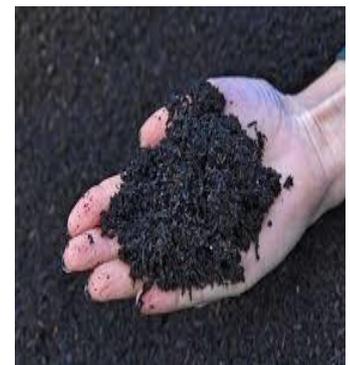
Biochar brings agricultural benefits by boosting soil's fertility and its availability to withstand drought or flooding, it can also rid soil of heavy metals and other pollutants. Adding biochar to 10% of global crop land could sequester the equivalent of 29 billion tons of CO_2 .



Recycle of Biochar



Decomposition of Biomass



Biochar is a soil amendment

Carbon content of biochar

Biochar is highly stable, comprising more than 65% carbon. Chemical composition is highly dependent on feedstock and pyrolysis conditions. Biomass subjected to pyrolysis is converted to biochar with high fixed carbon content and high stability.

Biochar as a climate change mitigation strategy

Through the process of photosynthesis, plants convert carbon dioxide from the air into organic material or biomass. If that biomass is then used to create biochar and returned to the soil, it has the potential to keep the carbon dioxide from re-entering the atmosphere for an extremely long period of time. It all depends on biochar's stability or how long it resists decomposition.

In addition to its potential benefits in addressing climate change, incorporating biochar into the soil is also increase fertility, help growth and improve other soil property.

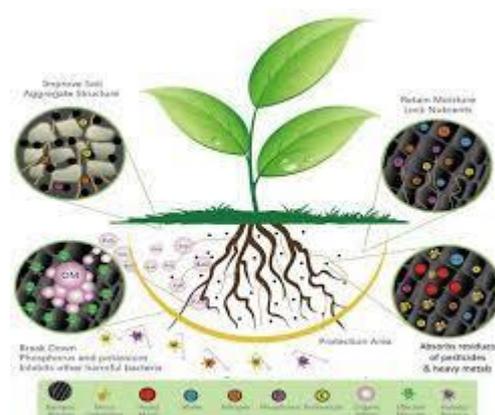
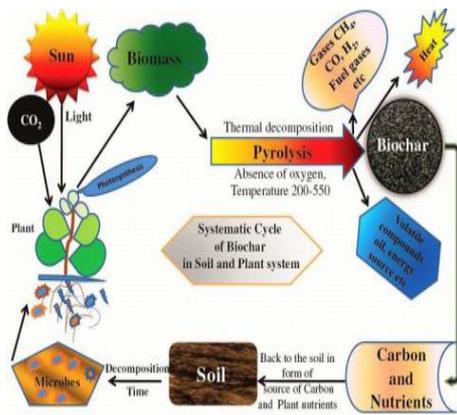


Fig: Importance of biochar in Agriculture

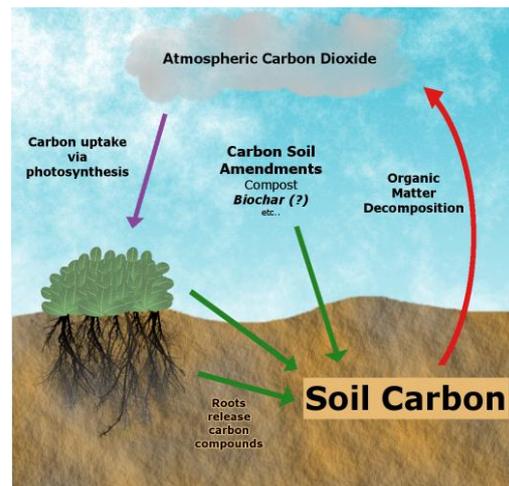


Fig: Biochar and Carbon Sequestration

Benefits of using biochar in agriculture

- Enhance soil fertility
- Improve plant growth
- Provide nutrition
- Replenish nutrients
- Retains moisture
- Reduces greenhouse gas emissions
- Ability to withstand drought or flood
- Increase in crop yield
- Adsorption of soil pollutants
- Increase in plant disease resistant
- Catching and storing carbon
- Remove organic/inorganic contaminants from water and soil

Biochar soil amendment

- Improves soil quality by increasing soil pH
- Moisture holding capacity
- Cation exchange capacity
- Improve micro flora function
- Improve soil structure and creates pore
- Improving soil health

Benefits of biochar as a feed additives

- Improved digestion

- Increased immunity
- Reduced chronic Botulism
- Increased feed and energy efficiency
- Increased growth rates
- Reduced methane production
- Increased milk protein
- Reduced odor of slurry

CONCLUSION

The widespread use of a low input sustainable agriculture method such as biochar provides many excellent solutions to sustainability issues. Biochar is environmentally friendly, socially responsible and economically profitable. It helps to sequester carbon from the atmosphere improve soil both for food production and environmental benefits and saves money for its producers. If the technology becomes widespread enough greenhouse gas levels in the air will not only stop their increase but begin a downward trend.

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