

Biochar – An Effective Way of Crop Residue Management

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INTRODUCTION

Agricultural waste may be defined as the waste material derived from various agricultural operations, According to the Indian Ministry of New and Renewable Energy around 500 million tons of agricultural waste is produced every year in India. Serious hazard to environment and human health are observed every year during the months of October and November in Delhi, and the nearby areas due to the formation of thick hazy layer consisting of burnt particles and pollutants in the atmosphere. Biochar is a soil supplement which helps in sequestration of carbon in soil therefore helping to mitigate global climate change, it has a great potential to reduce the greenhouse gas emissions and various other environmental hazards and also act as a soil. The production of Biochar under very high temperature using various crop residues and organic waste material has a great potential to offer multiple environmental benefits.

How to prepare biochar- a look into biochar production

Biochar is produced during pyrolysis, which is the thermal decomposition of biomass in an environment where oxygen is limited under the temperature range of 250 to 900° C. this process in an efficient strategy to convert the waste biomass produced from agriculture and forestry into value-added product like biochar, syngas and bio-oil. During the process of pyrolysis the lignocellulosic components like cellulose, hemicellulose and lignin undergo reaction processes like depolymerization, fragmentation and cross-linking at specific temperatures resulting in a different state of products like solid, liquid and gas.

The role of biochar in sequestering carbon and mitigating climate change:

The production of biochar is a carbon negative process, which literally means that it actually reduces the carbon dioxide in the atmosphere.

During the process of making biochar, the unstable carbon present in the decaying plant material is converted into a stable form of carbon and then stored in biochar and with the application of biochar to the soil the carbon is stored in a secure place for hundreds or thousands of years. The feedstock used to produce biochar would produce higher amount of carbon dioxide into the atmosphere if left to decompose naturally. By transforming the carbon content in the feedstock into stable structure that do not react with oxygen, Biochar ultimate leads to the reduction in the carbon dioxide present in the atmosphere.

The ability of biochar to enrich the soil and reducing the need for the application of chemical fertilizers also contributes to the mitigation of climate change. The resulted improved soil fertility also stimulates the growth of plants, which consume carbon dioxide, numerous benefits of Biochar for both climate and agriculture systems make it a favorable tool for regenerative agriculture.

CONCLUSION

Biochar can help in solving a variety of world problems; the process by which biochar is manufactured could help in sequestration of around billion tons of carbon annually and

store it in the soil for thousands of years. During the production of biochar clean renewable energy is produced which can play a vital role as an alternative to fossil fuels which has exacerbated global warming by adding greenhouse gases to the atmosphere, some other benefits of biochar to the environment include the reduction in amount of waste and high profitability to farmers, this technology can also play a crucial role in contributing to food security by increasing the crop yield and retaining water in the areas which are prone to drought.

REFERENCES

- Khare, P., Deshmukh, Y., Yadav, V., Pandey, V., Singh, A., & Verma, K. (2021). Biochar production: A sustainable solution for crop residue burning and related environmental issues. *Environmental Progress & Sustainable Energy*, 40(2)
- Yaashikaa, P. R., Kumar, P. S., Varjani, S., & Saravanan, A. (2020). A critical review on the biochar production techniques, characterization, stability and applications for circular bioeconomy. *Biotechnology Reports*, 28