

Increased carbon trapping in plant and deposition in soil is possible through the application of processed carbonaceous wastes in soils

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The concentration of CO₂ in the atmosphere is increasing in the world which is causing the warming of the globe and ultimately elevating the sea level. Bangladesh is going to face the worst effect of global warming and climate change resulting 13 million internal climate migrants and severe food crisis [1]. The organic carbon content in soils of Bangladesh are only one tenth than the typical soil carbon content due to favourable temperature, rainfall and intensive cultivation to feed more than 180 million people living in 147570 sq. km. The indiscriminate use of chemical fertilizers to grow more food from existing agricultural lands are worsening the situation causing the further depletion of organic carbon from agricultural lands. We aimed to determine the effects of the application of different types of composts, biochar and char produced from carbonaceous part of different types of wastes (including plastic and e-wastes) on the carbon content, total microbial content, N fixing beneficial bacteria content in soils, on plant growth and on soil erosion through a series of lab and pot experiments. Results showed that although 20 t/ha application of biochar resulted the highest carbon content in soils but decreased plant production which might be due to decreasing the beneficial microbes in soil. The 2.5 t/ha and 5 t/ha compost application in soils increased the production of spinach (*Spinacia oleracea*) and red amaranthus (*Amaranthus cruentus*) up to 60% while significantly increasing carbon content in soils and reducing soil erosion up to 50%. Plastic chars increased carbon content in soils but did not increase the plant production significantly. The combined application of 2.5 t/ha compost and 2.5 t/ha biochar increased the carbon content in soil and plant production significantly. It could be concluded that by using processed carbonaceous wastes in soil, a huge amount of carbon could be stored in soil while trapping CO₂ in plant body through improved plant production. Moreover, through the application of biochar and char in soils the mineralization of carbon could be significantly retarded.

Reference:

[1] World Bank (2022). Bangladesh, country, climate and development report, World Bank Group, Washington, DC, USA.