

Scientists explore biochar to nourish soil, reduce carbon emission

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Since plants first made their appearance on earth, they have been instrumental in creation of plant biomass by absorbing carbon dioxide from air through the process of photosynthesis using sun light. This biomass, once broken down by microorganisms or burnt, is released back to the earth's atmosphere in the form of carbon dioxide, one of the major Green House Gases (GHGs). Scientists now see hope in converting this carbon into a soil enriching, non-polluting product called biochar, to partially deal with the problem of carbon emission from agriculture soils through its long term storage or carbon sequestration.

Scientists in India and other parts of the globe have been working on ways to contain the emission of carbon dioxide into the earth's atmosphere during the process of decomposition of plant biomass by subjecting it to a thermo-chemical conversion process or pyrolysis, at a low temperature in an oxygen-minus condition.



Bamboo clump before biochar compost application in Koppa in 2014

The end product of this process is biochar, a fine-grained, carbon-rich and porous product. Whether converting carbon dioxide into biochar is a fool-proof way of protecting the earth against its relentless emission is still under investigation by scientists. But the biochar's usefulness in improving the soil's productive potentials by

mixing it with organic compost is fast gaining currency. Bangalore-based scientist, Dr Syam Viswanath, have been spearheading research in this direction.

"Sustainable biochar systems can be carbon negative by transforming the carbon in the biomass into stable carbon structures in biochar, which can remain



Fully emerged culms in the bamboo clump in November 2015

WHAT IS BIOCHAR

It is charcoal produced from plant matter and stored in the soil as a means of removing carbon dioxide from the atmosphere.

sequestered in soils for hundreds or thousands of years. The main quality of biochar that makes it an attractive soil amendment is its highly porous structure, considered responsible for improving the water retention capacity of the soil and increased surface area of the biochar, a nanomaterial," Dr Viswanath told Bangalore Mirror. One gram of biochar has a surface area equivalent to 400 square metre, the size of a football field.

Scientific experiments aimed at establishing the efficacy of biochar as a soil nourishing agent being conducted under the aegis of the Institute of Wood Science and Technology (IWST) have, so far, yielded encouraging results. Working in tandem with a city-based commercial biochar production company (Pointec Pens and Energy, Attebele), a team of

IWST scientists have been able to establish the efficacy of the product in developing better quality bamboo shoots.

The compost is made by mixing biochar with microbial and compost enriched with effective microorganism. For experiment purposes, scientists procured biochar compost from the company. Biochar is a by-product of the gasification process used to generate electricity to run the Pen manufacturing factory in Attebele. Inorganic fertilizers, compost and biochar were mixed in different combinations for speeding up shoot production in six different bamboo species.

"The inputs were applied on six-year old clumps developed at the IWST Gottipura-based field station in Hosakote. The results have been impressive in Koppa, Chikmangalore, where the growth of culms almost doubled," said Dr Viswanath.

Director of the IWST, Dr T S Rathore, said numerous studies across the world have established that use of biochar increases agricultural productivity and mitigates GHG emissions from agricultural soils.