Holbrook Landcare Network

carbonfarming and your business

Greenhouse Gas Factsheet Series

# Biochar as a carbon sink

This factsheet has been produced by Holbrook Landcare Network to provide land managers in this region with information about improving their soils by sequestering carbon in the form of biochar.

Biochar is potentially a long term carbon store.

It is a form of carbon sequestration.

It improves the water holding capacity of the soil.

Biochar's buffering effect improves the pH and cation exchange capacity of the soil.

50% of the pyrolysed biomass is converted into biochar which can be stored in the soil, potentially improving soil fertility.

## WHAT IS BIOCHAR?

Biochar is organic matter that has been pyrolysed (burnt) to form a more inert form of carbon that can be stored in the soil. The pyrolysis process is an efficient way of producing energy because combustion is achieved without oxygen; as a consequence only very small amounts of carbon are lost as carbon dioxide or monoxide with most of the organic carbon is converted to syngas or biochar. A wide range of biomass products can be used to produce biochar, for example: wood, agricultural crop residues, biosolids (such as manure), and green waste.

## FACTS ABOUT BIOCHAR

- Gas produced during biochar production process can be used to generate electricity or converted to liquid fuels.
- Biochar has greater stability than the material from which it is made hence it can be a long term carbon store.
- Biochar can improve soil fertility.

Therefore by putting biochar into the soil, carbon is being sequestered for a very long time and the productive capacity of the soil can also be improved.

The use of biochar as a soil amendment is not new. Biochar production is modelled after a process begun thousands of years ago in the Amazon Basin, where islands of rich, fertile soils called terra preta ("dark earth") were created by indigenous people. These soils continue to "hold" carbon today and remain so nutrient rich that they have been dug up and sold as potting soil in Brazilian markets.

Biochar varies considerably in quality depending on the biomass source and the cooking time and temperature, this variation means that some products provide agronomic benefits whilst others are only for sequestering carbon.

## THE FUTURE OF BIOCHAR

Biochar is a promising theoretical concept which potentially addresses:

- Multiple environmental benefits
- Reduced fossil fuel emissions
- Carbon storage in soil (sequestration)
- Potentially improved soil fertility

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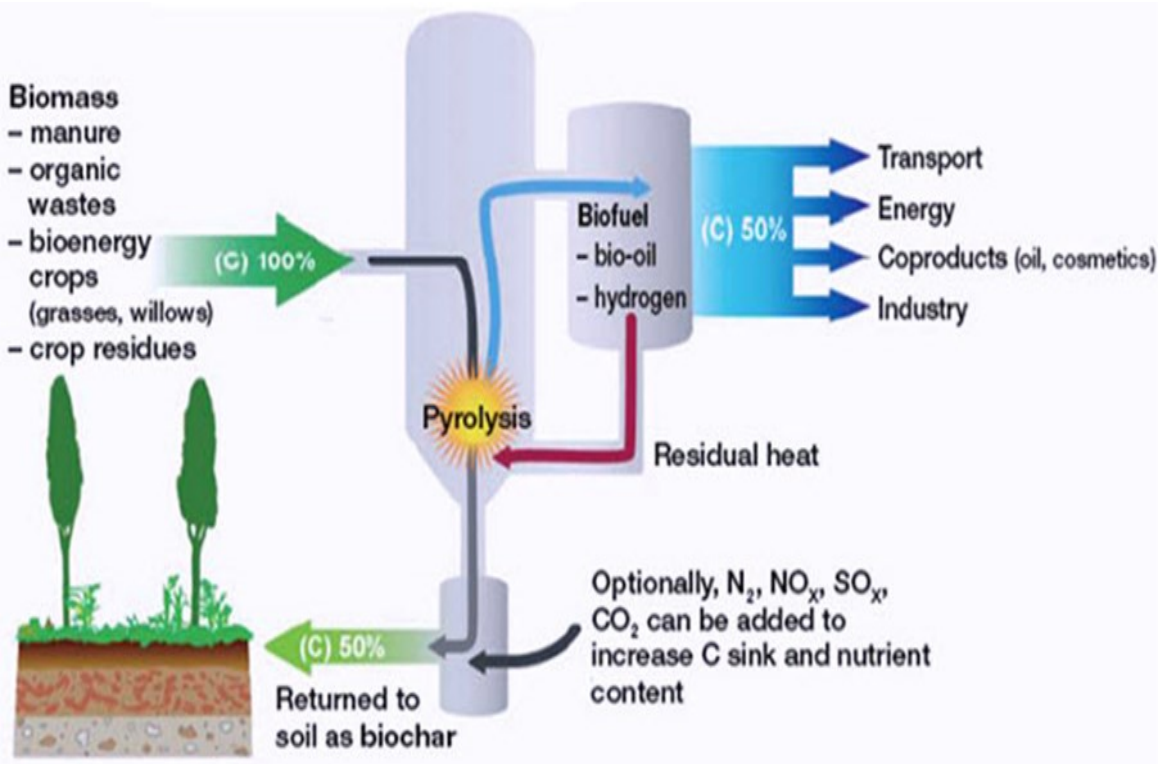


**Figure 1.** The diagram shows the pyrolysis process to produce biochar and syngas (Lehmann, 2007).

The Australian Government is currently funding biochar research through their "Biochar Capacity Building Programme"; this research is targeted at gaps in the understanding of this emerging technology. For further information refer to the two web sites below:

- http://www.daff.gov.au/climatechange/cfi/biochar
- http://www.daff.gov.au/climatechange/australias-farming-future/climate-change-and-productivity-research/biochar-research

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