Imperial College London

DEPARTMENT OF EARTH SCIENCE AND ENGINEERING

Biochar to Mitigate Climate Change

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This project is a collaboration between the Department of Earth Science and Engineering and the Department of Chemical Engineering.

Biochar is a term used to describe biomass that has been transformed to a more carbon-rich residue by thermal processes. The chemical stability of biochar means that it's carbon can be locked up for thousands of years. As the original source of carbon in biochar was atmospheric carbon dioxide, captured by photosynthesis, stored biochar has the potential to mitigate climate change.

Biochar is an attractive material for soil amendment. Earth's soil is an essential support system for all terrestrial plant growth and nearly half of the productive soil resource has been lost since the last century. Biochar application could further mitigate climate change by restoring soils and helping reforestation of parts of the Earth's surface.

The project aims to investigate the relative efficiency of biochar generation processes and determine the potential overall climate impact of biochar production and use. Different types of biomass will be subjected to various thermal and hydrothermal processing techniques. The organic chemistry of the resulting biochars will be examined using infrared spectroscopy and pyrolysis gas chromatography mass spectrometry. The inorganic contents and physical nature of the biochars will also be examined.

The data will be used to assess the chemical stability of biochars produced under different conditions and their suitability as soil amendments. The data will be incorporated into quantitative models that assess the potential impact on Earth's carbon reservoirs.

The research will use equipment in the Imperial College Organic Geochemistry Laboratories. Full training will be provided. The project would suit a candidate with a background in Earth Science, Chemical Engineering, Chemistry or a subject that develops similar skills.

- For more information contact: Professor Mark Sephton (m.a.sephton@imperial.ac.uk).
- Details of how to apply are at: https://www.imperial.ac.uk/study/pg/apply/how-to-apply/.
- Funding details can be found at: https://www.imperial.ac.uk/study/pg/fees-and-funding/scholarships/.