



ATSAF - CGIAR++ Junior Scientists Program Final Report

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Start and end date of stay at IARC: 08 May 2021 - 14 Oct 2021

Start and end date of remotely supervised project: -

Title: Chemical properties of biochar amended compost of plant biomass (chromolaena odorata and panicum Maximum) and poultry manure

Funded by the German Federal Ministry for Economic Cooperation and Development (BMZ)





The project aim is to produce two categories of sawdust mixed poultry manure composts. Each category contained plant biomass; *Chromolaena odorata* (CHODPM) or *Panicum maximum* (PAMAPM). A control treatment of only sawdust mixed poultry manure (PM) was also made. Separate treatments were made by co-composting the plant biomass mixed compost with cocoa pod biochar. The mineralisation pattern and gaseous (CO₂, NH₃ and N₂O) emissions results of the composts were gotten. The chemical properties of these composts will also be determined.

We did the project in Akure, Ondo state Nigeria. International Institute of Tropical Agriculture (IITA) has a base in Akure with their technicians posted there, so I worked with the IITA technicians in Akure (Blessing Obaseki and Joy Eze) and Dr Segun Oladele from Adekunle Ajasin University Akungba, Ondo state.

We did the composting at a constructed shed at the teaching and research farm of Federal University of Technology Akure (FUTA). We worked with the department of crop, soil, and pest management through Prof Moses Awodun. He also helped in getting permission from the management of FUTA to make use of the teaching and research farm. We sourced the plant biomass from the school environment. Poultry manure was provided by (IITA), Ibadan, it was gotten from a farm in Ibadan. We got cocoa pods from one of IITA farmers, we took the ones gathered on his farm at Idanre Ondo state. We used a fabricated pyrolysis chamber supplied by the department of Agronomy, Adekunle Ajasin University Akungba Akoko, Ondo State. We dried the cocoa pods for four days then pyrolyzed to biochar. We prepared the compost in a 60L bin. Six main treatments were made with five replicates each:

CHODPM: *Chromolaena odorata* and sawdust mixed poultry manure.

PAMAPM: *Panicum maximum* and sawdust mixed poultry manure.

PM: Sawdust mixed poultry manure.

CHODPMB: *Chromolaena odorata*, sawdust mixed poultry manure and biochar.

PAMAPMB: *Panicum maximum*, sawdust mixed poultry manure and biochar.

PMB: Sawdust mixed poultry manure and biochar.



Fig1: Fabricated pyrolysis chamber



Fig2: Freshly mixed compost Day 0



Fig 3: Composts arranged under shed

An innova multi gas machine was used to record the carbon dioxide (CO₂), Ammonia (NH₃) and Nitrogen oxide (N₂O) emissions from the compost daily for the first fourteen days and every two weeks subsequently. We took samples on day 0, day 28 and day 84 of composting and stored at the laboratory of IITA in Ibadan.



Fig 4: Innova machine set up with a stabilizer. Fig 5: Compost relocated; heavy rain destroyed shed

The composting was concluded on the day 84 and the samples already oven dried at 60°C were brought to department of Organic Plant Production and Agroecosystems Research in the Tropics and Subtropics (OPATS) of the faculty of Organic Agricultural Sciences at University of Kassel, Germany.