Tropentag, September 17-19, 2018, Ghent

"Global food security and food safety:
The role of universities"

Soil Rehabilitation Potential of Co-Compost Pellets Made from Municipal Solid Waste and Dewatered Faecal Sludge as Feedstock

AWS Pushpa Kumara[1], Felix Thiel[2], Jayantha Weerakkody[1], Bandula Ranaweera[1]

[1] *Wayamba University of Sri Lanka, Fac. of Agriculture and Plantation Management, Sri Lanka*
[2] *Ruhr University Bochum / International Water Management Institute, Inst. of Geography / Rural Urban Linkages, Germany*

Abstract

Solid waste management challenges are felt most keenly in the developing countries as a major consequence of development and modernisation. Sri Lanka as a developing country faces severe issues in managing the daily generated liquid and solid waste. Organic fractions of these waste takes a higher percentage. The organic portions of municipal solid waste (MSW) and co-composting of dewatered faecal sludge (DFS) is a feasible low-cost technology which enhances sanitation and waste management. The aim of this research was to evaluate the effect of MSW and DFS co-compost pellets produced with the addition of mineral fertiliser and biochar on soil chemical and biological properties. Trapezoidal windrow type co-compost piles were prepared with 18m^3 volume and 70 % MSW and 30 % DFS. Temperature measurements, watering and turning were done as necessary. Weekly samples were collected for chemical analysis. Resulted co-compost was mechanically pelletized using biochar and mineral fertiliser as additives and used in maize cultivation. The experiment was arranged as randomised complete block design using 7 treatments. Soil samples were collected from 30 cm and 60 cm depths to evaluate chemical and biological properties. There was a significant increase in pH values between control treatment (mineral fertiliser) and MWS-DFS co-compost treatments. The treatment with DFS-MSW-Biochar had the highest EC and organic carbon value suggesting that biochar has the ability to increase EC in soil and act as a carbon sequester. MSW-DFS co-compost treatments had the highest phosphorous and potassium values. Soil microbial activity was not significantly changed with the application of co-compost. Further, temperature changes during the co-composting process, was different from normal composting process, which may be resulted in a variation in feedstock characters. These results conclude that co-compost help to improve soil pH, EC, organic carbon, phosphorous and potassium with compared to the mineral fertiliser application. Hence, co-compost produced from MSW and DFS can potentially be used in soil rehabilitation while co-compost enriched with biochar act as a soil amendment.

Keywords: Biochar, co-compost, dewatered faecal sludge, municipal solid waste

Contact Address: Felix Thiel, Ruhr University Bochum / International Water Management Institute, Inst. of Geography / Rural Urban Linkages, Universitäts str 150, 11222 Bochum, Germany, e-mail: leifgrau@gmail.com