Feacal Sludge Reuse in Urban and Peri-Urban Crop Production

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ABSTRACT

Organic wastes, such as faecal sludge (FS), cocoa pod husk (CPH) and empty fruit bunch (EFB) abound in large quantities in the Ghanaian environment. They contain considerable amounts of nutrients and organic matter which can be recycled to improve soil organic matter content and boost soil fertility status. This study was conducted to characterize and quantify FS produced in Sekondi-Takoradi metropolis (STMA), co-compost FS with EFB and CPH, evaluate the suitability of the co-composts and compost tea as a growing medium and nutrient source, respectively and then ascertain the perception of farmers and consumers on FS compo sting and use in crop production. Samples ofFS were collected from the new liquid waste treatment facility in Sekondi- Takoradi and analysed for physico-chemical parameters (PH, EC, TS, BOD, COD, N, NH_4-N, N03-N, P and K) and pathogens *(E. coli,* faecal coliforms and helminth eggs). Dewatered FS was co-composted with EFB and CPH at 5 different treatment ratios: 1 FS: 1 EFB, IFS:ICPH; and FS: EFB: CPH in ratios of 1:1:1,2:1:1, and 2:2:1. Temperature, pH, pathogen reduction, and nutrient content were monitored. One co-compost was evaluated for its suitability as a potting medium and compost tea for raising pepper and tomato transplants. Media treatments were prepared by mixing carbonated rice husk (CRH) and co-compost at 5 different ratios 0: 1, 1 :3, 1: 1, 3: 1 and 1:0 ratio v/v. The compost teas were prepared by steeping 2.5 kg of compost in 15 L of distilled following the bucket-fermentation method. Questionnaires were administered to 10 vegetable farmers and 10 consumers in Accra to ascertain their perception on human waste composting and use in crop production. Results from this study showed that, the average biological oxygen demand (BOD) of septage and public toilet sludge in STMA were 1080 and 6200 mg/L respectively. This showed the septage was more stabilised than the public toilet sludge. Co-composting FS, EFB and CPH was viable and the process lasted for 12 weeks,

however not all treatment ratios produced sanitized co-composts. This was because the different feedstock affected the *CIN* ratio, temperature, pH and the microbial community in each treatment. The feedstock: FS, EFB and CPH in the ratio of 2: 2: 1 was found to be the best quality co-compost and this ratio supports the idea of using composting as a waste management solution as more human waste is used which can subsequently improve sanitation. The best growth media for tomato transplant production was compost and CRH ratio of 1: 1, whiles the ratio of 1: 1 to 1: 0 was found to be optimum for pepper transplants. These ratios provided the optimum nutrient balance and EC for transplant growth. Compost tea had positive effect on both transplant growth, however it was comparable to the inorganic N fertilizer of 100 mg NIL for pepper transplants. Only 33% of vegetable farmers interviewed had knowledge about the use of human waste reuse. However, they were willing to compost FS and subsequently apply to their crops provided training could be offered to them.

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