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MASS BALANCE AND GHG EMISSIONS REDUCTION POTENTIAL OF A SOURCE SEPARATED BIOWASTE COMPOSTING PLANT

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ABSTRACT

In recent years, decentralized composting appeared as one of the best options for organics waste treatment in low-and middle-income countries. In Sub-Saharan Africa, despite many composting initiatives implemented, there is still a lack of data regarding material flows and the GHG emission reduction of decentralized composting plants. This study assesses flows and GHG emissions reduction of decentralized composting, based on a pilot source separated biowaste composting facility in Tiassalé, southern Côte d'Ivoire. The material flow of the composting system was visualized using STAN 2.6 software. The inputs and outputs characteristics were determined through physical-chemical analysis. The composition of the biowaste collected was determined through two waste sorting campaigns, and the UNFCCC methods was used for carbon emissions reduction calculation. Results show that, from the 59.4 metric tons of biowaste processed, 14.2 metric tons of mature compost was produced, which corresponds to 24% of the input mass (on wet weight basis). On dry weight basis, mature compost represents 36% of the input mass. The nutrient content of the compost produced, was very high (N=15.9; P=5.2 and K=32.1 g/kg TS) compared to previous studies in sub-Saharan Africa, and heavy metal contamination was far below the threshold limits of both French and German standards (Cd=0.4; Cr=20; Ni=7.9; Pb=18.7 and Hg=0.2 mg/kg TS). The biowaste collected comprises mainly food waste (82.5%) and garden waste (5.2%). The impurity content was very low (1%) due to the effective source segregation. From the composting scenario implemented, 87% of the baseline emissions have been avoided. The study proved that decentralized composting with source separation of biowastes enables : to produce very good quality composts with a good production ratio on the one hand, and to achieve a significant GHG emission reduction on the other hand, which could help sub-Saharan countries to reach their intended nationally determined contributions.



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