

Characterization of Household Solid Waste in the Town of Abomey - Calavi in Benin

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ABSTRACT

Identification of waste characteristics is an important step towards improving waste recovery. The aim of this research was to determine the physical and physico-chemical characteristics of waste of Abomey-Calavi city and to study the relationship between standard of living and average ratio of daily waste generated by each person. In this study the methodology used French standards to characterize particle size and typology of solid waste generated by the population of Calavi City in Benin, West Africa. According to home criteria, the study area was stratified into three distinct levels of standard of living called: high standing, medium standing and low standing; Waste from 60 households was weighed daily. The total waste produced by each household was collected seven (7) days a week, for a period of three weeks. Waste characterization was performed using ratio, size granulometry and typological composition. Physico-Chemical analysis including organic mater, pH, Total Organic Carbon, total Kjeldahl nitrogen and metal trace element were also performed. To better assess waste compostability, water extractable organic matter was quantified and qualitative identification was made with XAD8 and XAD4 resins. Results show that the amount of waste increases with the standard of living; the average ratio of daily waste generated is 0.89 kg day⁻¹ person⁻¹. Independently of the standard of living, fermentable compounds represent the largest proportion of waste materials (45%). Qualitative difference of waste content in organic matter is shown as a function of the population's living standards. These results could be explained by a higher consumption of meat in the households with a higher standard of living, reflecting a greater proportion of transphillic (TPI), and hydrophillic (HPI) fractions. The C/N ratio is lower in the high standing households than in low ones. Metal trace element analysis showed a low but still significant pollution, whereas high iron and aluminum concentrations were found in all standings. In conclusion we propose a strategy for waste management in Abomey-Calavi based on sorting at the source to eliminate plastic waste and valorization of wastes via composting.

KEYWORDS

Wastes- Standard of Living - Water Extractable Organic matter – Metal Trace Element - XAD8/XAD4 Resins

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