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TREATMENT OF GARDEN AND SELECTED ORGANIC WASTES USING PASSIVE AERATION AND TRADITIONAL COMPOSTING TECHNIQUES

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ABSTRACT

"Composting should be practiced not merely for the sake of composting but rather for the good it can do." (Clarence G. Golueke, 1973).

Garden refuse constitutes a large volume of the total waste received at landfills in the eThekwini Metropolis and City of Durban. Indeed the incremental improvements to the standards of living of people and expansion of the Municipality's service areas are primary reasons for an increase in "green waste" production in the metro. The eThekwini Municipality has limited availability of land for development of existing and new landfills and emphasis has been placed on developing projects aimed at reducing the mass of waste disposed on eThekwini's landfills. Further to this, there is a significant shortage of high quality cover soil that could be utilized for promulgating vegetation growth whether it be for short time-spans or for final landfill rehabilitation. This project was established to provide a viable, low cost and sustained source of organic medium that could offer compost-quality like material for Durban's landfill operations.

The paper initially describes a low cost waste pre-treatment technique from a study at the University of KwaZulu-Natal that was undertaken to investigate the applicability of the German engineered method of Dome Aeration Technology (DAT). This method showed to be particularly successful and applicable to smaller communities and rural areas within South Africa for organic waste type composting. Previous work on composting pine bark using the DAT (Trois and Polster, 2006) proved the technology to be effective at full scale. A dimensional analysis was conducted and a small scale DAT model was produced. A combination of 95% chipped garden refuse with 5% putrescible waste or colloquially termed "kitchen wastes", was used to enhance the biological activity for increased biodegradation. Results on organic composting of the DAT for small communities and rural areas (Moodley, 2005) showed that a high quality compost in comparison to German standards, DIN 4187 was achievable within 6 weeks of composting with reduced efforts however there is still the need to optimize the technology further since the study showed that the windrow did dry out too quickly. Thermophilic temperatures were reached

within 3 to 4 days after placement of input material and this showed that full sanitation was achieved. The study also showed the DAT technology to be appropriate for South Africa in terms of low costs, low energy inputs and potential job creation. Results of the tests and details of the process monitoring and compost quality characterization tests are given in the paper.

The establishment of a full scale waste treatment system for garden and selected organic wastes is then presented in the paper. The Mariannhill landfill, which is a site operated within the constraints of its National Conservancy certificate, offers an appropriate case study for the use of the composted material. The authors offer comparisons between the full scale methods involving traditional windrows and DAT windrows. Since South Africa does not have a composting standard and precise legislation, the paper proposes a composting standard which is in line with published international standards abroad. For the City Durban, where large landfill airspace within a 10~15km radius from the CBD is to run out within the next 10 years, this paper concludes with the description of a *"waste treatment facility"* - the landfill of the future.