

The Selection of an Appropriate Wastewater Treatment System for the Coffee Industry in Kenya

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ABSTRACT

The coffee industry in Kenya produces large volumes of high strength effluent on a seasonal basis. Many of the processing sites are on hills with little land available for treatment. A further difficulty arises because of a lack of resources within the industry both in terms of finances and skilled staff. This paper reviews the requirement for wastewater treatment in the light of recent research that has suggested the impact of pollution from coffee processing is minor, compared with other pollution sources.

The options for wastewater treatment together with the results of research showing their removal efficiencies are reviewed. Treatment methods include anaerobic ponds, anaerobic contact processes and upflow anaerobic sludge blanket reactors (UASB's).

The COD and BOD₅ removal efficiencies reported for these systems are; anaerobic lagoons (50% and 96%), upflow anaerobic contact filters (90% and 90%) and the UASB (55% and 74%).

The selection of an appropriate treatment system is made using multiple criteria decision analysis (MCDA) which incorporates important decision making factors such as land availability and technical sophistication and produces a hierarchy of appropriate systems.

The decision making process is broken down into two stages; the first a screening stage and the second a more detailed weighted analysis. In the second stage, decision-making factors are assigned weighted importance on the basis of the specific requirements of the Kenyan coffee industry. The use of this selection method is demonstrated with a case study of the Jacaranda Estate, Ruiru, Kenya.