Kokobe Beyene

Yosan Teshome

Project Title

Improved Waste Paper Processing and Recycling Techniques using Small Scale Plants (Case Study: Addis Ababa University)

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Project description

Addis Ababa University generate a large amount of solid waste that could be recycled, reused, or composted and due to academic and research endeavors paper and paper products represent the single largest component of the AAU solid waste stream. Effectively to manage solid waste generated at the Addis Ababa University, it is essential to understand and identify the waste types and quantities disposed, the sources of these materials, and the possible opportunities for further reduction and recycling.

The main purpose of this project is to determine generation and composition of waste paper generated from whole campus of AAU, Assess comprehensive techno-economic analysis of waste paper recycling and analyses of the potential economic, environmental and legal impacts when waste paper ceases to be waste. A small-scale manually operating paper-recycling machine will be designed and constructed which can recycle waste paper for various productive purposes. Therefore, the data generated would produce the necessary information to set up an integrated solid waste management system. This recycling project will be a hands-on, interdisciplinary lesson that educates students about the environment, personal responsibility, community action, and solid waste management. The university recycling programs is not only impact students and their families but also impact communities and the overall solid waste diversion in a community.

Partners:

Supported by: Vice President for Research and Technology, Addis Ababa University

Project period: 2016 - June30, 2017

Total budget (ETB):100,000.00

Yosan Teshome

Zerihun Abate

Project Title

Textile Wastewater Treatment by Electrocoagulation

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Project description

The textile dyeing industry consumes large quantities of water and produces large volumes of wastewater from different steps in the dyeing and finishing processes. Wastewater from printing and dyeing units is often rich in color, containing residues of reactive dyes and chemicals, such as complex components, many aerosols, high color and high COD concentration as well as much more hard-degradation materials. At present, the dyes are mainly aromatic and heterocyclic compounds, with color-display groups and polar groups. The structure is more complicated and stable, resulting in greater difficulty to degrade the printing and dyeing wastewater. In recent years, new and novel processes for efficient and adequate treatment of various industrial wastewaters with relatively low operating costs have been explored due to strict environmental regulations such as Electrocoagulation (EC).

The electrocoagulation technique has some advantages when compared to conventional methods such as simple equipment, easy to operate, less retention time, reduction or absence of adding chemicals, rapid sedimentation of the electro-generated flocs and less sludge production. Electrocoagulation is a complex process involving a multitude of pollutant removal mechanisms operating synergistically. Although numerous publications have appeared in the recent past, the lack of a holistic and systematic approach has resulted in the design of several treatment units

without considering the complexity of the system and process control mechanisms. Due to, the fact that electrocoagulation is thought to be an enigmatic, promising treatment technology and a cost-effective solution for sustainable water management in the future, it will become increasingly important to provide a deeper insight into the pollutant removal mechanisms involved, kinetic modeling and reactor design. However, this technology hasn't been yet practiced in Ethiopia as far as our knowledge concerns.

The objective of this study is to investigate the optimum operating conditions for the simultaneous removal of pollutants such as organic matter, inorganic pollutants or microbes, heavy metals, colour, Nutrients, suspended solids content of real wastewater from textile industries by electrocoagulation treatment. To put it in nutshell, the effect initial dye concentration, initial pH, current density, type's electrode, inter-electrode distance, and treatment period on the removal efficiency of pollutant and overall performance of Electrocoagulation process will be investigated.
In general, the research is aimed to strengthen the concerted efforts of government on the environment through provision of economically and environmentally viable technology for wastewater treatment.

Partners:
Supported by: The Federal Democratic Republic Of Ethiopia
Ministry Of Science and Technology (MoST)

Project period: 2015-2017

Total budget (ETB):176,137.00