DAIRY PROCESSING WASTEWATER TREATMENT USING ANAEROBIC BIO-REACTORS

By

Eng. Hossam Mohammad Samir Sobhy Abd ELAzeez

A Thesis submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the degree of
MASTER OF SCIENCE
In

SANITARTY AND ENVIRONMENTAL ENGINEERING
PUBLIC WORKS DEPARTMENT
CIVIL ENGINEERING

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Eng. Hossam M. Samir

ABSTRACT

- In the dairy industry, processing plants use milk from farms to produce various products including fluid milk, evaporated milk, cultured dairy products such as cheese and frozen dairy products such as ice cream. Water has many uses in dairy processing {i.e. heating, cooling, washing and clean up}. Many plants use more than (4) gallons of water to process each gallon of processed milk. Accordingly, it is important to conserve water and reduce wastes.

- A biological pilot treatment plant composed of two "Up flow- Down flow" anaerobic bioreactors is used to treat the wastewater raised from dairy products processing in the Egyptian Company Misr Dairy and food Industries at Amiria District- Cairo -Egypt.

-The experimental work takes place in (5) cycles of treatment which are performed with variable hydraulic retention time. Analysis for samples from the bioreactors was carried out to determine the wastewater characteristics "Biological Oxygen Demand (BOD5) , Chemical Oxygen Demand (COD), Total Solids (TS) , Volatile Suspended Solids and pH value at several stages of the treatment process. The characteristics of influent and effluent samples are compared to determine the effect of applying the proposed treatment system and therefore the treatment efficiency can be determined. BOD5 removal percentage ranges from (86% to 89%) ,COD removal percentage ranges from (85.8% to 88.3%), Total Solids (TS) removal percentage ranges from (85.5%to 89%) , Volatile Suspended Solids (VSS) removal percentage ranges from (81% to 89.7%) as well as the pH value remains within the range (6.5 to 7.5) throughout the treatment processes.

- Also this research will highlight the role and importance of wastewater management in this industry as well as the important role of applying "Pollution Prevention Program" to minimize the needs for treating wastewater and dairy processing wastewater in specific, as the cost of treating is much higher than the cost of reducing wastes production.

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