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Treatment of dairy wastewater by using moving bed biofilm reactor sequential with integrated fixed-film sludge

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***Abstract*— Moving Bed Biofilm Reactor (MBBR) is a leading technology of biological solution for wastewater treatment based on the aerobic principle. In this study, lab scale experiments were done by using MBBR with Integrated Fixed-film Sludge(IFAS) process and polypropylene media to analyze BOD and COD removal from wastewater of dairy industries. The system efficiency in removal of BOD and COD was examined at a different rate of Hydraulic Retention Time (HRT) of 1, 1.5, 2, 2.5 and 3 hours. Similarly BOD and COD removal efficiency of 60% and 88% respectively was achieved with 3hrs HRT and also settling time was observed as 4 hours. Finally this study indicates that MBBR with IFAS process and polypropylene media as biofilm carrier posses very good removal of BOD and COD from Dairy Wastewater.**

***Index Terms*—Dairy wastewater, MBBR, IFAS Hydraulic Retention Time (HRT)**

INTRODUCTION

The dairy industry is generally considered to be the largest source of food processing wastewater in many countries. With increase in demand for milk and milk products, many dairies of different sizes have come up in different places. These dairies collect the milk from the producers, and then either simply bottle it for marketing, or produce different milk foods according to their capacities. Large quantity of wastewater originates due to their different operations. The organic substances in the wastes comes either in the form in which they were present in milk, or in degraded form due to their processing. As such, the dairy wastes though biodegradable, are very strong in nature. Several methods are available to reduce the high load content of pollutants in Dairy waste water. Among them Moving Bed Biofilm Reactor (MBBR) is considered as one of the promising process for treatment of wastewater. The basic principle of moving bed process is the growth of biomass on plastic supports that move in the biological reactor via agitation generated by aeration systems (aerobic reactors) or by mechanical systems or by anaerobic reactors. Integrated Fixed Film Activated Sludge (IFAS) is emerging technology that is highly efficient low footprint activated sludge solution. IFAS consists of submerged fixed bed polypropylene, textile media which promotes attached growth biomass in Integrated Fixed Film Activated Sludge.

A MOVING BED BIOFILM REACTOR (MBBR)

Two technologies are commonly used for biological treatment of sewage which is activated sludge and trickling filters, a MBBR is a compilation of these two technologies. The biomass in the MBBR exists in two forms suspended flocs and a biofilm attached to media. MBBR has become popular in the field of wastewater treatment because it maximizes the capacity and efficiency of the treatment plant by minimizing the footprints. It has the capacity to retrofit the old treatment plants, higher nutrient removal ability, produce less sludge as a result of high biomass, retention time, and easy maintenance, economical and so on. The key element of the MBBR is the use of small plastic biofilm support media to allow a high concentration of protected biofilm growth in a well-