

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM



**PROJECT REPORT ON
TREATMENT OF ORGANIC CONSTITUENTS AND NUTRIENTS OF
DOMESTIC AND DAIRY EFFLUENT USING SBBR TECHNIQUE
(Project Sponsored By KSCST)**

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ABSTRACT

In the present scenario, quantity of wastewater produced is increasing enormously where the main reason lies in the rapid urbanization and industrialization. The direct discharge of these effluents into water bodies would lead to increased growth of algae causing eutrophication problem hence an efficient and effective treatment of wastewater is required.

Sequential Batch Biofilm Reactor (SBBR) is one such advanced biological treatment process which requires less space for construction and has a great potential for the simultaneous and efficient removal of nutrients along with organic matter. SBBR is a process coupling suspended activated sludge and attached growth process in a single system. SBBR can achieve equalization, primary clarification, biological treatment and secondary clarification in a single system.

The present study is carried out for treating Domestic and Dairy wastewater using 2 separate SBBRs. Here an attempt is made to evaluate the performance of SBBR by varying the OLR (Organic Loading Rates). The variation in the OLR was brought about by diluting the sample with distilled water in ratios of 1:1, 1:4, 3:4 in case of Dairy wastewater and similarly 1:1, 1:4 and 7:10 for Domestic wastewater. A 24 hr cycle was adopted for treatment of effluents using SBBR where in 30 min was set for feed, 16 hr for Anaerobic phase, 6 hr for Aerobic phase, 1 hr for settle and 30 min for decant phase respectively.

Enhanced Biological Phosphorous Removal (EBPR) sludge enriched with Phosphorous Accumulating Organisms (PAOs) is used, which is developed using cow dung as a seeding material and polyurethane foam used as a Biofilm media for the growth of microorganism.

The synthetic wastewater was added continuously to the reactor for the enrichment of sludge. On 28th day VSS/TSS ratio reached 0.8 indicating sufficient growth of mixed culture of microorganism.

Experiments were conducted by varying the OLR such as 0.096, 0.196, 0.424 and 0.524 kg/m³/day for Dairy Wastewater and similarly with 0.024, 0.08, 0.196 and 0.297 kg/m³/day for Domestic Wastewater.

For Dairy wastewater it was observed that Nitrate, Phosphate, COD, Ammonia and BOD removal efficiencies ranged between 35% - 98%, 49% - 95%, 15% - 90%, 9% - 71% and 12% - 85% respectively and in case of Domestic wastewater the Nitrate, Phosphate, COD, Ammonia and BOD removal efficiencies ranged between 27% - 89%, 49% - 86%, 10% - 85%, 29% - 72% and 16% - 80% respectively. The maximum efficiency was obtained at OLRs of 0.196 and 0.297 kg/m³/day respectively for Domestic wastewater and similarly for Dairy wastewater at OLRs of 0.424 and 0.524 kg/m³/day.

Keywords: SBBR, Biofilm, OLR, EBPR and PAOs.