



## Study on efficacy of sequential Batch Reactor for Sewage water treatment

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### ABSTRACT

*Our planet is called blue planet due to the fact it's far ruled with the aid of using water, it covers extra than 70% of the earth's area. Water is a primary need for living organisms. India's surface consists of 2.45% of land area and 4% of water of the world although it also includes 16% of the world population. Increasing in population is one of the major reasons for the high demand of fresh water and the generation of waste water is also increasing. 99 % water carries domestic wastes generation from kitchen, bathing, and urine. The reuse of treated wastewater is important for agriculture development. The present study was carried out to analyse impact of Sequential Batch Reactor based on Sewage Treatment Plant. The sample was collected from inlet of Domestic Sewage treatment plant for three times. The plant appears removal effectiveness for limits pH, 7.55 to 8.12; COD, 472 to 62 mg/l*

**KEYWORDS:** Sequential Batch Reactor, Sewage Treatment Plant, Chemical oxygen demand

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### INTRODUCTION

In a generation of rapid urbanization, industrialization, economic growth and the pressure of population have increased numerous real and potential environmental hazards. All the human activities release wastewater both in part treated and untreated into the surroundings yielding numerous negative results and critical harm to the life-saving resources [1]. In India, with increasing financial & commercial growth, the contribution of wastewater pollutants has also increased resulting in the degradation of the environment. It has forced scientists & engineers to put forward new techno-economic feasible ideas to tackle these issues. Activated Sludge Process powerful for municipal and alternate sewerage; however, their demerit lies in a requirement of huge lands which makes it an unattractive option in current times where available lands are scarce [2]. According to calculations based on water supply, Vadodara produces about 358 MLD sewage each day [3]. SBR also additionally stand as an amazing choice for turning into a possible opportunity, especially for small to medium scale commercial units. Organic pollution and bacterial contamination have harmed almost all surface water sources to some extent, leaving them unsafe for human consumption until they are treated [4]. The major advantages in the usage of this technology are the energy of operation and processes. Sequencing Batch Reactor is considered to be a modern possibility for activated sludge process, which operates infill and draw mode for treatment of wastewater [5]. The Sequencing Batch Reactor is an activated sludge technique designed to work under non-consistent state conditions. The basic method is Fill, React, Settle, Decant, Idle carried out in a single reactor. Laboratory-scale SBR useful in removing organics & nutrients From Domestic wastewater [6].

### MATERIAL AND METHODS

The study was carried out located at Vadodara, Gujarat, India. And the experimental technique for this work consists of a lab-Scale. The Plant Collection of inlet and outlets Samples during my study has been

collected from STP plant based on SBR technology and for the duration of the period from January 2022 to February 2022 has been collected. The cycle processes of SBR followed FILL, REACT, and SETTLE, FINAL is controlled under operational conditions. Samples and analyses for various parameters like pH, BOD, COD, of STP have been analyzed following the standard techniques changed into evaluated.

**Fill Phase:** During this phase, Sewage effluent is added in the Basin of SBR and provided Jaggery and peptone as a portion of food to the microbes to create an environment for biochemical reactions to take place. After MLSS, MLVSS and SVI parameter is checked for getting the volume of sludge. Because of less sludge generation, more sludge is added after a few days to get proper sludge volume for the treatment of domestic sewage wastewater.

**React Phase:** During this phase, mechanical mixing and aeration units are on and no wastewater enters the basin. After MLSS, MLVSS, SVI is checked for getting the volume of sludge. Because of less sludge generation, more sludge is added to get proper sludge volume for the treatment of domestic sewage wastewater.

**Settle phase:** During this phase, activated sludge is allowed to settle under idle conditions. The activated sludge tends to settle as a flocculent mass. After proper settlement of sludge 20litres of Sewage, the water sample is added to SBR and set it on for 4-5 days.

**Final Phase:** After 4-5 days of settle phase Parameters such as pH, COD, MLVSS, MLSS, SVI tested.

## RESULT & DISCUSSION

The batch was initialized by the development of sludge required for the Sequential Batch Reactor. Minimum Sludge/ MLSS requirement is 7000 mg/L to 9000 mg/L. In the whole process, the sludge was generated by the addition of nutrients like Jaggery, peptone, nutrient agar, DAP & urea. Continuous Oxygen was provided to the batch by Compression air Pump. To maintain the quality of sludge, the listed parameter was checked presented in **Table 1**.

Whenever the COD, pH reduction is not the proper way so Nutrient added to SBR batch and pH raised to 8.5 using Sodium Hydroxide (5 N) The Daily data collected during the batch period with the measured parameter pH, COD, is presented in **Table 2**.

Day	MLSS mg/L	MLVSS mg/L	SVI	Remark
1	2844	2064	203.93	Insufficient sludge develops
2	2965	2138	-	Insufficient sludge develops
3	3065	2357	-	Insufficient sludge develops
4	3862	3211	-	Insufficient sludge develops
5	4540	3610	-	Insufficient sludge develops
6	6920	5668	137.28	Sufficient sludge develops
7	7012	5864	-	Sufficient sludge develops
8	7251	5921	-	Sufficient sludge develops

Table 1. Tested Parameter

DAY	COD	pH
1	320	7.40
2	176	7.95
3	128	7.70
4	320	7.62
5	272	8.17
6	192	8.10
7	32	8.05
8	88	8.15
9	80	7.77
10	62	8.08

Table 2 Daily basis parameter

## CONCLUSION:

At present, there is an urgent need for the up-gradation of the present setup of treatment plant life to control the wastewater of the towns and industries considering its efficiency to treat sewage water. This

present examine changed into undertaken to evaluate the performance of SBR for treating sewage water. The common performances of STP become discovered satisfactory as maximum of the studied parameters have been observed under this limits (pH, 7.55:8.12, COD472:62mg/l

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