

REUSE OF WASTEWATER TREATED BY USING SEQUENTIAL BATCH REACTOR (SBR) PROCESS FOR AGRICULTURE/IRRIGATION PURPOSE

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Abstract:- Water is the main part of our life. It is a fact that if water is used there will be Waste. The Treatment of municipal sewage wastewater for possible agricultural reuse was investigated. The treatment method consisted of chemical coagulation and sequencing batch reactor (SBR) system. A new type of SBR Reactor was designated which allow continuous wastewater inflow in contrast to intermittent wastewater feeding of the traditional use. Experimental tests were performed using both SBR treatment systems. The results show that both SBR treatment systems perform equally well. The influences of the various operating parameters on the water quality were determined for the new as well as for the traditional SBR reactors. The combined chemical coagulation and SBR treatment were to found to be quite satisfactory to meet the agricultural irrigation standards for the discharged water.

Keywords: Water Reuse (WR), Agriculture, SBR and Wastewater.

I INTRODUCTION

Sewage treatment or the treatment of wastewater is necessary to remove contaminants from wastewater which are hazardous to Environment. Before disposed of it in river streams or on land, In Present Day's There are two systems are running in treatment of wastewater one is Activated Sludge Process (ASP) or Conventional Process And the other is Sequential Batch Reactor (SBR) Technology. the objective of this Project is to study the parameters of treated wastewater come from both the units and to examine or study reuse of the wastewater treated by using the SBR technology for Agriculture purpose. As it is now a Days necessary due to shortage of natural sources of water. And need to find the best alternative option for agriculture purposes.

Conventional Treatment of wastewater consists of Preliminary Treatment, Primary Treatment, Secondary Treatment & Tertiary Treatment. The first two steps of treatments are common for both the ASP & SBR as in this treatment Screening and grit removal is carried out which is basic for both.

1.1 Activated sludge process (ASP):

Aerobic treatment processes utilized a mixed population of micro-organisms. The wastewater is first treated in Preliminary and Primary treatment units, as discussed above in these treatment around 50 to 60% suspended solids and about 40% Of BOD is removed. Then the Wastewater is treated biologically. The objectives of this treatment are to coagulate and remove the non-settleable colloidal solids and to stabilize the organic matter with the help of mixed population of micro-

organisms. The Activated Sludge Process (ASP) is an aerobic biological wastewater treatment process that uses micro-organisms which includes bacteria, fungi, protozoa, to speed up decomposition of organic matter requiring oxygen for treatment.

1.2 Objectives Of Study:

- To Study the Working Processes OF Both Treatment Processes ASP & SBR in detail.
- To Study the Difference Between ASP & SBR to determine most effective method.
- To Study the Parameters of wastewaters Before and after the treatments using SBR technology.
- To Check the Water Compatibility for Reuse of Such treated water for Agriculture / Irrigational Purpose.

II LITERATURE REVIEW

M.A.H et.al (2008) The paper stated that SBR is a modified form of the ASP, which has been successfully used to treat the municipal as well as the industrial wastewater, this paper also describes the key features of SBR technology. Vz; High Percentage of BOD removal, COD Removal, Cost Effective Process, and its Simple Operations.

Sunil. S. Mane , & Dr. G.R. M. et.al (2012) in "SBR-An Application Wastewater" this paper describes SBR is One Of the Potential option to treat the Industrial wastewater. As it Consists A wide variety of both inorganic and organic pollutant. Which can be successfully Removed by use of this Technology.

B.Saba, Tariq Mohammad, & Bush J et.al (2011) In “Reuse Of Treated Wastewater Using SBRR in improvement of Wheat Growth” in this paper they examine the growth parameters variety of wheat plant, the result shows the positive growth of plant using this treated water.

III METHODOLOGY

3.1.Characteristics of the Studied Wastewater:

(1) Physical Characteristics Of Wastewater:

- Color:** Fresh sewage is normally brown and yellow in Color but over time becomes black in Color.
- Odour:** Wastewater that includes sewage develops a strong Odour.
- Temperature:** Due to more biological activity, wastewater will have a higher temperature.
- Turbidity:** Due to suspended solids in wastewater will have a higher turbidity.

(2) Chemical Characteristics of Wastewater:

- Chemical Oxygen Demand (COD): COD is measure of organic materials in wastewater in terms of the oxygen required to oxidize the Organic Materials.
- Total organic Carbon (TOC): TOC is a measure of carbon within organic materials.
- Nitrogen: Organic nitrogen is the amount of nitrogen present in Organic compounds.
- Phosphorous: phosphorous (in protein) and inorganic phosphorous (phosphates, PO_4^{3-}).
- Chlorides (Cl^-)
- Sulphate (SO_4^{2-})

Analyzing the physical and chemical characteristics of wastewater plays a critical role in the wastewater treatment process.

(3) Biological characteristics of Wastewater:

- Biochemical Oxygen Demand (BOD); BOD is the amount of oxygen needed to stabilize organics matter using microorganisms.
- Nitrogenous Oxygen Demand(NOD): NOD is the amount of oxygen needed to convert organics and ammonia nitrogen into nitrates by Nitrifying bacteria.
- Microbial life in Wastewater: wastewater contains the following microbes.
 - Bacteria
 - Protozoa
 - Fungi
 - Viruses

3.2Three Stages of Wastewater Treatment:

(1) Primary Wastewater Treatment:

A Primary treatment of wastewater involves sedimentation of solid waste within the water. This is done after filtering out larger contaminants within the water. Wastewater is passed through several tanks and filters that separate water from contaminants. The resulting “sludge” is then into a digester, in which further processing takes place. The primary batch sludge contains nearly 50% of suspended solids within wastewater.

(2) Secondary wastewater treatment:

Secondary treatment of wastewater makes use of oxidation to further purify wastewater. This can be done in one or Three Way.

1. Biofiltration: This method of secondary treatment of wastewater employs in sand filter, or contact filters, or trickling filters to ensure that additional sediment is removed from wastewater. Of the three filters, trickling filters are typically the most effective for small-batch wastewater treatment.

2. Aeration: Aeration is a long, but effective process that entails mixing wastewater with a solution of microorganisms. The resulting mixture is then aerated for up to 30 hours at a time to ensure results.

3. Oxidation Ponds: Oxidation ponds are typically used in warmer places. In addition of this method utilizes natural bodies of water like lagoons. Wastewater is allowed to pass through this body for a period of time and is then retained for two to three weeks.

(3)Tertiary wastewater treatment:

The third and last step in the basic wastewater management system is mostly comprised of removing phosphates and nitrates from the water supply. Substance like activates carbon and sand are among the most commonly used materials that assists in this process.

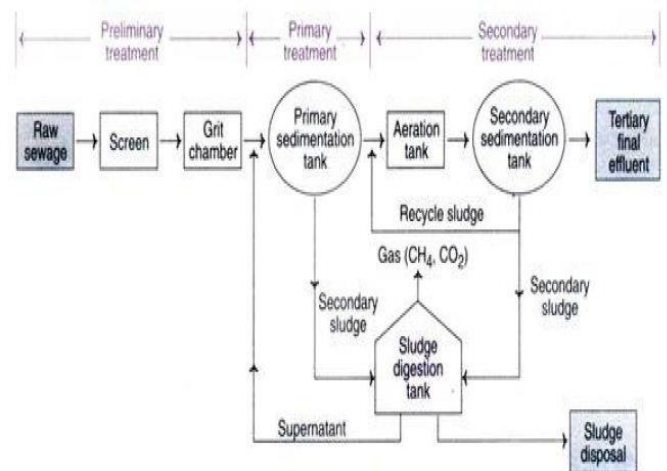


Figure .1.1 Shows The Conventional Flow Diagram Of Sewage Treatment Plant.

IV CONCLUSIONS

- Potential Reuses of wastewater depends on the Hydro chemical And Biochemical characteristics of wastewater, which determine the methods and degree of treatment required.
- It can be Recycled/ Reused as a source of water for a multitude of water-demanding activities such as agriculture, aquifer recharge, aquaculture, firefighting.
- The waste water High BOD, Turbidity and total dissolved solids. Our aim is to make this water safe for disposal in natural environment or to use it for other purposes.

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