

Name 167anullah

ID 7765

Section 13

Date 2 - July - 2020

Submitted to Engr Nadeemullah  
Siv

Assignment No 1 revised.



①  
Two basic design parameters of wastewater treatment system are Hydraulic Retention time (HRT) and solid detention Time (SRT)

Q1 Briefly describe each one these parameters.

Ans  
Hydraulic retention Time (HRT):-

The hydraulic retention time or  $t$  ( $\tau$ ) is a measure of average length of time that is soluble compound remains in a constructed bioreactor. The volume of the aeration tank divided by the influent flow rate is  $T$  ( $\tau$ ) the hydraulic retention time.

⇒ IMPORTANT OF HYDRULIC RETENTION TIME :-

The Hydraulic retention time is closely related to the amount of substrate that ~~can~~ <sup>can</sup> be handled per unit time, thereby has a direct impact on the economic feasibility of a bioprocess. A short HRT yields a higher hydrogen production rate and lowers capital outlay by reducing the size of the bioreactor.



(2)

## Effect of hydraulic retention time and media of constructed wetland for treatment of domestic waste water:-

A green house experiment was conducted to investigate the effect of varying soil-to-sand ratio of constructed wetland on wastewater treating efficiency. Wetland beds were prepared with locally available plant, specifically cattail. Treatment efficiency was evaluated for parameters such as BOD<sub>5</sub>, COD, SS, TKN and TP. The result indicated that the nutrient reduction corresponds to a longer retention time in wetland beds. Under the longest hydraulic retention time (HRT) of 3 days, the system with media containing soil-to-sand ratio of 75:25 illustrated the highest removal efficiencies of BOD<sub>5</sub>, COD, SS, TKN and TP by  $92 \pm 5$ ,  $91 \pm 6$ ,  $76 \pm 9$ ,  $90 \pm 3$  and  $95 \pm 3$  % respectively. The infiltration rate was also decreased after operation particularly in the treatment with lower sand content. However, the highest growth rate of cattail was found under the shortest HRT (0.75 day) condition.



③

Q2 What are method use for decoupling SRT from HRT?

Ans: By decoupling the SRT and the HRT, the liquid wastewater can be processed faster. HRT is the time three stirring method can be used in this system

- mechanical stirring
- biogas recycling
- and heated wastewater recycling.

The hydraulic retention time SRT from HRT Reduces the capital Expenditure and increase Biogas production and for CHP utilization.

The decoupling of SRT from HRT not only increase glucose at organic loading rate of  $6.5 - 42.8 \text{ g COP/L-d}$  and HRT 8-12 hour. The solid retention time (SRT) to 99.9% in the IBRCS from 0.55-1.8 in CSTRs to  $2.4 - 9.6 \text{ g/L-d}$  SRT from HRT to ensure sufficient reactor biomass



### Q3 Advantage of decoupling SRT from HRT :-

- ① Good contact b/w biomass and substrate efficiency.
- ② Required small area.
- ③ stable sludge
- ④ long service time
- ⑤ simple design.
- ⑥ Relatively low cost
- ⑦ Low excess sludge production