

Q#01:-

Ans:- Hydraulic Retention Time:-

The hydraulic retention time is a measure of the average length of time that a soluble compound remains in a constructed bioreactor

The volume of the reaction tank divided by the influent flow rate is  $\tau$  (tau) the hydraulic retention time.

The hydraulic retention time is closely related to the amount of substrate that can be handled per unit time and thereby has a direct impact on economic feasibility of bioprocess. A short hydraulic retention time yields a higher hydrogen production rate and lower capital outway by reducing the size of bio reactor.

According to Bolzonella David.

The hydraulic Retention time is the ratio b/w the reactor volume and the feed flow rate represents the average time the cells and substrate stay inside the reactor

HRT is very important parameter for the hydrogen and methane production in continuous mode.

## → Solid Retention Time:

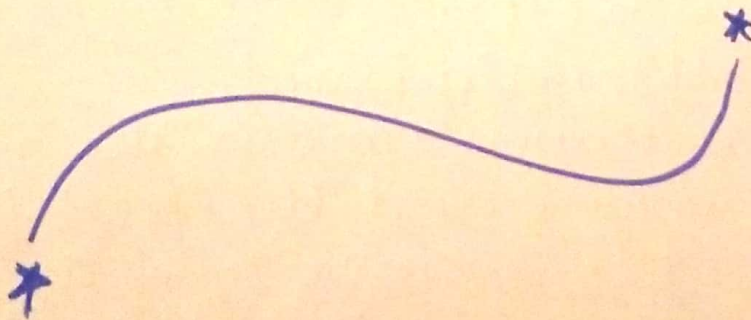
The solid Retention time (SRT) is the time of solid fraction of the wastewater spend in a treatment unit. It is the quantity of solid maintained in the reactor divide by the quantity of solids coming out the reactor each day

$$SRT = V \times C_d / Q_{out} \times C_{out}$$

$C_{out}$  is the solids concentration of the effluent in a conventional completely mixed or plug flow reactor the HRT equals to SRT

The solid Retention time (SRT) controls the concentration of bacteria through the treatment system

- ⇒ Small reactor size
- ⇒ Large separate size
- ⇒ Reduce sludge production



## Q#02:- Methods Used For Decoupling SRT from

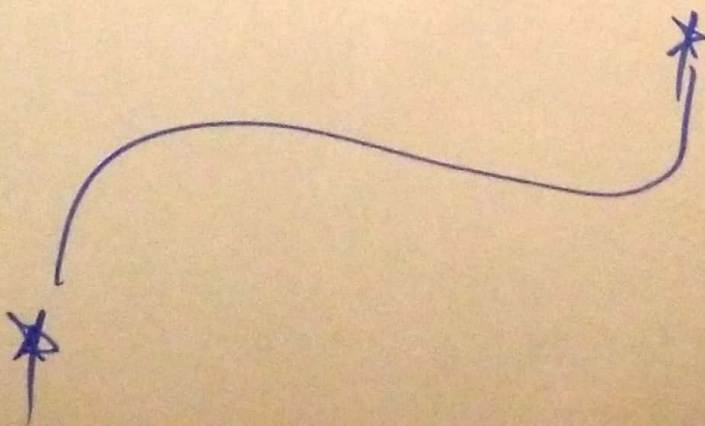
### HRT:-

By decoupling the SRT and HRT, the liquid waste can be processed faster.

HRT is the time water and retained within the digester and is equal to reactor volume divided by the average volumetric flowrate in many instance a short HRT will reduce Capital operation cost. There may have some advantages for a simple design generally reliable and easily managed. Through modern control permit it hands off management of more complex design that decouple HRT and SRT

Some of the most common digester types are given below

- 1) Continuous stirred tank reactor
- 2) HRT Contract reactor
- 3) HRT Sequencing batch reactor
- 4) Plug flow reactor
- 5) Induced load reactor.



Q#03:- Advantages of Decoupling SRT from HRT:-

- 1) HRT treatment technology has relatively low equipment cost
- 2) Available HRT treatment system can be applied at small as well as larger scale
- 3) HRT process stability can be easily achieved
- 4) Management requirement is low.
- 5) off gas air pollution can be eliminated.
- 6) Foaming of surfactant containing wastewater can be avoided
- 7) The HRT treatment technology does not require the import of expensive equipment
- 8) HRT microdegradable organic can be degraded.
- 9) Less space is required for an HRT treatment plant compared to an HRT treatment plant.

