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Section : A

Semester : (Batch-14)

Assignment: Waste water Engineering

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ns1 The Hydraulic retention time (HRT) or t (tau) is a measure of the average lenght of time that a saluable compound remain in a constructed bioreactor.

Hydraulic Retention time

HRT refined as the ration between the reactor volume and the feed flow rate, represents the average time the calls and substrates stay inside the reactor [3]. HRT is a very important paramnder for the hydrogen and methade production in continuous mode. very low HRT comparts the

washout of the reator. which mean all from the microorganisms escape out from the reactor. On the contrary an adequate HRT result in abundant hydrogen and methane yields. This parameter is linked to the specific guarantying the survival of hydrogen producers. Thus low HRT and slight acid pH (6.0-6.5) represent the best condition for hydrogen production, on the hydrogen fermentation pattern my shift to methanogenic one when HRT is increase-

This formula will establish the hydrolic Retention time of an municipal wastewater treatment plant:

$$\tau = (SRT/X_r) \cdot \left(\frac{Y(S_o - S) \cdot (1 \cdot f_d k_d (SRT) + X_{as})}{1 \cdot k_d (SRT)} \right)$$

Solids retention time

The Solids retention time or SRT controls the concentration of becteria throughout the treatment system. A higher SRT contributes to a higher bacterial concentration in the reactor which gives rise to. Smaller reactor size

Reduced sludge production

Higher aeration requirment due to the extra oxygen required for endogenous respiration.
Clearly an optimum SRT exists terms. For municipal sewage combined nitrification - denitrification typical wasting ratio generally fall in the range 0.025 - 0.10 for a hydraulic retention time of 12 - 24 hours.

SRT - Solids Retention time

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The solids Retention time (SRT) is the average time the activated sludge solids are the system - The SRT is an important design and operating parameter for the activated - sludge process and is usually expressed in days.

Ans 2:- There are four methods used for decoupling HRT and SRT which are explained below.

1 Biomass immobilization in attached growth system - anaerobes attached to support media (plastic, gravel, sand or activated carbon) to form biofilms. Examples - anearobic filter roating anearobic contactor;

2) Granulation and floc formation anaerobic microbes agglomerate to form granules and flocs that will settle well in the bioreactor. Example: upflow anaerobic sludge blanket reactor, static granular bed reactor.

Biomass recycling - Feed with high Suspended Solids (e.g wood fiber) enables microbes to attach to solids forming settable flocs which are then recycled back to the reactor.

Bio-mass retention - Membrane integration into reactor retains biomass. Example Anaerobic membrane biorector.