

CONTINUOUS CULTURE

In this type of culture substrate concentrations and other cultural condition are kept constant,

Cells grow at a constant exponential rate.

This can be achieved by frequent transferring of cell population to fresh nutrient medium.

The reverse is simple i.e.

Addition of new medium to a growing cell population and withdrawal of equal volumes of bacterial culture.

It may be carried out in chemostat or turbidostat.

Fig: Chemostat

⇒ There is exponential decrease in bacterial cell concentration

$$x = x_0 \cdot e^{-Dt}$$

⇒ There is also exponential increase in bacterial cell in culture vessel

Rate of increase = $\mu x = \frac{dx}{dt}$

$$\Rightarrow x = x_0 \cdot e^{\mu t}$$

⇒ Hence Inside the culture vessel the rate of change in bacterial cell concentration depends upon these two.

→ Removal & growth.

i.e. $\frac{dx}{dt} = \mu x - Dx$

If μ & D are equal

(μ = growth rate
 D = dilution rate),

Then bacterial gain and loss by wash out are in balance.
(by growth)

Hence change in bacterial mass is zero.

or There is constant bacterial concentration & the culture is in constant or steady state.