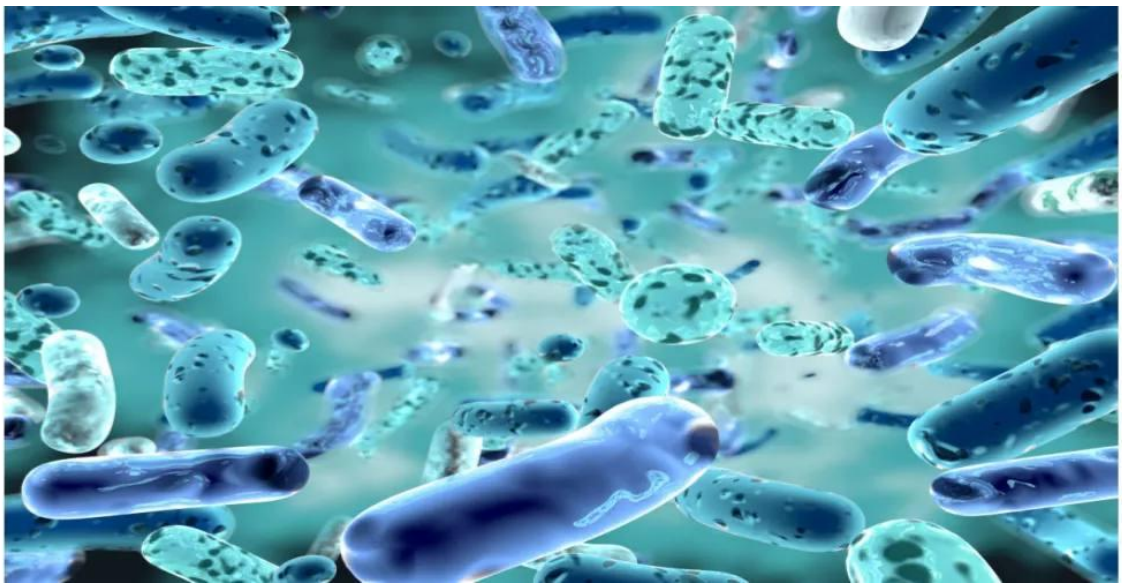
ADVANESD BACTERIA

D.FAWZIA ALBELADI



SHAHD AHMED ALZAHTANI

ID:447000196

4.11 What can happen to the growth curve when a culture medium contains two carbons.

sources, if one is a preferred carbon source of growth-limiting concentration and the

Second, is it a nonpreferred source?

When E. coli is cultivated in a medium that contains both lactose and glucose, a two-phase growth pattern known as "diauxic growth" is seen. This is how it goes: First Exponential Phase: E. coli grows at its fastest rate using glucose. Glucose Depletion: Cells temporarily cease growing when glucose is depleted. The term "lag phase" refers to this pause. Second Exponential Phase: E. coli grows again after the lag by breaking down lactose, but more slowly than it does glucose. The characteristics of the growth curve with lactose and glucose: A characteristic of diauxic growth is the growth curve's two discrete exponential phases, which are separated by a lag phase.

4.12How would you modify the equations describing microbial growth rate to describe the rate of death?

The correct equation for the microbial growth rate is:

$(dN)/(dt)= mu * N$

N: Number of cells

mu: Growth rate

When we want to calculate the death rate, we replace mu with the death rate and use a negative sign: -kd. This equation represents the exponential decrease in cell numbers.

$(dN)/(dt)=-kd * N$

kd: Death rate

If we calculate the simultaneous growth and cell death event, we use:

$(dN)/(dt)=mu * N * -kd * N = (mu - kd) * N$

4.13 Why are cells in log phase larger than cells in stationary phase?

The Log Phase

Binary fission causes cells to divide continuously, increasing their numbers significantly. Cells exhibit steady metabolic activity and a steady growth rate during the logarithmic period. They are hence bigger and stay the same size.

Stationary Phase

During the logarithmic phase, a number of variables cause the growth rate of the cell population to decrease. Nutrients are gradually depleted, and waste products accumulate. Furthermore, the slow decrease in oxygen begins to limit the proliferation of aerobic cells. Cell growth is slowed and eventually stopped by this combination of unfavorable circumstances, resulting in a reduction in size relative to the Log Phase.