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TYPES OF MICROBIAL CULTURE AND ITS GROWTH KINETICS

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B.Sc. 5th Semester

CONTENTS

1. Definition
2. Phases of growth culture and curve
3. Advantages and disadvantages

Definition

A microbial culture is a method of multiplying microbial organisms by letting them produce in predetermined culture medium under controlled laboratory conditions.

Phases Of Culture

1. Batch Culture
2. Fed-batch Culture
3. Continuous Culture

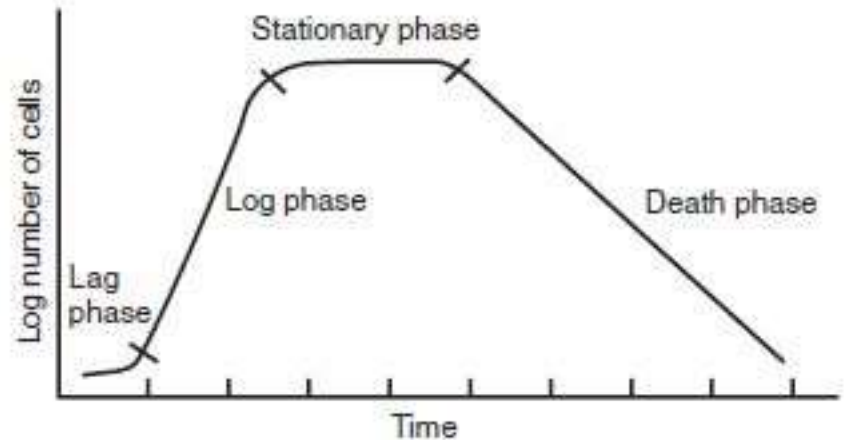
1. Batch Culture

In Batch Fermentation the sterile growth Medium is inoculated with appropriate microorganisms and fermentation proceeds without addition of any fresh growth medium.

After inoculating the medium and start measuring the biomass at different time intervals, you may find six different phases.

Under this conditions usually six phases are observed.

- I . Lag Phase
- II . Accelerated Phase
- III . Exponential Growth Phase
- IV . Decelerated Growth Phase
- V . Stationary Phase
- VI . Death Phase



I . Lag Phase

Lag phase is an initial phase period of cultivation During which the change of cell number is zero or negligible.

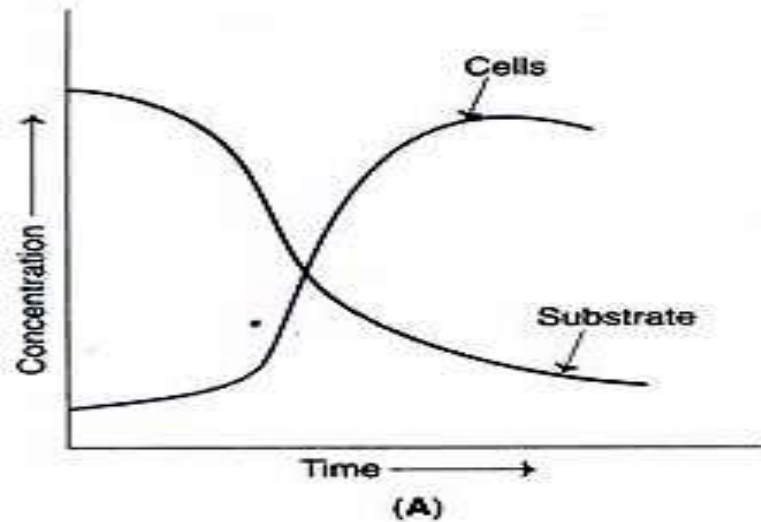
Even though the cell number doesn't increases, the Cells may grow in size during this period.

II . Acceleration Phase

At the end of lag phase, when growth begins the division rate increases gradually and reaches a maximum value, and it is called acceleration phase.

III . Log Or Exponential Phase

Under the log phase the cell mass undergoes several doublings and specific growth rate remains constant due to enough nutrients.



IV. Decelerated Phase

The end exponential phase occurs when any of the essential nutrients is depleted or toxic metabolite accumulated in the system during this phase the growth rate decline this phase is called decelerated phase.

V. Stationary Phase

As the media start depleting the concentration of metabolites increases the growth is inhibited. The increase in cell mass ceases the cell enters stationary phase.

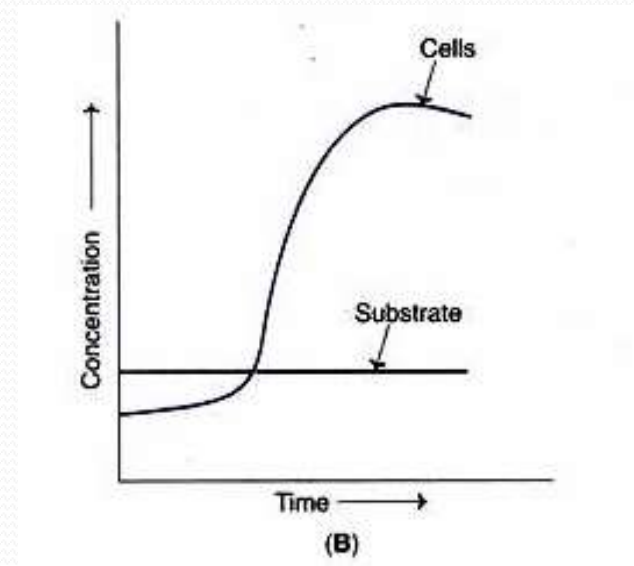
VI. Death phase

This is the death phase where the cells will start to lyse and the cell density decreases.

Decline in the number of viable cells.

2. Fed-batch Fermentation

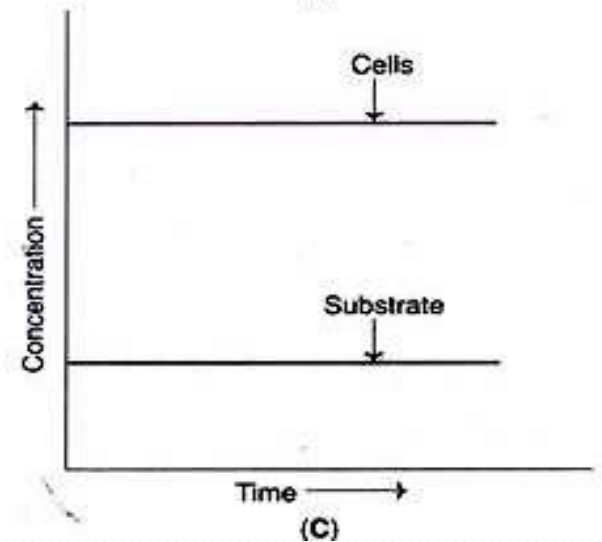
In fed-batch fermentation nutrients are added incrementally at various time, regular interval of time no growth media and micro-organisms are removed until the end of process, this addition is prolonged to log phase and stationary phase, thereby increasing the biomass and the amount of metabolites.



3. Continuous fermentation

In continuous fermentation fresh growth medium is added continuously during fermentation but there is also continuous removal of an equal volume of medium containing suspended microorganism.

In this type - a steady-state conditions of the total number of cells and the volume in the bioreactor is maintained.



Advantage

1. Continuously is not used in small fermentation.
2. Continuously fermentation can be easily centrifuge.
3. Avoids down time to batch time.
4. Physiological state of cell during continuous fermentation is more uniform thus production yield much consistence.

Disadvantage

1. Due to larger during fermentation 500-600 Hrs, some cells may be lose.
2. Sterility maintain is very tough.



THANK YOU