**Kinetic Data for Bioflocculant Synthesis from fermentation Studies**

Obtaining kinetic data for bioflocculant synthesis from fermentation studies. It involves measuring various parameters during the fermentation process.

**Parameters to Measure**

1. Bioflocculant concentration (g/L)
2. Cell growth (OD 600 or cell dry weight)
3. Substrate consumption (g/L)
4. pH
5. Temperature ()
6. Dissolved Oxygen (DO)

**Sampling and Analysis**

1. Collect fermentation broth samples at regular intervals (24hrs,48hrs,72hrs,96hrs,120hrs,144hrs)
2. Measure bioflocculant concentration: Using methods like

* Gravimetric Analysis (Precipitation and drying)
* Spectrophotometry (e,g absorbance at 600nm)
* High performance liquid chromatography (HPLC)

1. Determine cell growth using:

* Optical density (OD 600)
* Cell dry weight measurement

1. Analyze substrate consumption using:
2. Titration methods

* Acid – Base Titration
* Glucose Analyzer

1. Monitor pH and temperature using

* pH meter
* Thermometer

1. Monitor Dissolved oxygen using

Dissolved oxygen Aanalyzer

**Kinetic Data Calculation**

1. Specific growth rate ( ): Calculate using the equation

Where is the cell concentration at time t, is the initial cell concentration, and t is the time

1. Bioflocculant production rate (rp): Calculate using the equation

rp = r

where p is the bioflocculant concentration and t is the time.

1. Substrate consumption rate (rS) : Calculate using the equation:

rS =

Where S is the substrate concentration and t is the time.

**Kinetic Models**

1. Monod model
2. Logistic model
3. Luedeking – Piret model
4. Modified luedeking – Piret model

These models describe the relationship between cell growth, substrate consumption, and bioflocculant production

**Software Tools**

1. MATLAB
2. Python ( e.g Scipa, Numpy)
3. Excel
4. Origin Pro

Use these tools to analyze and visualize your data, fit kinetic models and estimate parameters

**Data Analysis**

1. Plot bioflocculant concentratration against time
2. Plot the cell biomass concentration against time
3. Plot the substrate concentration against time

Determining stationary phase, lag phase e,g for the second graph.