



BATCH FERMENTATION VS CONTINUOUS FERMENTATION PROCESS

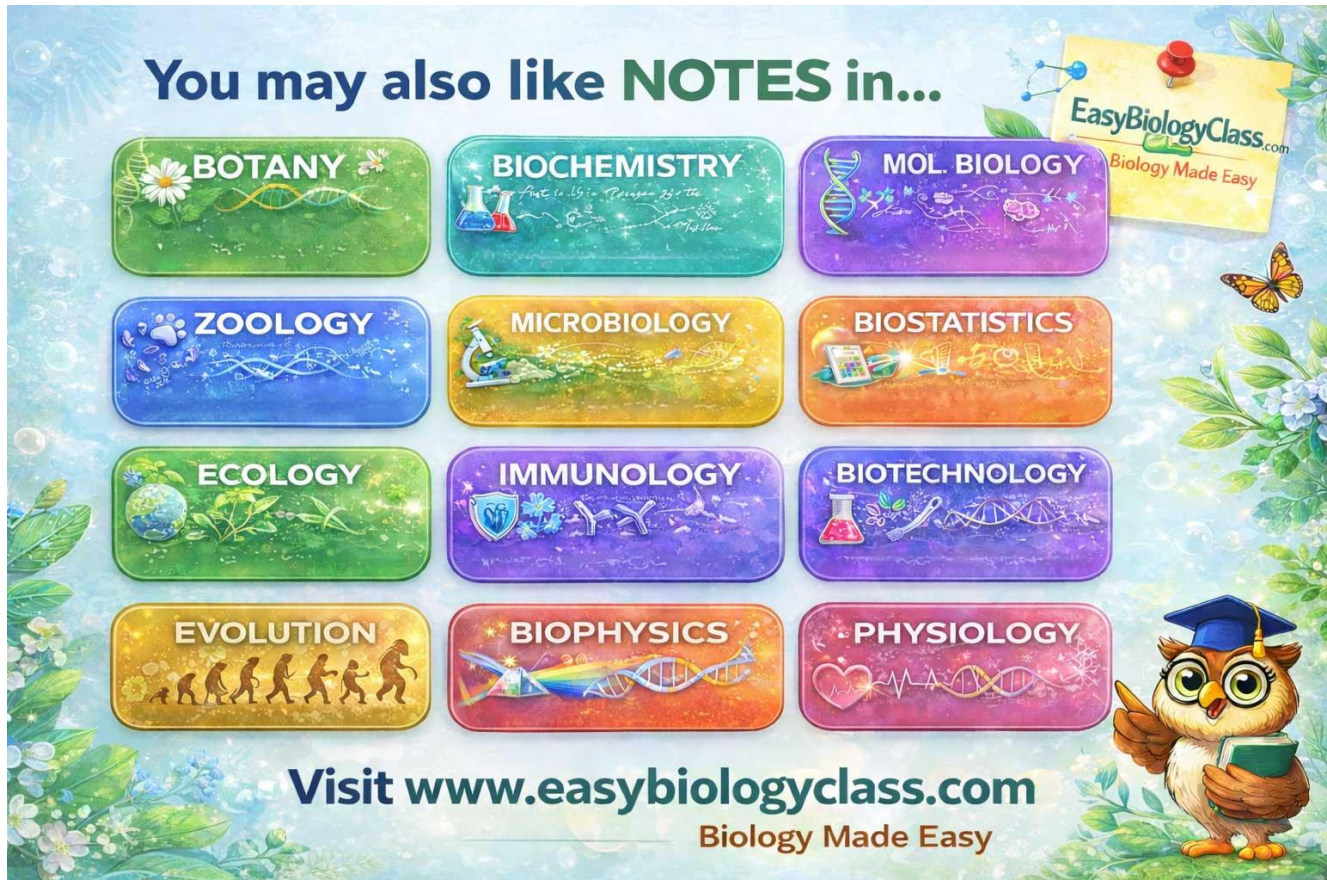
Similarities and Difference between Batch Fermentation and Continuous

Industrial fermentation processes usually adopt two types of Fermentation process for the large-scale production of microbial biomass or metabolites. They are Batch Fermentation and Continuous Fermentation.

Batch Fermentation: Here the fermenter is first filled with the raw material (carbon source). Then the microbes are added and allowed to ferment the raw material under optimum pH and aeration. The products remain in the fermenter until the completion of fermentation. After fermentation, the products are extracted and the fermenter is cleaned and sterilized before next round. Thus here the fermentation is done as separate batches.

Continuous Fermentation: Here the exponential growth rate of the microbes is maintained in the fermenter for prolonged periods of time in by the addition of fresh media are regular intervals. The metabolite or the product of fermentation is extracted for the overflow from the fermenter. Thus unlike batch fermentation, in continuous fermentation, the fermentation process never stops in between and it continues to run for a long period of time with the addition of nutrients and harvesting the metabolites at regular intervals.

The present post describes the Similarities and Differences between Batch Fermentation and Continuous Fermentation Process as a Comparison Table.



Similarities between Batch Culture and Continuous Culture Fermentation Methods

- Both are industrial fermentation methods for the large scale production.
- Both methods can be used for the production of microbial biomass or products.
- Both run under controlled environmental conditions
- The mechanical components of fermenter is almost similar in both types

Difference between Batch Fermentation and Continuous Fermentation Process

Sl. No.	Batch Fermentation	Continuous Fermentation
1	It is a closed system.	It is an open system.













2	Setup is not changed from outside once the fermentation is started.	Setup is changed from outside during the fermentation process.
3	The process is stopped once the product is formed.	The process is not stopped for the collection of the products, but it is continuously taken out from the fermenter.
4	Nutrients are added only once (in the beginning) and not added in between the fermentation process.	Nutrients are added many times (in the beginning and in between the fermentation process).
5	Less control over the growth of the microbes and the production of desired products.	More control on the growth and production.
6	Environmental conditions in the fermenter will not be constant.	Environmental condition in the fermenter will be kept constant.
7	Turnover rate (conversion of the substance to desired product) is less.	Turnover rate will be high.
8	Nutrients in the fermenter are utilized in relatively slow rate.	Nutrients in the fermenter are utilized in relatively fast rate.
9	Microbes in the fermenter show lag, log and stationary phases.	Optimum or exponential growth rate of microbes is maintained in the fermenter.
10	Contents of the fermenter are removed after the fermentation process for the isolation of products.	Contents of the fermenter are NOT removed for the isolation of products. Products are extracted from the overflow from the fermenter.
11	The fermenter is washed and cleaned before the next step of fermentation.	No such washing step required since continuous addition of nutrients and microbes are performed.
12	Relatively larger size fermenters are used.	Smaller size fermenter is required, since the yield is very high.
13	Less close to the natural environment.	More closer to the natural environment.

14	Huge application in the industrial production.	Limited application in the industrial production.
15	Suitable for the production of secondary metabolites whose production is not associated with the growth of the microbes. Example: antibiotics.	Suitable for the primary metabolites whose production is associated with the growth of the organism. Example: organic acids, amino acids.
16	More common method for the large scale production of cell biomass and products.	Less commonly used for large scale production.
17	Easy to set-up and run than continuous culture.	Not easy to setup. Require sophisticated instrumentation.
18	Less initial investment required.	Initial investment will be more.
19	Less suitable for the production of biomass such as Single Cell Proteins (SCP).	More suitable for the production of biomass (SCP).
20	Labour demand is less.	Labour demand is more.
21	Chance of contamination is less.	Chance of contamination is more
22	Easy and Quick control methods.	Control methods are more complicated.

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