

## Machine Learning in Microbiology

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Microbiology is defined as a scientific major focusing on small living creatures like bacteria, viruses, and fungi. Considering the fact that industrial manufacturing of essential products like enzymes, hormones, and medicines has attracted enormous attention, scientists are seeking the solution to develop sustainable approaches. Among all proposed green synthesis methods, microbial production seems to be the best option due to its fast, simple, and environmentally friendly production mechanisms.

In line with industrial-scale production by microbes, it is essential to optimize crucial factors like temperature and pH. Applying computational modeling before conducting an experimental trial will provide a clear vision of how manipulating cellular and environmental factors would affect the process.

Machine learning is a type of artificial intelligence in which computers will train rather than programmed to conduct specific tasks. Different algorithms counting Artificial neural network, Clustering, Decision tree, Gaussian process, K-nearest neighbors, Linear regression, Regularization, and Support vector machine/regression have been widely used in different fields of microbiology: Analyzing Genomics, proteomics, and microarray data, evolution, and system biology. More specifically, machine learning has proved to be valuable in industrial strain development. Host strain selection, Metabolic pathway reconstruction, Tolerance enhancement, Metabolic flux optimization, Fermentation, and Downstream process are the well-studied subject in this area [1-9].

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