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Microbial fermentation: Enzymes, metabolic pathways and fermentation aspects

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The original definition of fermentation is the anaerobic conversion of sugars to ethanol and carbon dioxide by yeast. This original definition has been expanded over time to the conversion of organic materials by multiple diversities of organisms (bacteria, yeasts, molds, animal cells, or plant cells) under anaerobic or aerobic conditions into wide ranges of molecules types different In general, fermentation can be divided into four types that are not necessary disjoint from each other:

- Production of biomass (viable cellular materials),
- Production of extracellular metabolites (chemical compounds),
- Production of intracellular components (proteins), and
- Transformation of substrates into bio products.

The key elements of fermentation industry are strain microbial/cells selection, media composition, and conditions optimization. Microbial fermentation will be highlighted in this presentation that includes microbial enzymes, metabolic pathways and fermentation process.

Biography

Osama O Ibrahim is a highly-experienced Principal Research Scientist with particular expertise in the field of microbiology, molecular biology, food safety, and bioprocessing for both pharmaceutical and food ingredients. He has knowledge in microbial screening /culture improvement; molecular biology and fermentation research for antibiotics, enzymes, therapeutic proteins, organic acids and food flavors; biochemistry for metabolic pathways and enzymes kinetics, enzymes immobilization, bioconversion, and analytical biochemistry. He was external research liaison for Kraft Foods with Universities for research projects related to molecular biology and microbial screening and holds three bioprocessing patents. In January 2005, he accepted an early retirement offer from Kraft Foods and in the same year he formed his own biotechnology company providing technical and marketing consultation for new startup biotechnology and food companies. He received his BS in Biochemistry with honor and two MS degrees in Microbial physiology/ Fermentation and in Applied Microbiology. He received his PhD in Basic Medical Science (Microbiology, Immunology and Molecular biology) from New York Medical College. His research dissertation was on the construction of plasmid for the expression of a fusion protein of VEGF121/ Shiga-like toxin as a therapeutic protein for targeting angiogenesis (cancer treatment). Since 1979 he is a member of American Chemical Society, American Society of Microbiology, and Society of Industrial Microbiology.

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