Dept: Department of Physical Sciences
Year: Year 2 Semester 2
Course Code: ICH 2222
Course Title: Industrial Microbiology
Program: Bachelor of Science in Industrial Chemistry

ICH 2222: Industrial Microbiology

Introduction

This course unit introduces the industrial application of microbiology. Microbiology deals with the study of microscopic organisms, those being unicellular (single cell), multicellular (cell colony), or acellular (lacking cells). Microbiology encompasses numerous sub-disciplines including virology, mycology, parasitology, and bacteriology. Eukaryotic micro-organisms possess membrane-bound cell organelles and include fungi and protists, whereas prokaryotic organisms—all of which are microorganisms—are conventionally classified as lacking membrane-bound organelles and include eubacteria and archaebacteria. Microbiologists traditionally relied on culture, staining, and microscopy. However, less than 1% of the microorganisms present in common environments can be cultured in isolation using current means. Microbiologists often rely on extraction or detection of nucleic acid, either DNA or RNA sequences.

Learning Outcomes of This Study

Upon completion of this study unit, you should be able to

1. Define microbiology and differentiate between pure and applied microbiology

2. Define industrial microbiology and explain the importance and benefits of microorganisms

3. Enumerate and explain different types of microorganisms used for industrial purposes

4. Enumerate and explain different types of products made using microorganisms and the processes involved

5. Explain different requirements for microbial applications in industries

6. Explain Fermentation and the processes involved.

Definition: Microbiology is the study of microscopic organisms, such as bacteria, viruses, archaea, fungi and protozoa. This discipline includes fundamental research on the biochemistry, physiology, cell biology, ecology, evolution and clinical aspects of microorganisms, including the host response to these agents. Viruses have been variably classified as organisms, as they have been considered either as very simple microorganisms or very complex molecules. Prions, never considered microorganisms, have been investigated by virologists, however, as the clinical effects traced to them were originally presumed due to chronic viral infections, and virologists took

Box 1

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search—discovering "infectious proteins". As an application of microbiology, medical microbiology is often introduced with medical principles of immunology as *microbiology and immunology*. Otherwise, microbiology, virology, and immunology as basic sciences have greatly exceeded the medical variants, applied sciences.