

**Department of Basic Sciences (Microbiology option)
Faculty of Basic and Applied Sciences
Benson Idahosa University
Benin City, Edo State,
Nigeria**

MCB 415 (ENVIRONMENTAL MICROBIOLOGY)

Part 1 (Outline)

1. Principles of biodeterioration and bioremediation
2. Microbes as clean-up agents in solid waste management
3. Waste disposal and management systems
4. Methods of sewage treatment
5. Activities of specific microorganisms involved in sewage treatment
6. Biodegradation of recalcitrants

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Week 1: Principles of biodeterioration and bioremediation

Introduction to biodeterioration (Student's opinion)

Biodeterioration is defined as any undesirable change in the properties of a material caused by the vital activities of living organisms (Hueck, 1965, 1968)

Classes of biodeterioration:

1. Physical or mechanical biodeterioration
2. Fouling or soiling biodeterioration (aesthetic biodeterioration)
3. (Bio)chemical assimilatory biodeterioration
4. (Bio)chemical dissimilatory biodeterioration

Class work: Share students into group(s) and task them on the following

Group 1: Come up with 2 examples of biodeterioration

Group 2: Estimate possible income lost to biodeterioration annually

Group 3: Suggest possible ways of avoiding biodeterioration of materials

Bioremediation

Bioremediation is the use of living organisms, primarily microorganisms, to degrade the environmental contaminants into less toxic forms.

Class work 1: Discuss some advantages of bioremediation over conventional remediation

Class work 2: Discuss some differences between biodeterioration and bioremediation

Critical factors to consider when evaluating the use of bioremediation for site clean up

1. Magnitude, toxicity and mobility of contaminants
2. Proximity of human and environmental receptors
3. Degradability of contaminants
4. Planned site use
5. Ability to monitor properly

Factors that influences the rate and extent of biodegradation

A. Biological factors

B. Environmental factors (e.g. pH, temperature, type of soil, nutrient etc.)