

COURSE CODE: BIO 404
COURSE TITLE: Biotechnology
NUMBER OF UNITS: 3 Units
COURSE DURATION: Three hours per week

COURSE DETAILS:

Course Coordinator: Dr. Akintokun, A.K. Bsc., Msc., PhD
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Office Location: Room A212, COLNAS
Other Lecturers: Dr.Oluwafemi, Flora, Dr. Balogun, S.A

COURSE CONTENT:

- History and evolution of the new technology
- Different areas of biotechnology including genetic engineering, cell culture, biomass production
- Technology of enzymes
- Immobilized cell and enzymes
- Biofuels
- Microbial insecticides
- Nitrogen fixation
- Potential application of biotechnology in agriculture, health and energy
- Social and economic implication of biotechnology

COURSE REQUIREMENTS:

This is a compulsory course for all microbiology students . The students are expected to attend classes and practical sessions.

READING LIST:

1. Gillings, M. And Holmes, A. Plant Microbiology.
2. Simon Baker, Jane Nicklin, Naveed Khan and Richard Killington. Instant Notes microbiology
3. Agrawal/ Parihar. Industrial Microbiology Fundamental and Application.

LECTURE NOTES

- Definition of microbial insecticides
- This is the use of microorganisms to prevent insect infestation that damages crops
An example of microbial insecticide is *Bacillus thuringensis* (BT). BT can kill moths, beetles, aphids, butterflies, flies, termites and ants.
- **Definition of nitrogen fixation**

Nitrogen fixation is of two types symbiotic and asymbiotic nitrogen fixation.

The difference between symbiotic and asymbiotic nitrogen fixation is that microorganisms form symbiotic association with leguminous plants to fix atmospheric nitrogen. The asymbiotic nitrogen fixation microorganisms does not formed symbiotic association with plants

DEFINITION OF BIOFUEL

- Biofuel is the production of gaseous and liquid fuels by microorganisms that is the production of renewable and sustainable fuel resources
- Biofuel can replace oetroleum and natural gas as energy sources.
- Examples of gases produced from biofuel are methane, hydrogen and ethanol

BENEFIT OF BIOFUEL

- Can be used for cooking
- Can be used in internal combustion engines to power pumps and electric generators
- The sludge can be used as fertilizer
- It helps in minimising environmentally pollution and meeting the demand of energy for various processes

APPLICATION OF BIOTECHNOLOGY IN THE AREA OF AGRICULTURE

- Genetic engineering of individual species to introduce novel traits
- New genetic mapping as an aid to conventional plant breeding programmes
- New diagnostic based on the use of monoclonal antibodies and nucleic acid probes for the identification of plant diseases
- Clonal propagation of plants to produce large amounts of clean planting materials
- Better nutritional quality
- Use of microorgaisms as biocontrol and biofertilizer

ADVANTAGES OF MICROBIAL INSECTICIDES

- Environmentally safe
- Biodegradable
- Economic feasible due to low cost
- Absence of development of resistance
- Does not have adverse effect on human and animals
- Permanency