

4. Principles and Processes of Biotechnology

Learning Objectives

The learner will be able to

- ❖ Apply the knowledge of traditional and modern biotechnology in day to day life.
- ❖ Appreciate the uses of fermentation process.
- ❖ Acquire the knowledge on the process of genetic engineering
- ❖ Analyse the uses and limitations of genetically modified plants
- ❖ Cognize the terms of bio prospecting and bio piracy.

Important Notes and Points

- ❖ **PCR:** Polymerase Chain Reaction is a common laboratory technique used to make copies (millions) of a particular region of DNA.
- ❖ **Walking Genes** - Gene walking involves the complete sequencing of large more than 1 kb stretches of DNA.
- ❖ Transposons (Transposable elements or mobile elements) are DNA sequence able to insert itself at a new location in the genome without having any sequence relationship with the target locus and hence transposons are called **walking genes** or **jumping genes**.

- ❖ **ELISA (Enzyme Linked Immuno Sorbent Assay)** Elisa is a diagnostic tool for identification of pathogen species by using antibodies and diagnostic agents. Use of ELISA in plant pathology especially for weeding out virus infected plants from large scale planting is well known.
- ❖ **DNA Probes**, isotopic and non-isotopic (Northern and Southern blotting) are popular tools for identification of viruses and other pathogens.
- ❖ **Transfection:** Introduction of foreign nucleic acids into cells by non-viral methods.
- ❖ **Genome sequencing:** The location of genes on the entire diploid chromosome of an organism.
- ❖ **Barcode:** You might have seen in all books barcoding and also in items you buy in supermarket. This will reveal the identity of the book or item as well the details like prize. Similarly, Barcode in genetic term refer to the identify of the taxon based on its genetic makeup. In practice, it is an optical, machine-readable representation of data which describes about the characters of any plants or any objects.
- ❖ **Transgenic plants** contain a novel DNA introduced into its genome.
- ❖ **Biopharming** also known as molecular pharming is the production and use of transgenic plants genetically engineered to produce pharmaceutical substances for use of human beings. This is also called “**molecular farming or pharming**”.