

Lecture No. 1

Topic: Introduction to Microbial Biotechnology

Keywords: Interferons, Bio-fertilizers, Bio-pesticides, Single cell proteins, Fodder problems, Frost Damage

Microorganisms are used extensively to provide a vast range of products and services. They have proved to be particularly useful because of

- the ease of their mass cultivation,
- speed of growth,
- use of cheap substrates (which in many cases are wastes) and
- the diversity of potential products
- their ability to readily undergo genetic manipulation

The genetically engineered microbes are being used for the commercial production of some microbial and non microbial products e.g. interferon, human growth hormones, viral vaccines, insulin etc. These genetically engineered microbes help in reducing the environmental pollution through various processes such as recovery of metals from polluted waterways; elimination of sulphur from metal ores and coal-fired power, use of bio-fertilizers and bio-pesticides etc. Microbes are being also used to produce the single cell proteins (SCP) to solve the food and fodder problems and for biogas production.

The genetically engineered bacteria have found applications in various areas:

A) Crop Production and Protection through Biological Control of Insects and Fungal Diseases, Frost Damage.

Genetically engineered bacterial strains have been developed to control insects, fungal diseases or frost damage etc.

Table-1: Genetically Engineered Bacteria in Crop Production and Protection

Bacterium	Altered trait	Possible use
<i>Rhizobium meliloti</i>	Additional copies of 'nif' genes	Increased efficiency of N ₂ fixation
<i>A. radiobacter</i>	Deletion of 'tra' gene of Agrocin 84 plasmid	Biological control of crown gall
<i>P. fluorescens</i>	Addition of lac ZY	Assessment of movement of bacteria for biological control
<i>Clavibacter xyli</i>	Transfer of B.thuringiensis delta endotoxin gene	Control of corn ear worm
<i>Pseudomonas fluorescens</i>	Transfer of Serratia marcescens chitinase gene	Control of fungal disease
<i>P. syringae</i>	Deletion of 'ice' gene	Control of frost damage

Microbial Biotechnology Lecture Notes

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