

# SRI KRISHNADEVARAYA UNIVERSITY :: ANANTAPUR

## DEPARTMENT OF MICROBIOLOGY

### M.Phil/Ph.D. Written Examination

#### Broad Area of Research: **AGRICULTURAL MICROBIOLOGY**

#### Syllabus for Paper II : Special Paper

Soil - Physical and chemical properties, soil formation, classification.

Organic matter - Sources, nature and formation of humus.

Decomposition of organic carbon constituents - Cellulose, hemicellulose, starch, pectin, lignin and chitin.

Rhizosphere - Nature, extent, influence of root exudates on microflora, rhizosphere effect and its alterations, spermosphere.

Plant growth promoting rhizobacteria, their importance, siderophore production.

Microbiological and ecological significance of ammonification, nitrification and denitrification

Nitrogen fixation - Ecology and biology of non-symbiotic (including associative symbiotic), symbiotic (including stem-nodulating) and phyllosphere diazotrophs, mechanism of dinitrogen fixation, genetics of nitrogen fixation in *Klebsiella pneumoniae*, methods for evaluation of nitrogen fixation.

Microbial transformations of phosphorus, sulphur and iron and their ecological significance.

Biofertilizers - Cultivation and mass production of *Rhizobium*, *Azotobacter*, *Azospirillum*, *Azolla*, *Frankia*, cyanobacteria, phosphate-solubilizing bacteria and ecto and endomycorrhizae, carrier-based inoculants, methods of application, quality control, agronomic importance.

Biopesticides - *Bacillus thuringiensis*, *B. sphaericus*, *B. popilliae*. Microbial control of plant pathogens by means of fungi and baculoviruses.

Recycling of agricultural wastes - Microbiology and biochemistry of biogas production.

Pesticide - Microflora interactions - Recalcitrance of pesticides in soils, their effect on soil microflora, microbial degradation of pesticides with special reference to 2,4-D. Plasmid-mediated biodegradation of pesticides.

Plant diseases - Principles, symptoms and control of diseases, Major plant diseases caused by bacteria, fungi and viruses.

Bacterial- Leaf blight of rice, citrus canker.

Fungal - Fusarial wilts (red gram, cotton, flax), tikka, red rot of sugarcane.

Viral and mycoplasma - Bud necrosis of peanut, citrus mosaic, tungro of rice, little leaf of brinjal, tomato leaf curl.

Survival of soil borne pathogens.