

**MICROBIOLOGY**

**AGRICULTURAL AND  
ENVIROMENTAL MICROBIOLOGY**

T.Y.B.Sc. (Sem.-IV) (MB - 346) (Paper- VI)

Prof. Dr. Sangeeta S. Ahiwale  
Prof. Vaishali E. Sonawane (Ahire)  
Prof. Laxmi S. Singh

As Per  
New Syllabus  
& with solved  
Question  
Paper



**SUCCESS PUBLICATIONS**

ATTESTED  
*Madhu*  
PROFESSOR  
Dr. Vimalaben Khatke, Jyotikanya Arts  
Sciences & Commerce College  
Deccan-Camp Nashik.

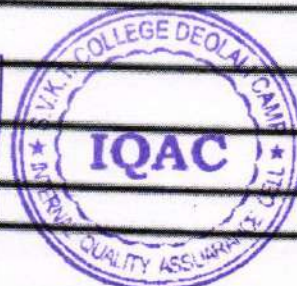




# Index

Unit No.	Contents	Page No.
1	<b>Agriculture Technology</b>	1.1 to 1.36
	1.1. Agricultural Technology 1.2. Plant Growth Improvement 1.3. Methods of Plant Disease Control	
2	<b>Biochemistry and Production of Bio-fertilisers</b>	2.1 to 2.34
	2.1. Bio-fertilisers 2.2. Nitrogen Fixation 2.3. Phosphate Solubilisation 2.4. Potassium Mobilisation 2.5. Iron Chelation	
3	<b>Bioremediation and Waste Water Treatment</b>	3.1 to 3.33
	3.1. Bioremediation 3.2. Bioaugmentation 3.3. Genetically Modified Micro-organisms in Bioremediation 3.4. Biosorption	
4	<b>Bioleaching</b>	4.1 to 4.19
	4.1. Bioleaching 4.2. Micro-organisms used for Bioleaching 4.3. Process of Bioleaching 4.4. Bioleaching of Copper, Iron, Manganese, Gold and Silver 4.5. Advantages of Bioleaching	
5	<b>Introduction to Nanobiotechnology</b>	5.1 to 5.13
	5.1. Nanobiotechnology 5.2. Synthesis of Nanoparticles using Micro-organisms 5.3. Applications of Nanoparticles	
6	<b>Microbial Biosensors and Biochips in Environmental Monitoring</b>	6.1 to 13
	6.1. Microbial Biosensors 6.2. Microbial Biochips 6.3. Applications of Biosensors and Biochips	
7	<b>Biofuel Cells and Biodegradable Plastic</b>	7.1 to 8.17
	7.1. Biofuel Cells 7.2. Biodegradable Plastic	
8	<b>Bioterrorism</b>	8.1 to 8.10
	8.1. Bioterrorism	
-	<b>Bibliography</b>	8.11
-	<b>University Question Paper</b>	8. to 8.12

**ATTESTED**  
  
**PRINCIPAL**  
 Smt. Vimlaben Khimji Tejookaya, Arts,  
 Science & Commerce College  
 Deolali-Camp **viii** shik





## Unit

# 1

# Agriculture Technology

- 1.1 Agricultural Technology
- 1.2 Plant Growth Improvement
- 1.3 Methods of Plant Disease Control

### Introduction :

Agriculture is the art and science of cultivating the soil, growing crops and raising livestock. It includes the preparation of plant and animal products for people to use and their distribution to markets.

Modern farms and agricultural operations work far differently than those a few decades ago, primarily because of advancements in technology, including sensors, devices, machines and information technology. Today's agriculture routinely uses sophisticated technologies such as robots, temperature and moisture sensors, aerial images and GPS technology. These advanced devices and precision agriculture and robotic systems allow businesses to be more profitable, efficient, safer and more environmentally friendly. Agriculture provides most of the World's food and fabrics. Cotton, wool and leather are all agricultural products. Agriculture also provides wood for construction and paper products. These products, as well as the agricultural methods used, may vary from one part of the world to another.

### 1.1 Agricultural Technology :

Over Centuries, the growth of agriculture contributed to the rise of civilisations. Before agriculture became widespread, people spent most of their lives searching for food hunting wild animals and gathering wild plants. About 11,500 years ago, people gradually learned how to grow cereal and root crops and settled down to a life based on farming. By 2,000 years ago, much of the Earth's population had become dependent on agriculture. Scholars are not sure why this shift to farming took place, but it may have occurred because of climate change.

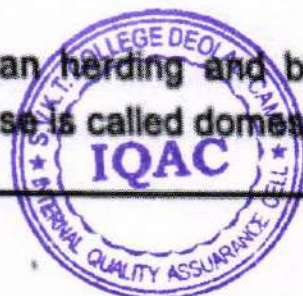
When people began growing crops, they also began herding and breeding wild animals. Adapting wild plants and animals for people to use is called domestication.

ATTESTED

PRINCIPAL

Mt. Vimlaben Khimji Tejookaya, Arts,  
Science & Commerce College  
Deotoli-Camp (Nashik)

1.1







**Prof. Dr. Sangeeta S. Ahiwale**

M.Sc., Ph.D., SET.

Mahatma Phule Mahavidyalaya, Pimpri, Pune.

Prof. Dr. Sangeeta S. Ahiwale is currently working as Assistant Professor in Department of Microbiology at Mahatma Phule Mahavidyalaya, Pimpri, Pune. She has almost 16 years of teaching experience. She has published several Research Papers in reputed National and International Journals. She has attended various State, National and International level Workshops, Seminars and Conferences.



**Prof. Vaishali E. Sonawane (Ahire)**

MSc., SET.

MVP Samaj's S.V.K.T. College Deolali Camp, Nashik.

Prof. Vaishali E. Sonawane (Ahire) is currently working as Assistant Professor in Department of Microbiology at MVP Samaj's S.V.K.T. College Deolali Camp, Nashik. She has 11 years of teaching experience. She has Internal Exam Co-ordinator as well as Co-ordinator of Microbiological contest conducted by Shirur College, Pune. She worked as paper setter for Diploma in 'Fruit Processing' under MSBTE.



**Prof. Laxmi S. Singh**

M.Sc.

Padmashree Dr. D. Y. Patil ACS College Pimpri, Pune.

Prof. Laxmi S. Singh is currently working as Assistant Professor at Department of Microbiology at Pad. Dr. D. Y. Patil ACS College Pimpri, Pune. She has almost 5 years of teaching experience. She has published several Research Papers in reputed National and International Journals. She has attended various State, National and International level Workshops, Seminars and

ISBN : 978-93-5158-512-1



**SUCCESS PUBLICATIONS**

Address : Radha Krishna Apartment, 535, Shaniwar Peth,  
Appa Balwant Chowk, Opp. Prabhat Theatre, Pune - 30.  
Ph. No. 24433374, 24434662, 64011289, Mobile : 9325315464  
E-mail : sharpgroup31@rediffmail.com  
Website : www.sharpmultinational.com

PT-  
1255

APPROVED  
Principal  
Smt. Vidhantika Ramteerodkar, Apts.  
Science & Commerce College  
Deolali Camp, Nashik

