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Estd.- 1971



Ref. No.....

Date.....

This is to certify that the following ICT enabled tools for effective teaching-learning process was used by the various Departments in the session 2021-2022 at Rabindra Mahavidyalaya, Champadanga, Hooghly, West Bengal


Principal
Rabindra Mahavidyalaya
Champadanga • Hooghly

Dr. Prasanta Bhattacharyya
Principal

Session 2021-22

Teachers use ICT enabled tools for effective teaching-learning process.

Due to Covid-19 entire teaching learning was switched to online mode. Google Meet, Zoom, etc were used for teaching through. desktop, Laptop. Smart Phone etc. Video, PPT, PDF, excel, etc files were shared for study material. E-Journals and e-books were used for effective teaching and learning.

Some screenshots of the same are attached here.

Department of Botany (2021-2022)

Snapshots/ screenshots of E-resources and techniques used

Screenshot (sample) of E- Journal Resource

The screenshot shows a web browser displaying a journal article from Taylor & Francis. The browser address bar shows the URL: [tandfonline.com/doi/epdf/10.1080/15592324.2019.1596719?needAccess=true&role=button](https://doi.org/10.1080/15592324.2019.1596719?needAccess=true&role=button). The page layout includes a left sidebar with the journal cover 'PLANT signaling & behavior' and the article title 'Plant defense against virus diseases; growth hormones in highlights'. The main content area features the article title, authors (Waqar Islam, Hassan Naveed, Madiha Zaynab, Zhiqun Huang, and Han Y. H. Chen), an abstract, and the beginning of the introduction. The abstract discusses the role of phytohormones in plant defense against pathogens and the impact of virus-mediated disruptions. The introduction starts by discussing the strategies of plant viruses and the role of phytohormones in plant growth and defense.

Details

Plant Signaling & Behavior
Volume 14, Issue 6
2019

Review
Plant defense against virus diseases; growth hormones in highlights
[View Review page](#)

Waqar Islam, Hassan Naveed, Madiha Zaynab, Zhiqun Huang and Han Y. H. Chen

PLANT SIGNALING & BEHAVIOR
2019, VOL. 14, NO. 6, e1596719 (10 pages)
<https://doi.org/10.1080/15592324.2019.1596719>

REVIEW

Plant defense against virus diseases; growth hormones in highlights
Waqar Islam^{a,b}, Hassan Naveed^a, Madiha Zaynab^a, Zhiqun Huang^{a,b}, and Han Y. H. Chen^{a,b,c}

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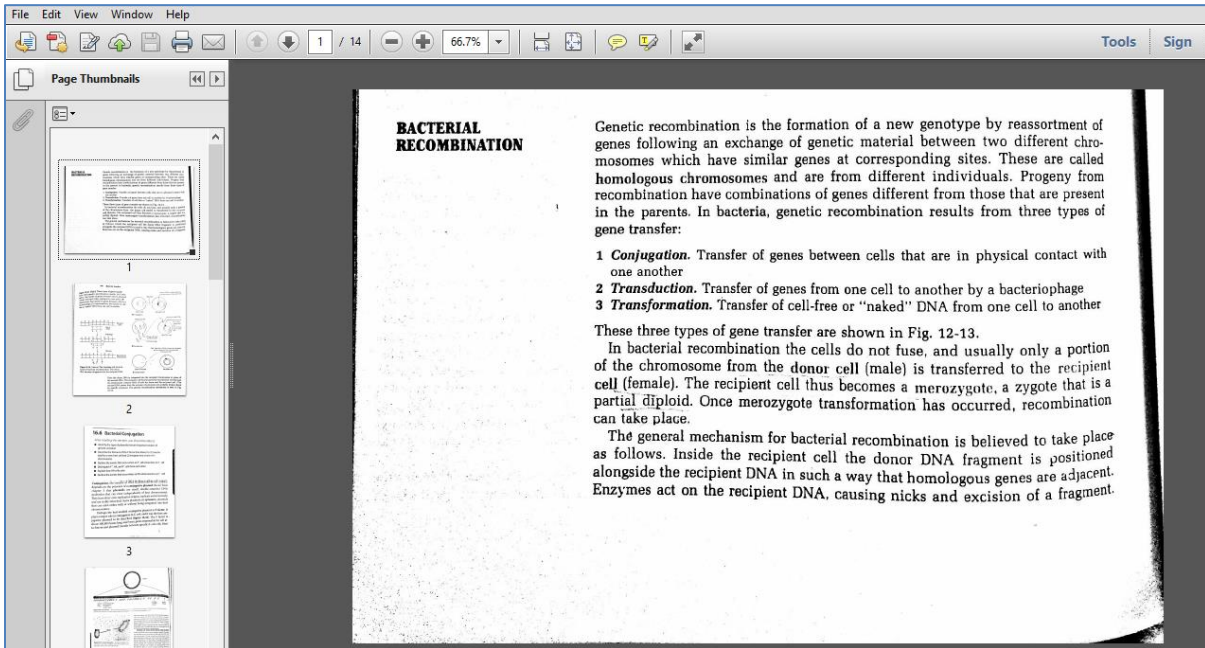
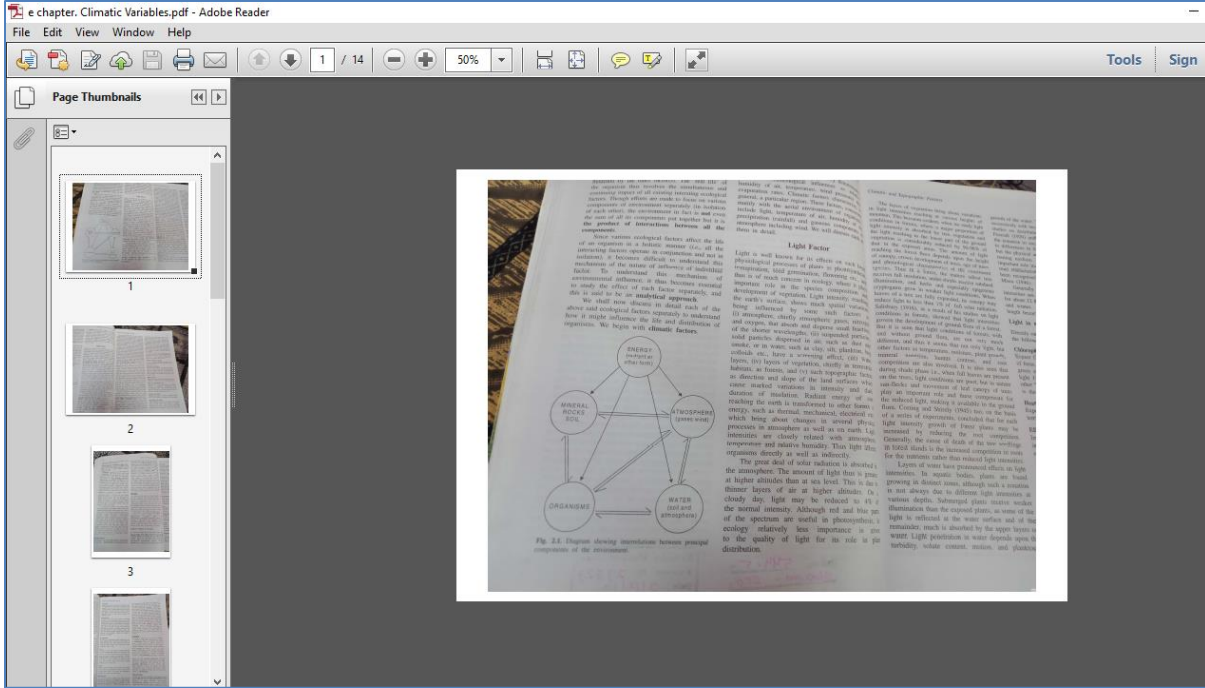
ABSTRACT
Phytohormones are critical in various aspects of plant biology such as growth regulations and defense strategies against pathogens. Plant-virus interactions retard plant growth through rapid alterations in phytohormones and their signaling pathways. Recent research findings show evidence of how viruses impact upon modulation of various phytohormones affecting plant growth regulations. The opinion is getting stronger that virus-mediated phytohormone disruption and alteration weakens plant defense strategies through enhanced replication and systemic spread of viral particles. These hormones regulate plant-virus interactions in various ways that may involve antagonism and cross talk to modulate small RNA (siRNA) systems. The article aims to highlight the recent research findings elaborating the impact of viruses upon manipulation of phytohormones and virus biology.

ARTICLE HISTORY
Received 4 March 2019
Revised 10 May 2019
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KEYWORDS
Plant defense; pathways; ethylene; salicylic acid; jasmonic acid; gibberellins; auxin; cytokinins; abscisic acid; brassinosteroids

1. Introduction
Plant viruses utilize numerous strategies that are more conducive for replication and viral spread inside the plant's cellular environment.¹⁻³ Phytohormone accumulation and signaling pathways can be directly or indirectly disrupted due to virus infections.⁴ Several phytohormone pathways exist within plants, contributing to plant growth, reproduction, and development.^{5,6} Ethylene (Et), jasmonic acid (JA), and salicylic acid (SA) play an important role in mechanisms of defense.⁷⁻¹¹ However, abscisic acid (ABA), auxin (Aux), cytokinins (CK), gibberellins (GA),¹²⁻¹⁶ and brassinosteroids (BR) also show defense relations but play vital roles in plant physiology and development.¹⁷⁻¹⁹ Additionally, there is some call²⁰ and autotoxic interactions²¹ associations of viral components affecting the phytohormone pathways, our knowledge about their role in the development of symptoms is quite limited.²² Recently, several plant-viral components were found involved in phytohormonal pathways linked to symptom development²³ (Figure 1). The first mechanistic explanation regarding modulation of virus regulatory systems through phytohormones within their host plants was provided by Wang et al. and Nafisi et al.,^{24,25} which linked the symptom development to plant-virus interactions. Aux is an important phytohormone that is disrupted directly by viral components.²⁶ Aux signaling disruption largely depends upon the biosynthesis of Aux or mutants showing resembling symptoms to viral disease, i.e., stunting, leaf curling, mosaic, and mottle.^{26,27} For example, Aux signaling

PDF Sample



Unit 1_1.8_Complex permanent tissue (Xylem).pdf - Adobe Reader

File Edit View Window Help

1 / 5 75%

Tools

Page Thumbnails

1

2

3

Core Course (CC- 1C): Plant Anatomy and Embryology
Unit 1: Meristematic and permanent tissues
1.8_Complex permanent tissue
Topic: XYLEM

ii. জটিল স্থায়ী কলা (Complex Permanent Tissues) : আকার ও গঠন ভিন্ন হওয়া সত্ত্বেও একই রকম কার্যসম্পন্নকারী এবং একই উৎস থেকে সৃষ্টি হয়েছে এরকম কেশ সমন্বিতে জটিল স্থায়ী কলা বলে।

এই কলা উদ্ভিদের সংবেদন কলা বা পরিবহন কলা নামে পরিচিত। এই জটিল কলা দুই রকমের, যথা— জাইলেম কলা ও ফ্লোয়েম কলা। এই জাইলেম ও ফ্লোয়েমের মাধ্যমে যথাক্রমে জল ও খাদ্য বিভিন্ন অংশে প্রবাহিত হয়, তাই এদের সংবেদন কলা (conducting tissue) বলে। প্রধানত জাইলেম ও ফ্লোয়েম একত্রে নালিকা বাঁড়িল (vascular bundle) গঠন করে।

i) জাইলেম (Xylem) :

● **সংজ্ঞা (Definition) :** উদ্ভিদের যে জটিল স্থায়ী কলার মাধ্যমে মূল থেকে শোষিত জল ও জলে দ্রবীয় বস্তু নীচের দিকে পাতায় পরিবাহিত হয়, তাকে জাইলেম কলা বলে।
এটি গ্রীক শব্দ 'xylem' (= কাঠ) থেকে এসেছে।

□ **গঠন (Structure) :**

(i) জাইলেম হল অন্যতম জটিল স্থায়ী কলা।
(ii) এই জাইলেম ও ফ্লোয়েম একত্রে নালিকা বাঁড়িল (vascular bundle) গঠন করে অর্থাৎ জাইলেম নালিকা বাঁড়িলের একটি অংশ গঠন করে।
(iii) জাইলেম বিভিন্ন প্রকৃতির মৃত ও সজীব কেশ দ্বারা গঠিত। জাইলেম প্যারেনকাইমা জাইলেমের একমাত্র সজীব কলা।
(iv) সংবেদন অংশগ্রহণকারী ট্রাকিয়ারি উপাদান (tracheary elements), যেমন— ট্রাকিড ও ট্রাকিয়া, জাইলেম প্যারেনকাইমা (xylem parenchyma) এবং জাইলেম তন্তু (xylem fibres) নিয়ে জাইলেম কলা গঠিত।

□ **অবস্থান (Occurrence) :** একবীজপত্রী ও দ্বিবীজপত্রী উদ্ভিদের মূল, কাণ্ড ও পাতার নালিকা বাঁড়িলে (vascular bundles) জাইলেম কলা অবস্থান করে।

□ **উপাদান (Components) :** জাইলেম চার প্রকার সজীব ও মৃত কেশ নিয়ে গঠিত, যথা— (A) ট্রাকিড (tracheid), (B) ট্রাকিয়া (trachea), (C) জাইলেম প্যারেনকাইমা (xylem parenchyma) এবং (D) জাইলেম তন্তু (xylem fibres)। উপরের উপাদানগুলির মধ্যে ট্রাকিড (tracheids) এবং জাইলেম বাহিকা (vessel members) অর্থাৎ ট্রাকিয়া (trachea) জল ও খনিজ লবণ পরিবহনে সাহায্য করে, সেই কারণে এদের একত্রে ট্রাকিয়ারি উপাদান (tracheary elements) বলে।

(A) **ট্রাকিড (Tracheid) :**

● **সংজ্ঞা (Definition) :** পুরু কোশপ্রাচীরযুক্ত, লম্বা, ছুঁচোদো প্রান্তবিন্দিত মৃত জাইলেম কোশকে ট্রাকিড (tracheid) বলে।

PPT. Sample

Protoplast_Culture, isolation and fusion [Compatibility Mode] - PowerPoint

FILE HOME INSERT DESIGN TRANSITIONS ANIMATIONS SLIDE SHOW REVIEW VIEW

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PROTOPLAST ISOLATION, CULTURE, FUSION

1

2

- **Protoplast** is defined as naked plant cells or plant cells without a cell wall.
- It consists of plasmalemma containing all the other cellular content or components in it.
- The protoplast term was first introduced by the scientist Hanstrom (1980).
- In tissue culture labor it's used to regenerate a whole plant providing suitable artificial medium and environmental conditions. This process is known as **protoplast culture**.

3

- Protoplast also known as a naked plant cell refers to all the components of plant cell excluding the cell wall.
- Protoplast is the biologically active and most significant material of cells.

4

- Plant cell wall acts as physical barrier and protects cytoplasm from microbial invasion and environmental stress.
- It consists of a complex mixture of cellulose, hemicellulose, pectin, lignin, lipids, protein.
- For dissolution of different components of the cell wall it is essential to have the respective enzymes.

5

History

- **Hesslein** introduced the term 'Protoplast'.
- The isolation of protoplasts from was first achieved through by **Klecker** (1972) on plantified cells.
- **Costig** (1965) for the first time isolated the protoplasts of plant tissues by using cell wall degrading enzymes viz. cellulase, hemicellulase, pectinase, and protease extracted from a saprophytic fungus *Trichoderma viride* & *Mycrothecium verrucosum*.
- First achievement in protoplast fusion by Peter (1970)

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- ✓ The culture of protoplast in an aseptic liquid media is called Protoplast Culture.
- ✓ The basic principle of protoplast culture is aseptic isolation of large number of living protoplast and culture them on suitable nutrient medium for their growth and development.
- ✓ **Suspension culture** is a type of culture in which single cells/protoplasts or small cell aggregates multiply in agitated liquid medium
- ✓ Development of hybrid plants through the fusion of somatic protoplasts of two different plant species/varieties is called somatic hybridization.

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Protoplasts have a wide range of applications; some of them are listed below:

1. The protoplast in culture can be regenerated into a whole plant.
2. Hybrid can be developed from protoplast fusion.
3. It is used to produce large scale cell wall with protoplasts.
4. Genetic transformation can be achieved through genetic engineering of protoplast DNA.
5. Protoplasts are excellent materials for ultra structural studies.
6. Isolation of cell organelles and determination is easy from protoplasts.
7. Protoplasts are useful for membrane studies (transport and uptake processes).
8. Isolation of enzymes from protoplast cultures is easy.

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General steps of a protoplast culture protocol are:

1. **Stage 0 - Plant material:** This involves sterilization of the plant material and tissues are finely dissected or shredded.
2. **Stage 1 - Protoplast isolation:** It begins with treatment of plant material with a solution of degrading enzymes that remove the cell wall. Later, the protoplasts are removed from the solution, purified and cultured.
3. **Stage 2 - Protoplast culture:** It refers to the transfer of the isolated protoplast to an appropriate culture medium. The protoplasts develop the cell wall within few, followed by cell division resulting in small cell colonies that will grow into cells. You can use liquid or semi-solid culture medium that needs to have a component such as essential that maintains a proper osmotic pressure.
4. **Stage 3 - Plant regeneration:** It can be achieved by regeneration or subculturing. The former refers to the formation of roots and organs while the latter refers to the formation of embryos. For the stage you need to move the culture to a medium that induces plant regeneration.

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Among the different stages, different factors can determine the success of the protoplast culture, such as:

1. Plant source, genotype, age, and growth conditions;
2. Pre-treatment and enzyme concentration used;
3. Purification method; and
4. Culture medium (especially plant growth regulators, osmotic stabilizers, and gelling agents) and growth conditions (temperature, light, and cell density).

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Major limitations of protoplast culture

In practice, some challenges while performing it:

1. Protoplast culture is a process that demands specialized tissue culture expertise, requires complex manipulations, and can be time-consuming.
2. Protoplasts are very fragile and there is genetic instability associated with their culture.
3. Current methods for protoplast regeneration are very genotype-specific reducing its application and success.

However, the advantages of using protoplast culture instead of other methods (in vitro fertilization): First protoplasts have a wide range of applications from their use in the isolation of cell organelles such as chloroplasts and nuclei to developing new plant varieties as a result of the fusion between cells of different plant species.

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Co-culture of protoplasts: Protoplasts of two different plant species (one slow growing and another fast growing) can be co-cultured. This type of culture is advantageous since the growing species provide the growth factors and other chemicals which help in the generation of cell wall and cell division. The co-culture method is generally used if the two types of protoplasts are morphologically distinct.

Micro drop culture: Specifically designed dishes usually contain dishes with outer inner chambers are used for micro drop culture. The inner

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Sub-Protoplasts: The fragments derived from protoplasts that do not contain all the contents of plant cells are referred to as sub-protoplasts. This can be done by application of different centrifugal forces created by discontinuous gradients during centrifugation. Exposure of protoplasts to cytochalasin B in association with centrifugation is a better approach for fragmentation of protoplasts.

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1. **Mini protoplasts:** These are also called as karyoplasts and contain the nucleus. Mini-protoplasts can divide and are capable of regeneration into plants.

2. **Cytoplasts:** These are sub-protoplasts containing the original cytoplasmic material (in part or full) but lack nucleus. Thus, cytoplasts are nuclear free sub-protoplasts which

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SLIDE 9 OF 50 ENGLISH (INDIA)

LECTURE 23-POPULATION GENETICS_PART 4 - PowerPoint

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1

LECTURE 23 POPULATION GENETICS: PART 4

2

MIGRATION

- Gene flow or migration can also change frequency of alleles in populations.
- Migration includes both immigration (in coming) and emigration (leaving) of alleles in populations. Mass immigration and emigration have tremendous potential in changing allele frequency in populations.
- Migration generally refers to the movement of individuals into a population from a different population. Migration may introduce new alleles into the population. These new alleles alter mating with the individuals of original population may alter gene and genotype frequency in a population.
- The rate of change in gene frequency through migration depends on the number of migrants. If the number of migrants is high, the rate of change will be rapid and vice versa. Emigration of some individuals from a population results in decrease in the frequency of alleles present in original population.

3

GENETIC DRIFT

- Random drift or genetic drift refers to random change in gene frequency due to sampling error. Random drift is generally more in case of small sample size. Large sample size provides more representative value of a population or value which is nearer to the population mean.
- Therefore, sample size should be adequate to avoid sampling error. Three factors of evolution viz. selection, mutation and migration alter gene and genotype frequency in a particular direction and are called as directional factors. However random genetic drift is a non-directional factor because it does not change the gene frequency in a particular direction.
- The direction of change in the gene frequency may differ from generation to generation. In one generation, the change of gene frequency may be in one direction, which may change to opposite direction to the next generation.

4

THE BOTTLENECK EFFECT

- The bottleneck effect is an extreme instance of genetic drift that happens when the size of a population is severely reduced. Based on the strict definition, population, death and disease in a population, being small individuals, and having small gene random assortment of population.
- The allele frequency in the group may vary different than those of the population prior to the event, and some alleles may be missing entirely. The smaller population may also be more susceptible to the effects of genetic drift for generations (and on western genetic randomly) periodically causing one allele to be lost.
- How can a bottleneck event reduce genetic diversity? Imagine a bottle filled with marbles, where the marbles represent the alleles present in a population. If a bottleneck event occurs, a small random assortment of individuals carries the marbles and gene through the bottleneck (and into the night, while the rest majority of the population is left off predators in the bottle). The genetic composition of the random assortment is now the genetic composition of the entire population.

5

THE BOTTLENECK EFFECT

Population bottlenecks occur when a population's size is reduced for at least two generations. Because genetic drift acts more readily to reduce genetic variation in small populations, undergoing a bottleneck can reduce a population's genetic variation by a lot, even if the bottleneck doesn't last for very many generations. This is illustrated by the huge bottleneck disease before the population 2, an unusually small draw creates a bottleneck.

6

FOUNDER EFFECT

- The founder effect is another extreme example of drift, one that occurs when a small group of individuals breaks off from a large population to establish a colony. They are usually isolated from the original population, and the founding individuals may not represent the full genetic diversity of the original population. This is, often, the founding population may be missing altogether. The founder effect is similar in concept to the bottleneck effect, but it occurs by deliberate or accidental colonization rather than circumstances.
- Approximate genetic diversity depends on the number of founders and the number of migrants and alleles. Both occur on subpopulations that are established in the same particular place. The founder effect may occur when a small founder group first disperses to establish new colonies. This may occur because different groups of species will migrate from the original population. As the allele frequency in the colonies (and even) may be different from the original population. Also, the small size of the new population may not contain all members of the original population.

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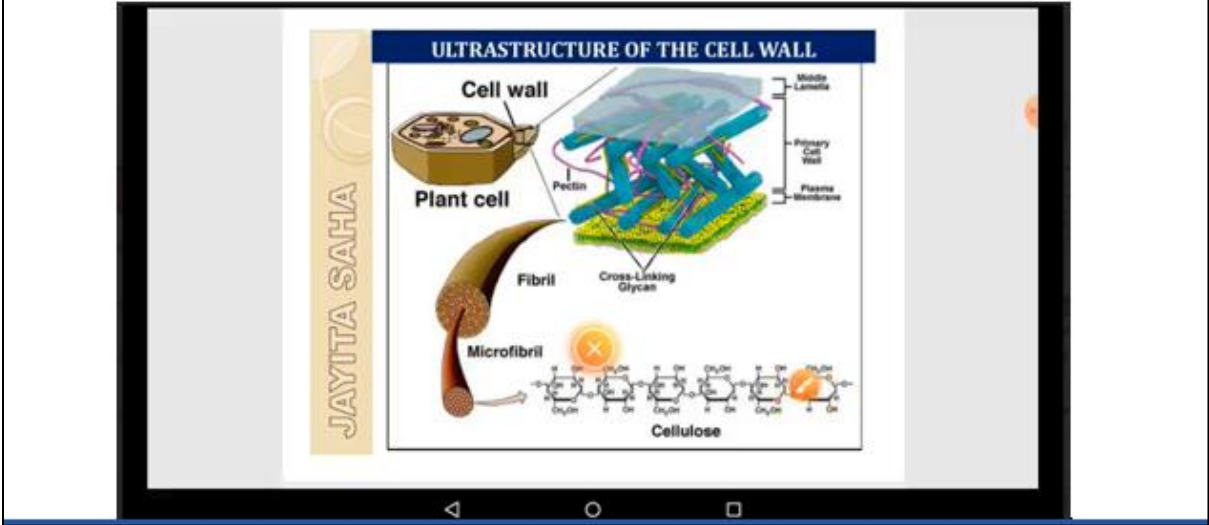
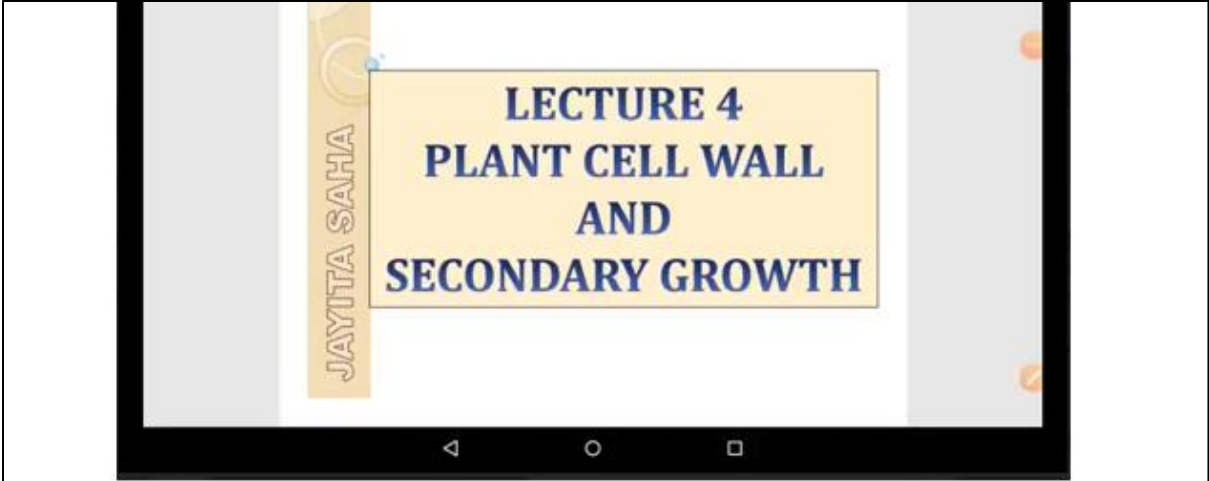
SIGNIFICANCE OF POPULATION GENETICS

1. Knowledge of gene and genotype frequency in a population is useful for a plant breeder in the assessment of competitive ability of various genotypes in natural situations. Such studies help in identification of genotypes with high adaptive value.
- If such studies are conducted over multiple generations, the vertical feasibility or stability can also be assessed in vertical trends. Hardy-Weinberg Law operates in random mating or panmictic species.
- Study of gene frequency in a population also reveals significance of various factors in natural evolution. In cross pollinated crops, development of composite and synthetic varieties is based on Hardy-Weinberg principle.

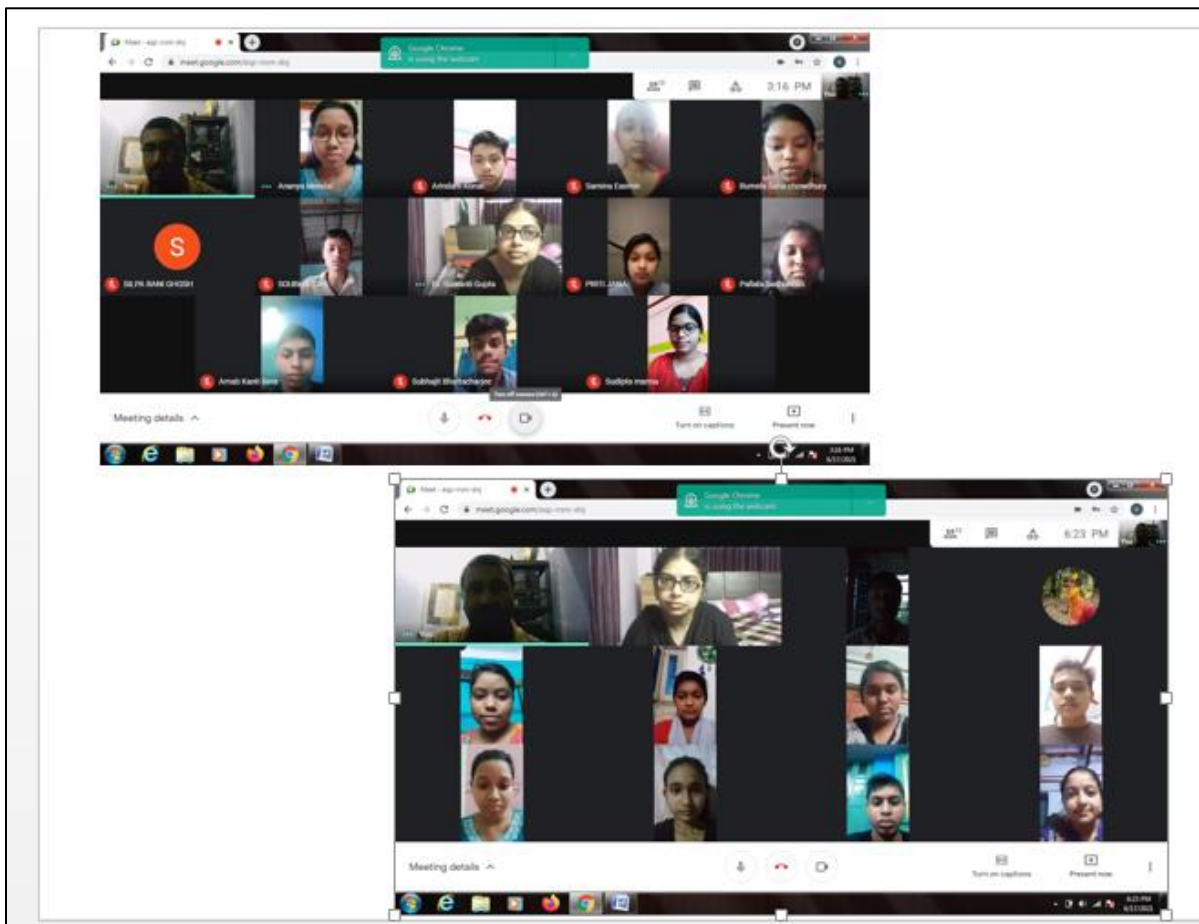
8

THANK YOU

Screenshot of Video (Sample)



Google Meet



Department of Chemistry (2021-2022)

Snapshots/ screenshots of E-resources and techniques used

Screenshot (sample) of Resources

PPT Sample

| | | |
|---|---|---|
| <p style="text-align: center;">Mechanisms of enzyme inhibition</p> <p style="text-align: center;">By Dr. Sucheta Joy The Department of Chemistry Rabindra Mahavidyalaya Champadanga, Hooghly</p> | <ul style="list-style-type: none"> Competitive inhibition: the inhibitor (I) binds only to the active site. $EI \leftrightarrow E + I$ Non-competitive inhibition: binds to a site away from the active site. It can take place on E and ES $EI \leftrightarrow E + I$ $EI \leftrightarrow ES + I$ Uncompetitive inhibition: binds to a site of the enzyme that is removed from the active site, but only if the substrate is already present. $EI \leftrightarrow ES + I$ The efficiency of the inhibitor (as well as the type of inhibition) can be determined with controlled experiments. | $E + S \xrightleftharpoons[k_{-1}]{k_1} ES \xrightarrow{k_2} E + P$ $E + I \xrightleftharpoons[k_{-2}]{k_2} EI \quad (21.6)$ $ES + I \xrightleftharpoons[k_{-3}]{k_3} ESI \quad (21.6)$ $\alpha = 1 + \frac{[I]}{K_I} \quad \text{and} \quad \alpha' = 1 + \frac{[I]}{K_I'}$ $\frac{1}{v} = \frac{1}{v_{max}} + \left(\frac{K_M}{v_{max}} \right) \frac{1}{[S]}$ $\frac{1}{v} = \frac{\alpha'}{v_{max}} + \left(\frac{K_M}{v_{max}} \right) \frac{1}{[S]}$ <div style="text-align: right;"> Competitive inhibition Uncompetitive inhibition </div> |
| 1 | 2 | 3 |
| <p style="text-align: center;">23.7 Kinetics of photochemical reactions</p> <ul style="list-style-type: none"> Primary photochemical process: products are formed directly from the excited state of a reactant. Secondary photochemical process: intermediates are formed directly from the excited state of a reactant. Photophysical processes compete with the formation of photochemical products via deactivating the excited state | <ul style="list-style-type: none"> Times scales of photophysical processes Within $10^{-15} \sim 10^{-14}$s for electronic transitions induced by radiation and thus the upper limit for the rate constant of a first order photochemical reaction is about 10^{15} s^{-1}. $10^{-12} \sim 10^{-11}$ s for fluorescence $10^{-12} \sim 10^{-11}$ s for intersystem crossing (ISC) $10^{-9} \sim 10^{-7}$ s for phosphorescence (large organic molecules) A slowly decaying excited species can undergo a very large number of collisions with other reactants before deactivation. The interplay between reaction rates and excited state lifetimes is a very important factor in the determination of the kinetic feasibility of a photochemical process. | <p style="text-align: center;">Autocatalysis</p> <ul style="list-style-type: none"> Autocatalytic: the catalysis of a reaction by its products $A + P \xrightarrow{k_1} 2P$ <p>The rate law is $\frac{d[P]}{dt} = k_1[A][P]$</p> <p>To find the integrated solution for the above differential equation, it is convenient to use the following notations $[A] = [A]_0 - x$; $[P] = [P]_0 + x$</p> <p>One gets $\frac{d[P]}{dt} = k_1([A]_0 - x)([P]_0 + x)$</p> <p>Integrating the above ODE by using the following relation</p> $\int \frac{1}{(a-x)(b+x)} dx = \frac{1}{(a-b)} \ln \left \frac{b+x}{a-x} \right + C$ <p>or rearrange into $\frac{1}{(a-b)} \ln \left \frac{b+x}{a-x} \right = \frac{k_1}{(a-b)} t + C$ and $b = [P]_0$ and $a = [A]_0$</p> |

POWERPOINT PRESENTATION ON Mrs. Subhra Dholey SACT Department of Chemistry WACKER PROCESS

1

CONTENT

- 01 Introduction
- 02 Wacker process
- 03 Condition and mechanism
- 04 Product analysis and application
- 05 Advantages and disadvantages
- 06 Conclusion

2

CONDITIONS

- Temperature and Pressure:** Ethylene passed through the reactor along with catalyst at 105-110°C and 10-15 ATMOSPHERE.
- Catalyst:** Propylene oxide of ethylene allowed to absorb water and then to use as a catalyst.
- Solvents:** Benzene or other solvents are used as a solvent for the ethylene and water. The solvent is used to absorb the ethylene and water.

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STEPS OF THE WACKER PROCESS

- 1) Oxidation of ethylene
- 2) Ligand exchange
- 3) Hydro-palladation
- 4) β - hydrogen elimination
- 5) Hydrogen insertion
- 6) Catalyst repressing & product formation

7

| ADVANTAGES | DISADVANTAGES |
|---|---|
| 1. High selectivity for the Wacker process. 2. High conversion of ethylene to acetaldehyde. 3. High selectivity for the Wacker process. 4. High selectivity for the Wacker process. 5. High selectivity for the Wacker process. | 1. Complexity for separation of water process and complex catalytic system. 2. Limited applicability for the Wacker process. 3. High selectivity for the Wacker process. 4. High selectivity for the Wacker process. |

MECHANISM

POWERPOINT PRESENTATION ON Hydroformylation Reaction Dr. Rabiul Alam Assistant Professor Department of Chemistry

1

CONTENT

- Definition of the reaction
- Reaction of ethylene to acetaldehyde
- Reaction of propylene to propionaldehyde
- Reaction of butene to butanal
- Reaction of pentene to pentanal
- Reaction of hexene to hexanal
- Reaction of heptene to heptanal
- Reaction of octene to octanal
- Reaction of nonene to nonanal
- Reaction of decene to decanal
- Reaction of undecene to undecanal
- Reaction of dodecene to dodecanal
- Reaction of tridecene to tridecanal
- Reaction of tetradecene to tetradecanal
- Reaction of pentadecene to pentadecanal
- Reaction of hexadecene to hexadecanal
- Reaction of heptadecene to heptadecanal
- Reaction of octadecene to octadecanal
- Reaction of nonadecene to nonadecanal
- Reaction of eicosene to eicosanal
- Reaction of heneicosene to heneicosanal
- Reaction of docosene to docosanal
- Reaction oftricosene totricosanal
- Reaction of tetracosene to tetracosanal
- Reaction of pentacosene to pentacosanal
- Reaction of hexacosene to hexacosanal
- Reaction of heptacosene to heptacosanal
- Reaction of octacosene to octacosanal
- Reaction of nonacosene to nonacosanal
- Reaction oftriacontene totriacontanal
- Reaction of htriacontene to htriacontanal
- Reaction of tetracosene to tetracosanal
- Reaction of pentacosene to pentacosanal
- Reaction of hexacosene to hexacosanal
- Reaction of heptacosene to heptacosanal
- Reaction of octacosene to octacosanal
- Reaction of nonacosene to nonacosanal
- Reaction oftriacontene totriacontanal
- Reaction of htriacontene to htriacontanal

2

INTRODUCTION

The hydroformylation reaction is a chemical reaction in which an alkene reacts with carbon monoxide and hydrogen to form an aldehyde. The reaction is catalyzed by a transition metal complex, typically a rhodium or cobalt complex. The reaction is exothermic and is used in the production of aldehydes for a variety of applications, including the synthesis of pharmaceuticals, polymers, and other chemicals.

3

Steps of the hydroformylation

1. Coordination of CO, H₂ and alkene to the metal.
2. Migratory insertion of the alkene into the metal-hydrogen bond.
3. Oxidative addition of CO to the metal-hydrogen bond.
4. Reductive elimination of the aldehyde.

5

MECHANISM

6

USES

- 1. The hydroformylation reaction is used in the production of aldehydes for a variety of applications, including the synthesis of pharmaceuticals, polymers, and other chemicals.
- 2. The hydroformylation reaction is used in the production of aldehydes for a variety of applications, including the synthesis of pharmaceuticals, polymers, and other chemicals.

7

Conclusion

The hydroformylation reaction is a chemical reaction in which an alkene reacts with carbon monoxide and hydrogen to form an aldehyde. The reaction is catalyzed by a transition metal complex, typically a rhodium or cobalt complex. The reaction is exothermic and is used in the production of aldehydes for a variety of applications, including the synthesis of pharmaceuticals, polymers, and other chemicals.

PRODUCTS OF HYDROFORMYLATION REACTION

The hydroformylation reaction is a chemical reaction in which an alkene reacts with carbon monoxide and hydrogen to form an aldehyde. The reaction is catalyzed by a transition metal complex, typically a rhodium or cobalt complex. The reaction is exothermic and is used in the production of aldehydes for a variety of applications, including the synthesis of pharmaceuticals, polymers, and other chemicals.

MECHANISM OF HYDROFORMYLATION REACTION

PDF Sample/ Books

TERPENOIDS

* Terpenes \Rightarrow Terpenes are naturally occurring hydrocarbons having a structural relationship with isoprene, i.e. 2-methyl-1,3-butadiene ($\text{CH}_2=\text{C}(\text{CH}_3)-\text{CH}=\text{CH}_2$)

Iso prene, itself, doesn't occur in nature.

3420
11.5.1

* Terpenoids \Rightarrow Terpenoids include hydrocarbons as well as their oxygenated derivatives, such as alcohols, aldehydes, ketones etc.

Most of the terpenoids are unsaturated alicyclic or cyclic compounds.

* Iso-prene rule \Rightarrow Thermal decomposition of almost all terpenoids produces isoprene as one of the products and the skeleton structure of all naturally occurring terpenoids can be constructed by joining isoprene units as required following head to tail connection.

$\text{H}_2\text{C}=\text{C}(\text{CH}_3)-\text{CH}=\text{CH}_2$ / structural skeleton \Rightarrow

* Head to tail connectivity in the following \Rightarrow

(a)

(b)

(c)

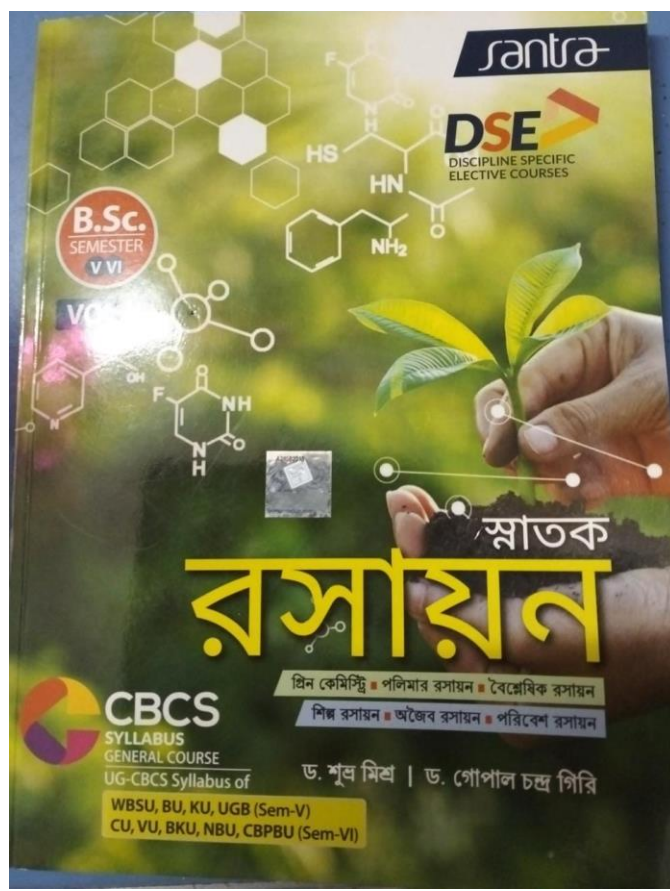
Biocatalysis for Green Chemistry and Chemical Process Development



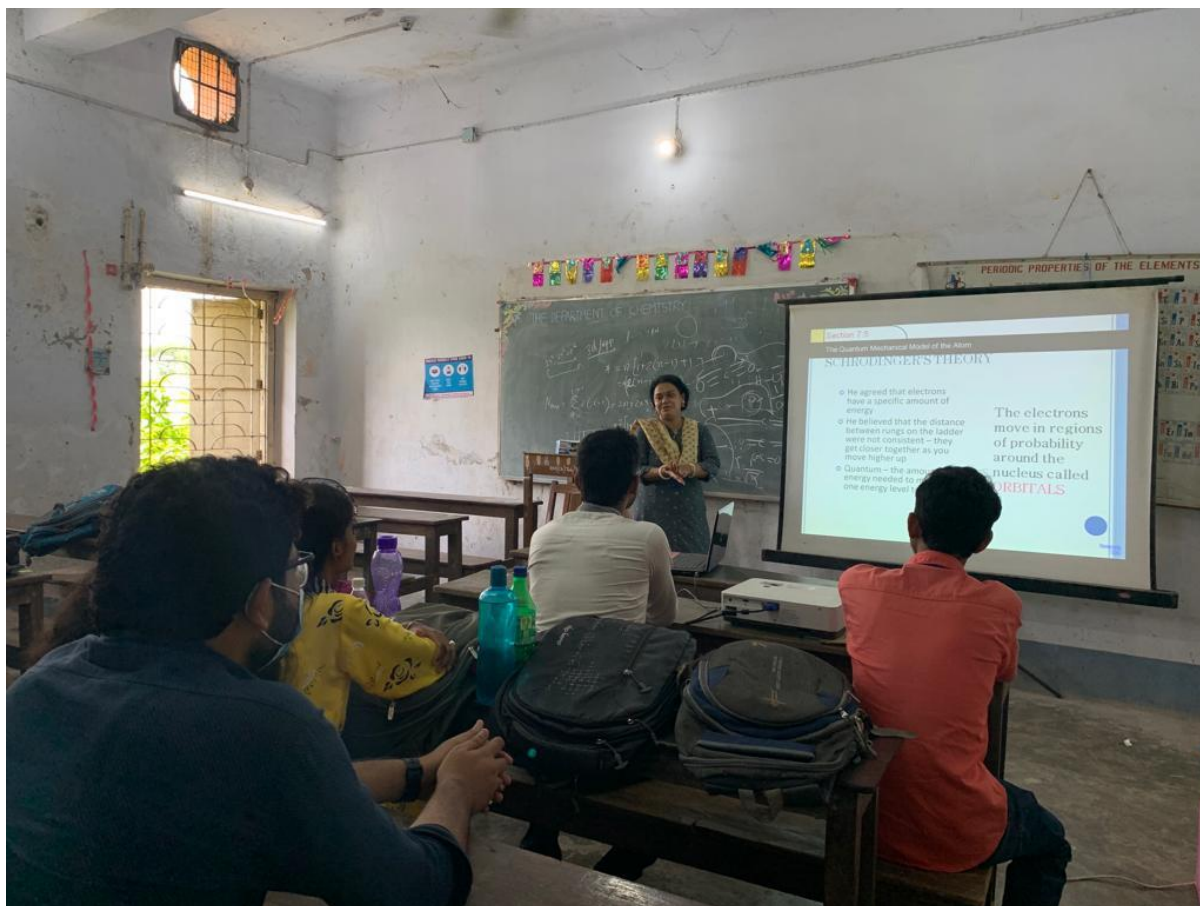
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Romas Kazlauskas

 WILEY

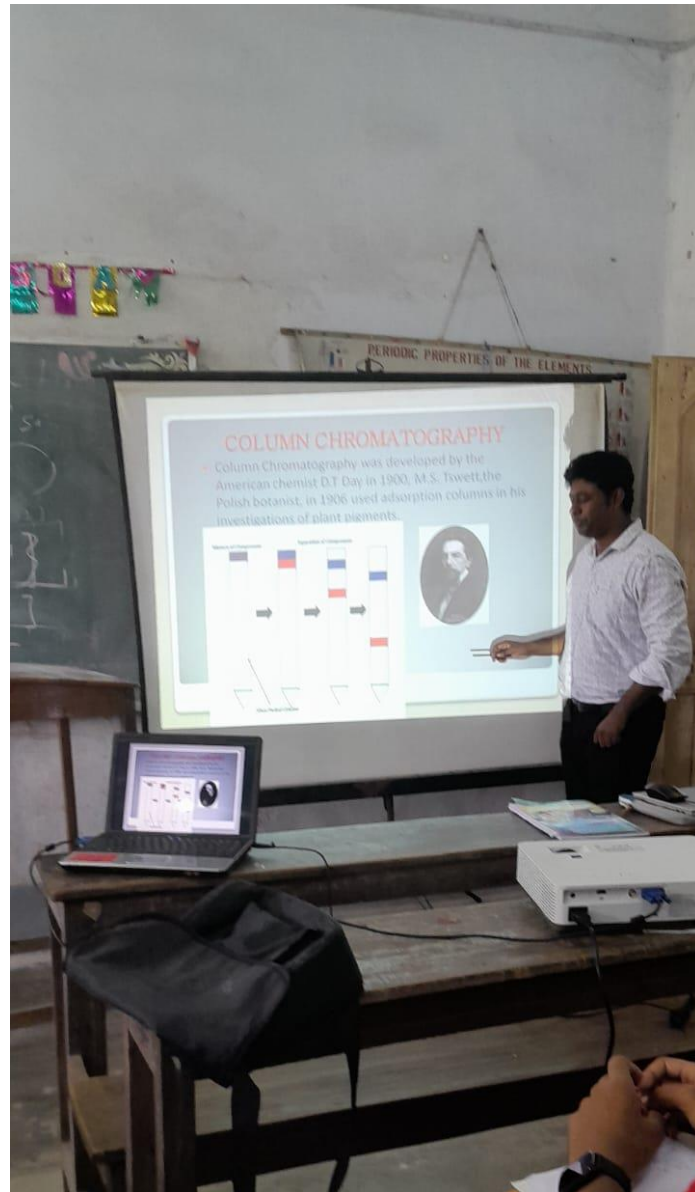
Bengali book for general students



ICT Classes

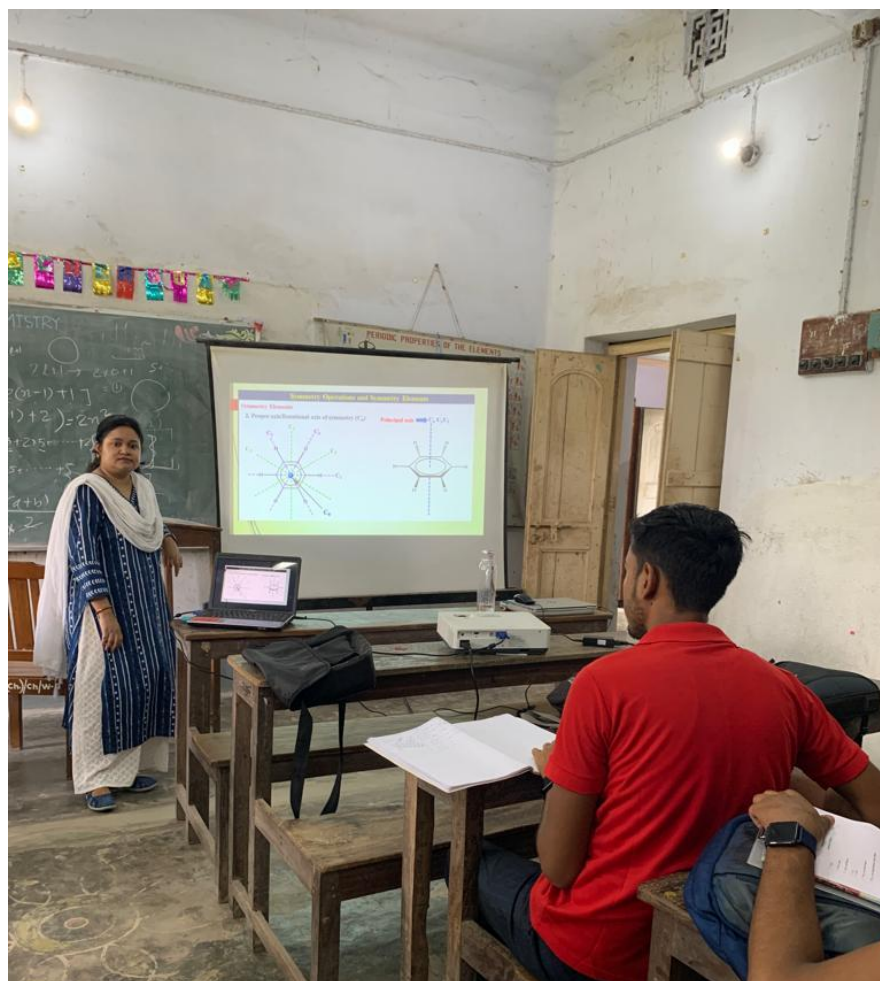


Class taken by Dr. Sucheta Joy, Assistant Professor, department of Chemistry



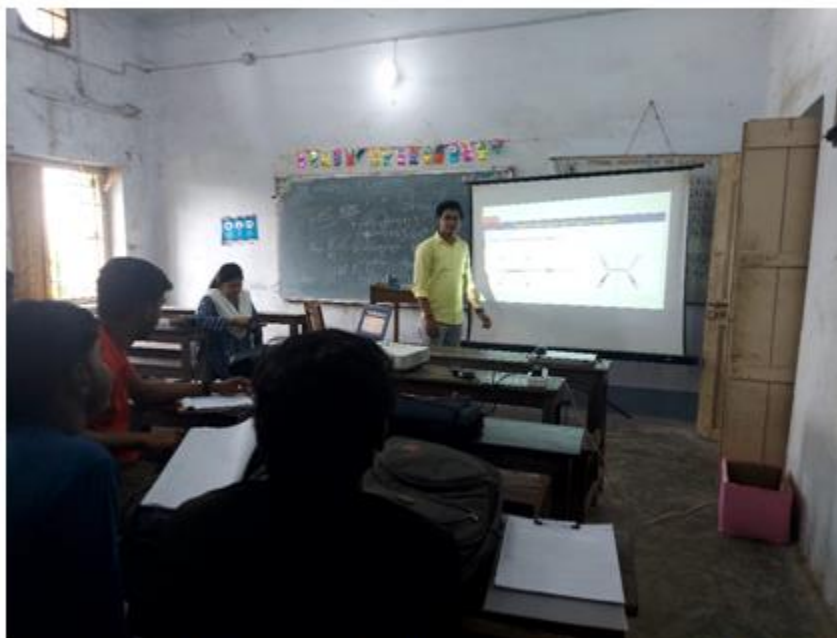


Class taken by Dr. Rabiul Alam, Assistant Professor, department of Chemistry





Class taken by Dr. Debasmita Sardar, Assistant Professor, department of Chemistry

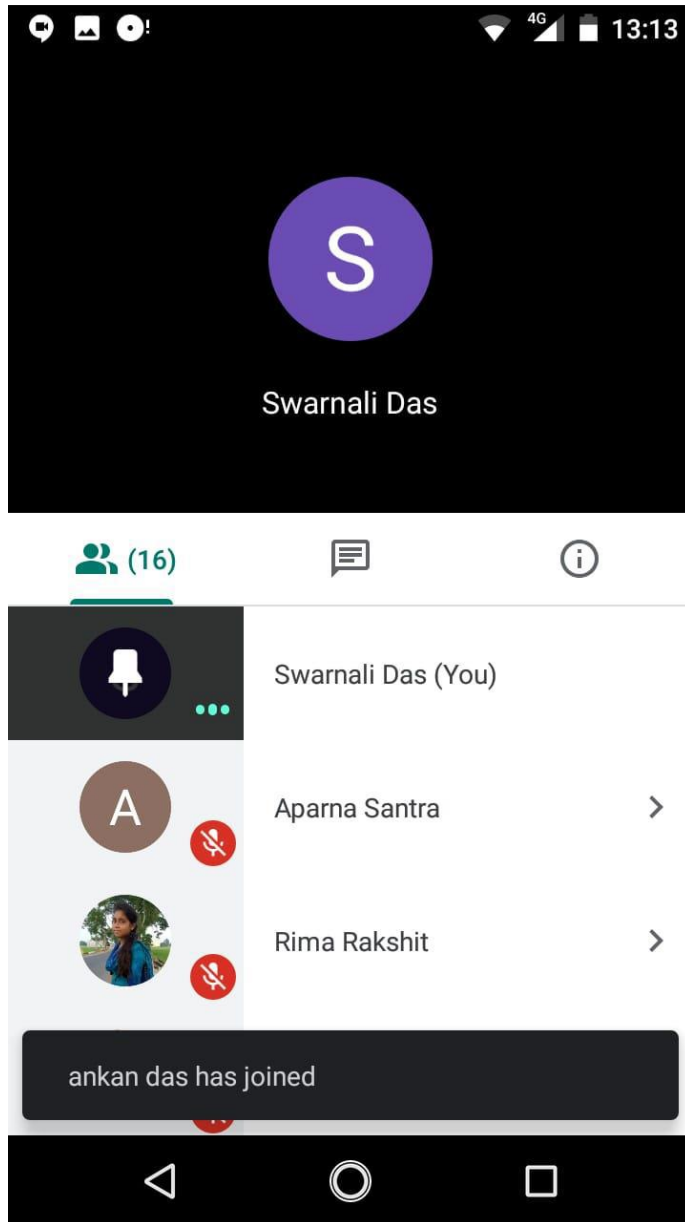


Class taken by Mr. Tanmoy Pandit, SACT, department of Chemistry

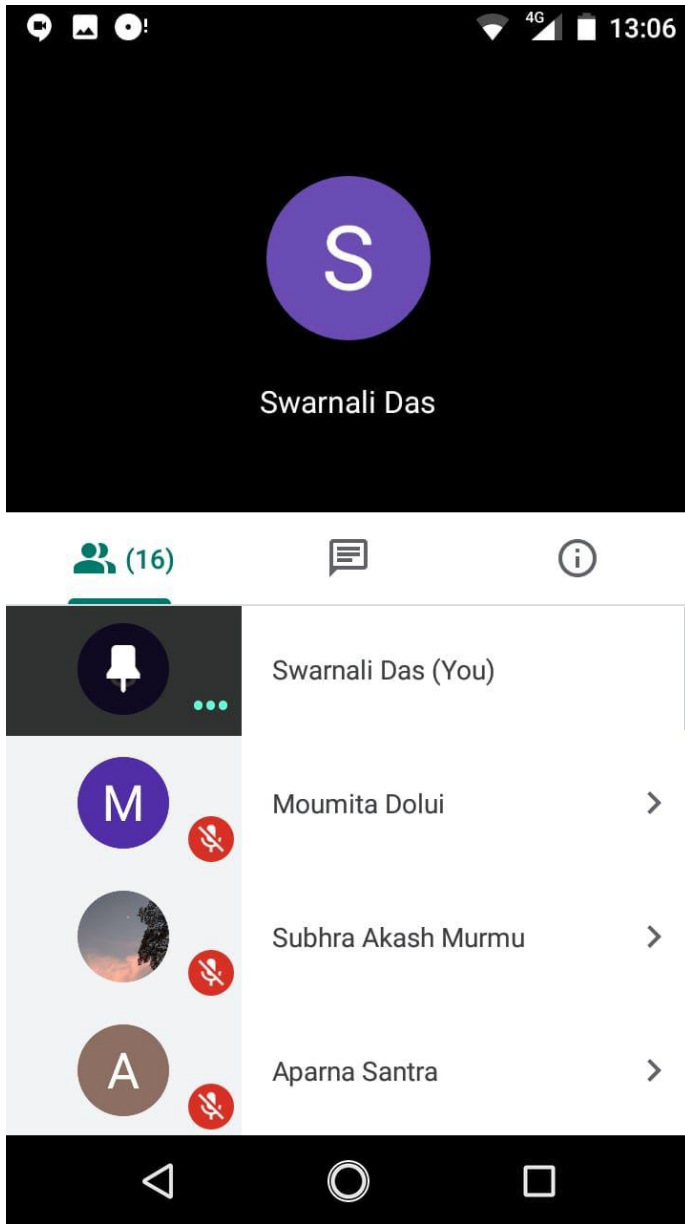


Class taken by Mrs. Subra Dholey, SACT, department of Chemistry

Department of Political Science



Online class taken by Swarnali Das (SACT) for 4 th sem generic



Online class taken by Swarnali Das SACT for Sem-6 Generic

10:13

VoLTE 90%

← About this call
































People

Information

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IN CALL

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-  Krishna Samanta  
-  K Kuheli Jana  
-  L Lipika Das  
-  Nilanjana Bhumij  
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-  S Sneha Das  
-  S Sudipta Patra  
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-  S Sutapa Jana  

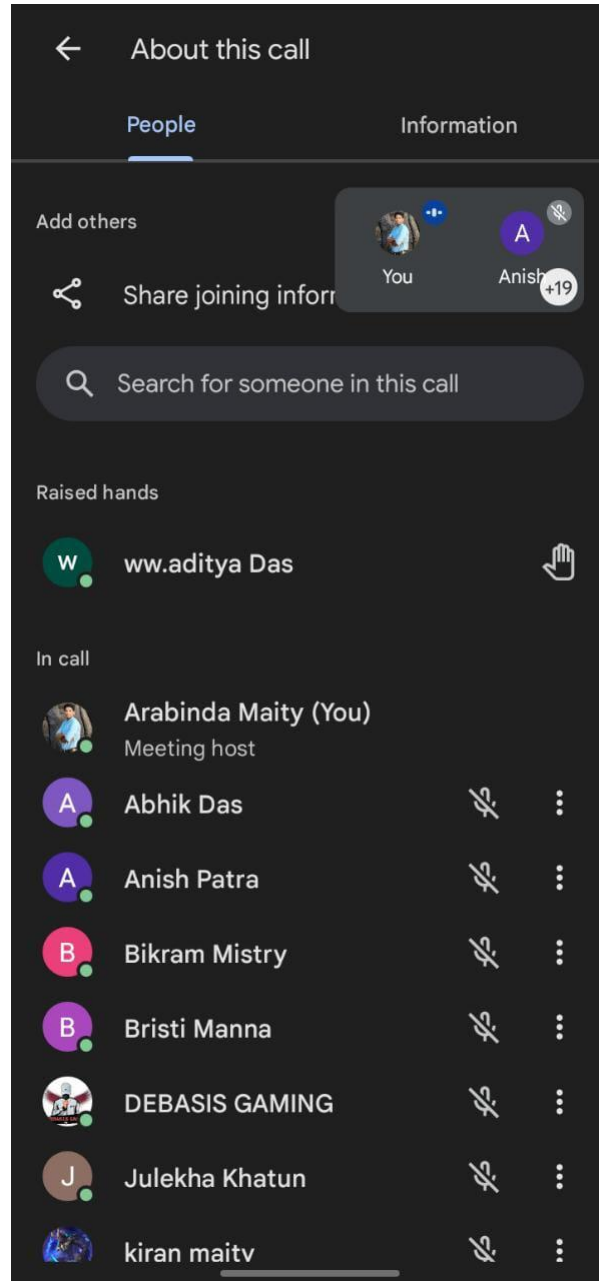
||| ○ <

Online Class taken by Mr. Krishna Kali Mondal Asst. Prof in Pol. Sc for 2 nd Sem Honours

DEPARTMENT OF PHYSICAL EDUCATION (SESSION 2021-2022)

ONLINE CLASS - SEMESTER-1

CLASS TAKEN BY MR. ARABINDA MAITY , SACT, PHYSICAL EDUCATION



Rests of the departments also have followed the similar techniques to conduct classes and evaluate student performance. (Screenshots are not attached.)