

5th Sem Hom.

Thursday

Week 06

Dipanjita Palclass - 418/09/2020Crassulacean Acid Metabolism (CAM)

* Crassulaceae, Cactaceae, Orchidaceae, Liliaceae

* diurnal pattern of organic acid formation
night $\rightarrow (+)$ Day $\rightarrow (-)$

* CAM Plant.

* 1st discovered Crassulaceae plant
Bryophyllum sp.* Types \rightarrow ① Obligate \rightarrow Behave like CAM
abundant H_2O supply e.g. Opuntia sp.② Facultative \rightarrow Shift from CAM to C_3
abundant H_2O supply
e.g. Kalanchoe sp.* Character \rightarrow
1) CO_2 uptake \rightarrow night
2) stomata open \rightarrow night
closed \rightarrow Day

Discipline like surgery, is not painless, but it is worth practicing anyway. - Shiv Kherra

Notes :

Appointment :

Wk	S	M	T	W	T	F	S	Wk	S	M	T	W	T	F	S
01		1	2	3	4	5		06	3	4	5	6	7	8	9
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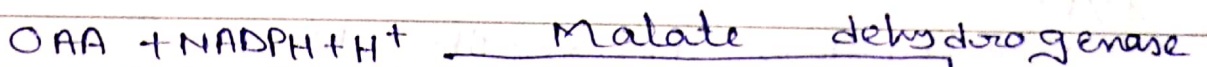
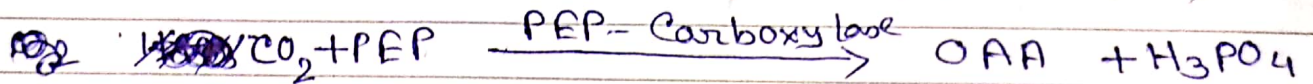
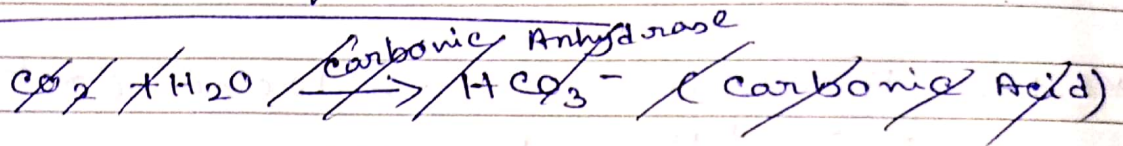
3) Malate accumulate \rightarrow night
 \therefore Dark acidification

4) Decarboxylation of malate \rightarrow Day
 \therefore Light de acidification

* Process \rightarrow

Dark Acidification (stomata open)

① Formation of malate \rightarrow



Malic Acid + NADP⁺

store

Vacuole

Acidity content is high in protoplasm \therefore pH \rightarrow less

Education is the transmission of civilization. - Ariel and Will Durant

Notes :

Appointment :

February 2019

March 2019

FEBRUARY

09

2019

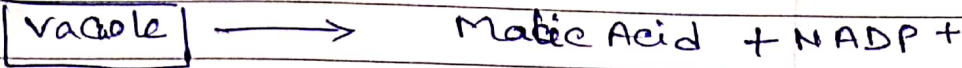
Saturday Week 06

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Light-deAcidification

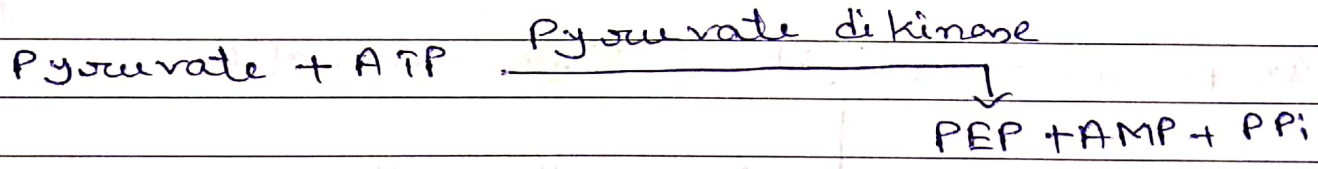
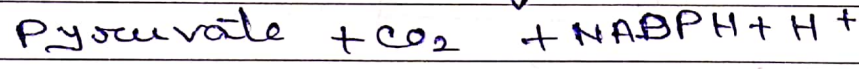
(stomata closed)

① Decarboxylation of malate →

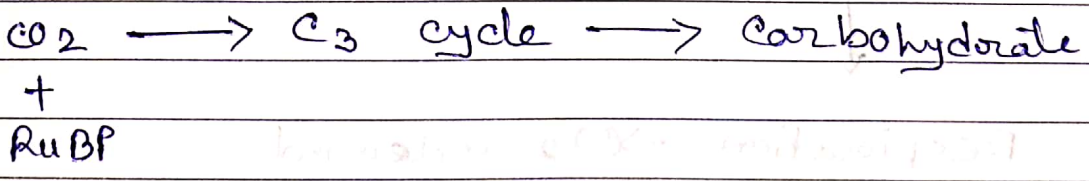


Acidity content
low in protoplast
∴ pH → high

NAD-malic enzyme (mitochondrial)
or
NADP-malic enzyme (cytoplasmic)



Sunday 10



Education is the movement from darkness to light. - Allan Bloom

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C₄

CAM

1) OAA → Day

2) OAA → Night

2) K⁺ → Present

2) K⁺ → Absent

3) Stomata open → Day

3) Stomata → Night

Photorespiration

Kozlov et al (1963)

In presence of light & high conc. of O₂

↓
chlorophyllous tissue

Respiration → CO₂ released

↓
2C compound

Phosphoglycolic Acid

i.e. C₂ cycle

Pisum ,

Nicotiana ,

Oryza

Don't Judge each day by the harvest you reap, but the seeds you plant. - Robert Louis Stevenson

Notes :

Appointment :

February 2019

March 2019

FEBRUARY

12

2019

Tuesday

Week 07

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* Organelles → chloroplast

Peroxisome

Mitochondria

Process →

* reaction in chloroplast →

1) $RuBP + O_2 \xrightarrow{RuBP\ oxygenase}$

2-phosphoglycolic Acid + 3-phosphoglyceric Acid

2) 2-phosphoglycolic Acid → Phosphoglycolate

Phosphatase

Glycolic Acid

↓
enter into peroxisome

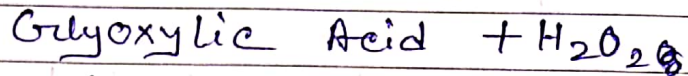
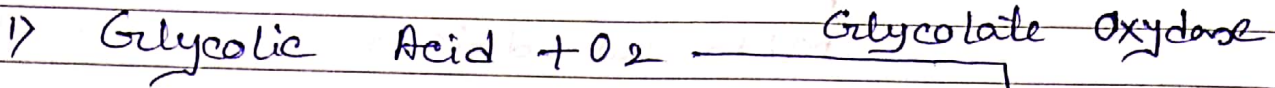
Creation is a drug I can't do without. - Cecil B. De Mille

Notes :

Appointment :

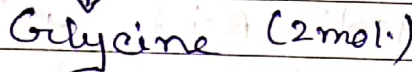
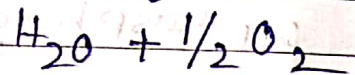
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* Reaction in Peroxisome →



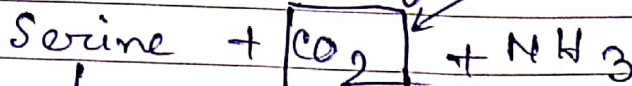
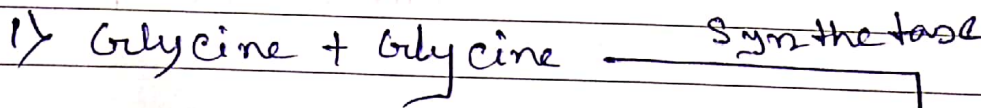
Peroxisomal
transaminase

catalase



enter into mitochondria

* Reaction in mitochondria →



Primary source
of CO₂
in photo
respiration

enter into peroxisome.

Education is a progressive discovery of our own ignorance. - Will Durant

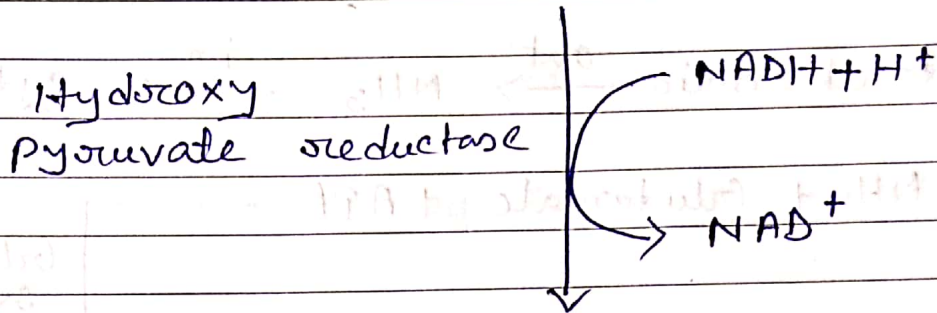
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* Reaction in Peroxisome →

1) Serine → Hydroxy Pyruvate



Glycerate

enter into chloroplast

* Reaction in Chloroplast →

1) Glycerate $\xrightarrow[\text{+ ATP}]{\text{Glycerate Kinase}}$ 3PGA

~~2) 3PGA + CO₂ $\xrightarrow[\text{Kinase}]{\text{Glycerate}}$ RUBP~~

2) 3PGA → enters into Calvin Cycle

↓
Produce RUBP

Education is an ornament in prosperity and a refuge in adversity. - Aristotle

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* Fate of NH₃ →

→ NH₃ + Glutamate

Mitochondria $\xrightarrow{\text{out}}$ NH₃ $\xrightarrow{\text{in}}$ cytoplasm

1) NH₃ + Glutamate + ATP

Glutamine Synthetase (GS)

Glutamine + ADP + P_i

enter chloroplast

Glutamine + α-Ketoglutarate

α-KGAT

Glutamate (2mol)

α-KGAT - Glutamine oxoglutarate aminotransferase

Cowards die many times before their deaths; The valiant never taste of death but once. - William Shakespeare

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FEBRUARY

16

2019

Saturday

Week 07

Glutamate (2mol.)

1mol.

1mol.

Continue
GCS reaction

enter peroxisome

Amino group donate to Glyoxylic
Acid

Produce Glycine

Sunday 17

Flattery is like cologne water, to be smelt of, not swallowed. - Josh Billings