PHOTOSYNTHESIS IN HIGHER PLANTS

PHOTORESPIRATION

PHOTORESPIRATION(PHOTOSYNTHETIC CARBON OXIDATION CYCLE - PCO CYCLE):

- It is also called PCO (photosynthetic carbon oxidation) cycle or C_2-cycle or glycolate metabolism.
- This cycle was discovered by Decker and Tio in tobacco (a C_3 plant)
- Photorespiration is a wasteful process because there is neither synthesis of sugars nor of ATP and NADPH. Rather it results in the release of CO_2 with the utilisation of ATP.
- Approximately 25% carbon is lost during this process.
- Photorespiration is a characteristic of C_3 plants.
- Three cell organelles are required to complete a turn of PCO cycle, namely ; chloroplast, peroxisome and mitochondria.

Conditions favour photorespiration :

(a) High light intensities : It is considered as main condition for photorespiration. This leads to following two conditions (b & c).

(b) Higher concentration of O_2 and lower concentration of CO_2 inside mesophyll cells. (under such condition RuBisCO binds with O_2 and acts as an oxygenase enzyme)

(c) High temperatures.

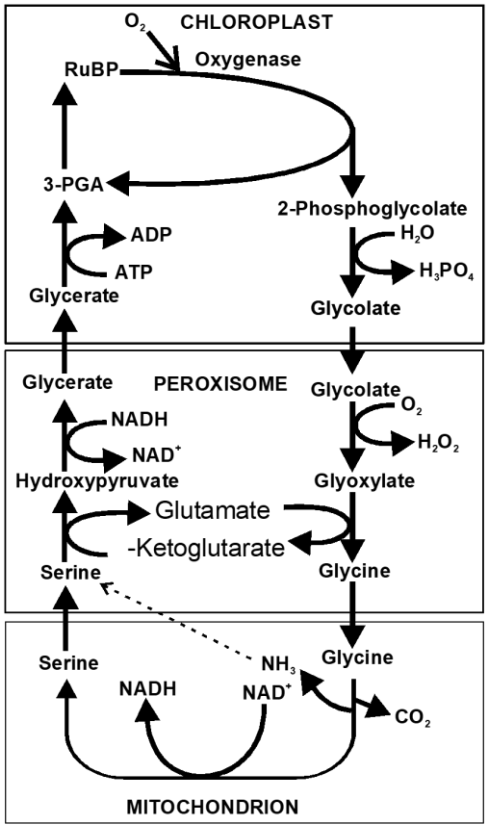

Fig:- C_2cycle

Warburg effect :

The Warburg's effect is the decrease in the rate of photosynthesis by high oxygen concentrations. Oxygen is a competitive inhibitor of the carbondioxide fixation by RuBisCO. Furthermore, oxygen promotes photorespiration which reduces photosynthetic output.

Bacterial Photosynthesis		Plant Photosynthesis	
(1)	Pigment containing structures are chromatophores.	(1)	Pigment containing structures are thylakoids insode chloroplasts
(2)	Pigments are bacteriochlorophyll and bacterioviridin	(2)	Pigments are chlorophylls and carotenoids

(3)	Its anoxygenic because PS II is absent whose photocenter is B-890 (Ps-II absent)	(3)	Its oxygenic because PS II is present which can photolyse the H_2O.
(4)	any one pigment system is present whose photocenter is B-890 (PS-II absent)	(4)	Two pigments system PS-I (P 700) and PS-II (P 680) are present.
(5)	Action spectrum us infer red.	(5)	Action spectrum is blue-red
(6)	Duringn light reaction NAD^+ being reduced to NADH	(6)	During light reaction $NADP^+$ being reduced to NADPH.