## RESPIRATION IN PLANTS

Respiration is an energy releasing enzymatically controlled catabolic process which involves a step-wise oxidative breakdown of food substance inside Ir4ing cell .

;HA – 6CO t6H, OtEnerzryr

- Cellular respiration is the mechanism of breaking down of food materials within the cell to release energy for wnthesis of ATP-

ıb Erwin. released during oxidation is riot IJsed directly but utilized In synthesis of ATP, which Is broken li mn when. energy is required. Therefore,. ATP is called enerwi currency of cells_

a The process of respiration requires *oxygen.* In plants oyeligen is taken in by stomata, lenticels arid root hairs.

■ Respirator Quotient Is the ratio of the volume of carbon dioxide produced to the volume of oxygen consumed in respiration over a period of time. RO is equal to one for carbaFrydrate and less than one for protein and peptones.

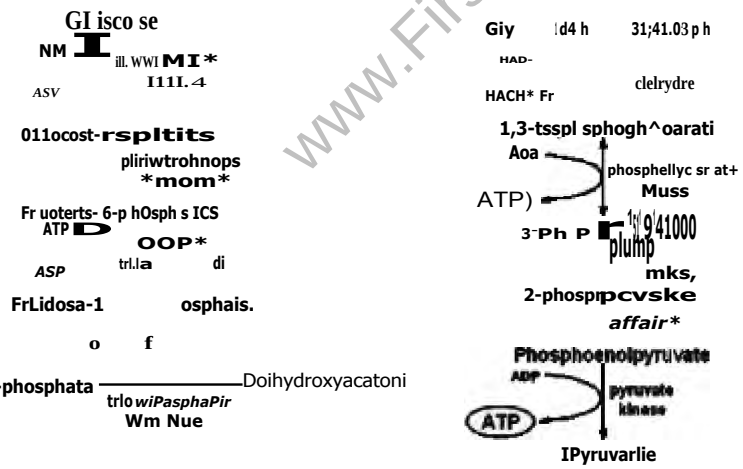


Aerokac Respiration is an enzymatically controlled release of energy irk a stepwise catabolic process Of complete oxiclatibn of organic food into carbon dioxide and water with oxygen acting as terminal oxidant.

**Glycollisls**

▪ TI'S scheme of givEcilysis is given by 'Gustav Emblem Otto Meyerhof, and Pa rnas. It is also calkd 5 MIR pathway_

▪ G Ivcolvsis is the partial oxidation of glucose or similar hexane sugar into two molecules of rryruific acid through a series of enzyme mediated reaction releasing some ATP and $NADEl_2$. It occurs in cytoplasm.







**a Iii fermentation by yeast, pyruvit acid is converted to ethanol and CD. . The enryme involved is pyrthric acid derma rboxylase and alcohol *de* hyclrogenase catalyze this reaction_**

▪ **In both lactic acid fermentation and alcohol fermentation very. ' less amount of energy Is released,**

▪ **Yeasts poison themselves to death if concentration of alcohol reaches above 13%.**

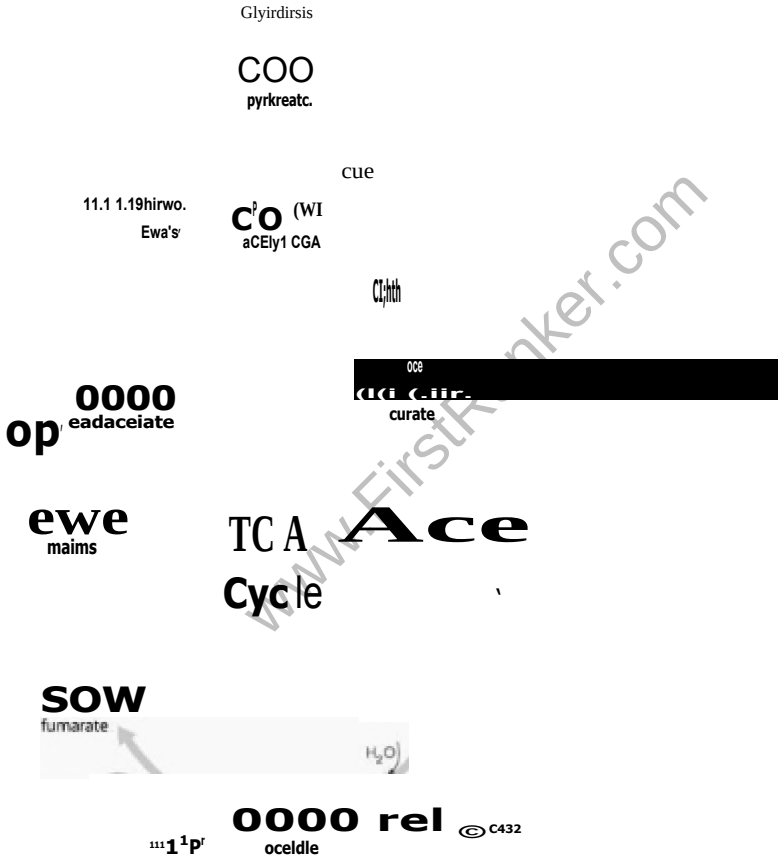
**Oxidation of Pyrtivateto Acetyl-CoA is done to produce CO, and NAN_ The reaction ratalwed byr pyrvvic dehydrogenase !eel:pukes the participation of several coenzymes Including ..NAo ·**

**Pyruvic NAB Acetyl CoA i CO NADH +I-**



**Pi* Weft. SI Ore &Wen IN**

**.4. The Acetyl CoA enters a cyclic pathway called TC cycle or Krelfs cycle_**




**TrIcarlzhomylle Acid Cycle/Krebs Cycle**

- **ICA cycle was disonwered by Hans Krebs in 1940_ This cycle is called TCA cycle because initial product is citric acid**
- **The two molecules of pyruwate are completely detracted ir« Krelfistycle to form two mdecules of ATP., ENADIA and 2FAD11$_2$-**

**$^{3}$y1ikriCailid + 4NAD$^{+}$ + FAD$^{-}$ 1- 2$H_2O$+ ADP +1$^{3}$| Hicd tir 30:1$_1$ -F 4NADI-l -F 4F1FAD11, ATP**

**Terminal Oxidation is the name of oxidation found in aerobic respiration that occurs towards end of catabolic process and invokes the passage of both electrons and 'protons of reduced coenzyme to oxygen to produce water.**

**Electron Transport Chain**

**●The rnetal;Polic pathwav through which the electron passes from one carrier to another inside the inner mitochondrial membrane is called ETC or miltoichondrial respiratory chain,**

*** Electrons from FIADI-l prixiluceci wring citric acid cycle are oxidized by FIADH dehydroge nase and electrons are transferred to ubiciumone located within the Inner membrane. ill:lig uinone also receives electrons from Acti $_z$ tran Sferred cytochrome c wia cytochrome ix$_1$ c_ornplipr.**

■ When the electrons pass from one carrier to another via electron transport chain, they produce ATP farm ADP and inorganic !phosphate. The number of AT molecules synthesized depends upon electron donor..

* Oxidation of *one* molecule of NiADH Ode. rise 3 molecules of ATP, while oxidation of one niDlectItE of $FADH_2$ produce two molecules. of ATP.

| Oxidative phuspharylation | Photophospharylation |
|---|---|
| a) It occurs in respiration process_ | a) It occurs in photosynthesis_ |
| h) Energy of oxidation reduction is used for production of protein gradient required for phosphDrylation- | b) Light energy is utilized for production of proton gradient for Osphoryiation. |

**Amphibolk Pathway**

- Glucose is the favored substrate for respiration_ All carbohydrates are usually converted into glucose before ti ed for respiration.
- Fats needs to be broken down into glycerol and fatty acid, which is further broken converted into Acetyl CoA and enter the respiratory pathway.
- Proteins are broken into amino acids and further enter into Krebs cycle.
- freaking down process within !Wing orRanisrn is called catabolism and synthesis process is called !nain! i5rn process. So, respiration is an Arnphilbolic pathway.