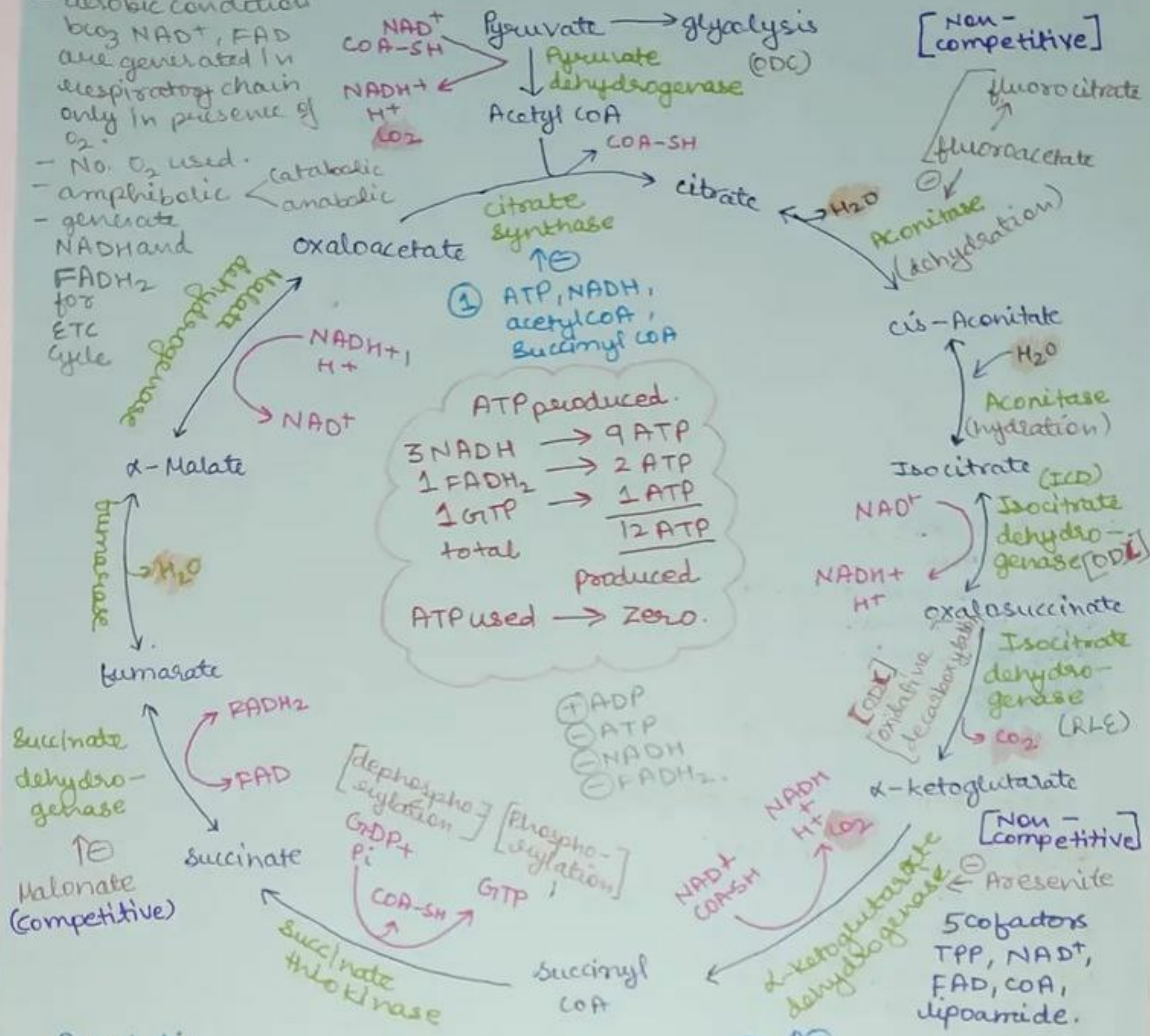


# CITRIC ACID CYCLE / Krebs cycle / Tricarboxylic acid cycle (TCA cycle)

- enzymes → Mitochondrial Matrix
- aerobic condition
- $\text{CO}_2$ ,  $\text{NAD}^+$ ,  $\text{FAD}$  are generated in respiratory chain only in presence of  $\text{O}_2$ .
- No.  $\text{O}_2$  used.
- amphibolic
  - ↳ catabolic
  - ↳ anabolic
- generate  $\text{NADH}$  and  $\text{FADH}_2$  for ETC cycle



**ATP produced:**  
 3  $\text{NADH}$  → 9  $\text{ATP}$   
 1  $\text{FADH}_2$  → 2  $\text{ATP}$   
 1  $\text{GTP}$  → 1  $\text{ATP}$   
**total produced** → **12  $\text{ATP}$**   
**ATP used** → **Zero.**

**Regulation**

- ② **Isocitrate dehydrogenase**
  - ↑ ⊖  $\text{ATP}$ ,  $\text{NADH}$
  - ↑ ⊕  $\text{ADP}$
- ④ **availability of ADP**
  - sufficient ADP
  - ↓ ⊕  $\text{NADH}$  and  $\text{FADH}_2$  [imp. for cycle to proceed.]

**Overall Rxn**  
 $\text{Acetyl CoA} + 3\text{NAD}^+ + \text{FAD} + \text{GDP} + \text{P}_i + 2\text{H}_2\text{O}$   
 ↓  
 $2\text{CO}_2 + 3\text{NADH} + 3\text{H}^+ + \text{FADH}_2 + \text{GTP} + \text{CoA}$

- energy (65-70%) ATP (oxidative phosphorylation)
- oxidation of acetyl CoA to  $\text{CO}_2$  and  $\text{H}_2\text{O}$ .
- final common oxidative pathway for carbs, fats, amino acids.
- No net consumption of any intermediates.



