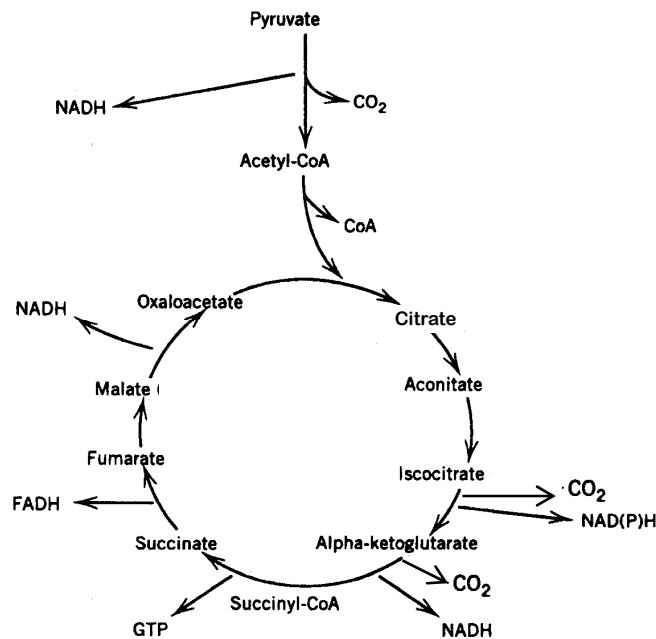


1. There has been one specific type of bacteria found at hot spring area. They can live under 55°C. For oxygen requirement, they can grow either with or without oxygen. Which of the following selection is the right description for such kind of bacteria? (A) thermophilic and facultative bacteria (B) thermophilic and aerobic bacteria (C) mesophilic and facultative bacteria (D) mesophilic and anaerobic bacteria (E) psychrophilic and aerobic bacteria. (15 分)
2. 何者是正確的使用二名法命名微生物: (A) *Clostridium beijerinckii* (B) *Clostridium beijerinckii* (C) *Clostridium beijerinckii* (D) *Clostridium beijerinckii* (E) *clostridium beijerinckii*。 (15 分)
3. Krebs cycle (又稱 Tricarboxylic acid cycle) 能將丙酮酸 (pyruvate) 完全氧化成 CO₂ 及 H₂O。就 Krebs cycle 內的物種與其對應的含碳數目而言, 請判斷以下何者是正確的。 (A) citrate --- 4 個碳 (B) malate --- 4 個碳 (C) alpha-ketoglutarate --- 6 個碳 (D) succinate --- 5 個碳 (E) fumarate --- 5 個碳。 (15 分)



4. Monod equation 常用來說明微生物比生長速率與基質間的關係。假設在一培養基裏以葡萄糖做為生長基質培養 A 細菌, 但後來發現 B 細菌也存在其中, 兩者均為中溫菌。A 細菌的最大比生長速率 $\mu_{\max}=0.3 \text{ h}^{-1}$ 、半飽和常數 $K_S=10 \text{ g COD/L}$; B 細菌的最大比生長速率 $\mu_{\max}=0.05 \text{ h}^{-1}$ 、半飽和常數 $K_S=0.8 \text{ g COD/L}$ 。請問要如何使 A 細菌在培養基裏成為優勢菌種, 說明原因。 (35 分)
5. 請畫出一批次培養中微生物隨時間的生長曲線, 並說明每階段的生長情形。 (20 分)