

RELATIVE ENERGY YIELDS OF ORGANICS RESPIRED WITH  
VARIOUS TERMINAL ELECTRON ACCEPTORS

Reaction	ΔG (kcal/mole)	ATP
$6(\text{CH}_2\text{O}) + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$	-688	38
$6(\text{CH}_2\text{O}) + 4.8\text{NO}_3^- + 4.8\text{H}^+ \rightarrow 6\text{CO}_2 + 2.4\text{N}_2 + 8.4\text{H}_2\text{O}$	-638	
$6(\text{CH}_2\text{O}) + 3\text{NO}_3^- + 3\text{H}^+ \rightarrow 6\text{CO}_2 + 3\text{NH}_3 + 3\text{H}_2\text{O}$	-429	
$(\text{CH}_2\text{O}) + \text{S}^0 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$	-5.7	
CH <sub>2</sub> O = acetate		
$6(\text{CH}_2\text{O}) \rightarrow 2\text{CH}_2\text{CH}_2\text{OH} + 2\text{CO}_2$	-57	2
$4\text{H}_2 + \text{CO}_2 \rightarrow \text{CH}_4 + 2\text{H}_2\text{O}$	-32.4	

ENERGY YIELDS FROM REDUCED CHEMICALS USED BY  
CHEMOLITHOTROPHS

Reaction	ΔG
$\text{NH}_4^+ + 3/2\text{O}_2 \rightarrow \text{NO}_2^- + 2\text{H}^+ + \text{H}_2\text{O}$	-62.1
$\text{NO}_2^- + 1/2\text{O}_2 \rightarrow \text{NO}_3^-$	-18.1
$\text{HS}^- + \text{H}^+ + 1/2\text{O}_2 \rightarrow \text{S}^0 + \text{H}_2\text{O}$	-48.5
$\text{S}^0 + 3/2\text{O}_2 + \text{H}_2\text{O} \rightarrow \text{SO}_4^{2-} + 2\text{H}^+$	-140.6
$\text{Fe}^{2+} + \text{H}^+ + 1/4\text{O}_2 \rightarrow \text{Fe}^{3+} + 1/2\text{H}_2\text{O}$	-17.0
$\text{H}_2 + 1/2\text{O}_2 \rightarrow \text{H}_2\text{O}$	-54.6