

Table 1
Oxido-reductases of the respiratory chains of *Escherichia coli*

Enzyme	Redox couple		Genes	Map position (min)	Signal sequence subunit (Aa residues)
	Pair	E'_m (V)			
<i>Primary dehydrogenases (DH):</i>					
Formate DH _N	HCO ₃ ⁻ /HCO ₂ ⁻	-0.43	<i>fdnGHI</i>	33.0	FdnG (1-33) (pot.)
Formate DH _O	HCO ₃ ⁻ /HCO ₂ ⁻	-0.43	<i>fdoGHI</i>	88.03	FdoG (1-33) (pot.)
Formate hydrogen-lyase			<i>fdhF, hycA-H</i>	92.6; 61.35	n.s.
Hydrogenase 1	H ⁺ /H ₂	-0.42	<i>hyaABCDE</i>	22.26	HyaA (1-45)
Hydrogenase 2	H ⁺ /H ₂	-0.42	<i>hybABCDEFG</i>	68.53	HybA (1-26/27)
NADH DH I	NAD ⁺ /NADH	-0.32	<i>nuoA-N</i>	51.64	n.s.
NADH DH II	NAD ⁺ /NADH	-0.32	<i>ndh</i>	25.17	n.s.
Glycerol-3-P DH _O	DHAP/Gly-3-P	-0.19	<i>glpD</i>	76.89	n.s.
Glycerol-3-P DH _N	DHAP/Gly-3-P	-0.19	<i>glpACB</i>	50.76	n.s.
Pyruvate oxidase	acetate + CO ₂ /Pyruvate		<i>poxB</i>	19.42	n.s.
D-Lactate DH	pyruvate/D-lactate	-0.19	<i>dld</i>	47.80	n.s.
L-Lactate DH	pyruvate/L-lactate	-0.19	<i>lctD</i>	81.55	n.s.
D-Amino acid DH	2-Oxoacid + NH ₄ ⁺ /Amino acid		<i>dadA</i>	26.64	n.s.
Glucose dehydrogenase	glucose/gluconate	-0.14	<i>gcd</i>	2.97	n.s.
Succinate DH	fumarate/succinate	+0.03	<i>sdhCDAB</i>	16.37	n.s.
<i>Terminal reductases:</i>					
Quinol oxidase <i>bo</i> ₃	O ₂ /H ₂ O	+0.82	<i>cyoABCDE</i>	9.78	CyoA (1-24) (pot.)
Quinol oxidase <i>bd</i>	O ₂ /H ₂ O	+0.82	<i>cydAB</i>	16.67	n.s.
Quinol oxidase III (Cyx)	O ₂ /H ₂ O	+0.82	<i>appBC (= cyxAB)</i>	22.42	n.s.
Nitrate reductase A	NO ₃ ⁻ /NO ₂ ⁻	+0.42	<i>narGHJI</i>	27.53	n.s.
Nitrate reductase Z	NO ₃ ⁻ /NO ₂ ⁻	+0.42	<i>narZYWV</i>	33.09	n.s.
Nitrate reductase, periplasmic	NO ₃ ⁻ /NO ₂ ⁻	+0.42	<i>napFDAGHBC</i>	49.5	NapB (1-34) (pot.)
Nitrite reductase	NO ₂ ⁻ /NH ₄ ⁺	+0.36	<i>nrfABCDEFG</i>	92.42	NrfA (1-26) NrfB (1-31) (pot.)
DMSO reductase	DMSO/DMS	+0.16	<i>dmsABC</i>	20.32	DmsA (1-16)
TMAO reductase	TMAO/TMA	+0.13	<i>torCAD</i>	21.61	TorA (1-39)
Fumarate reductase	fumarate/succinate	+0.03	<i>frdABCD</i>	94.4	n.s.

The second substrate for each of the enzymes are quinones which are not given. Molecular properties of the structural genes, map positions and signal sequences (n.s., no signal sequence; pot., potential signal sequence) were obtained from the *Escherichia coli* database [3]