

TABLE II

Biomass yield (Y_{xs} : g of biomass · (g of substrate)⁻¹), residual substrate concentration, protein content (g of protein · (g of dry biomass)⁻¹), and specific rates (q) of oxygen consumption, carbon dioxide production, glucose consumption, and ethanol production in steady-state chemostat cultures of *S. cerevisiae* CEN.PK113-7D (D, 0.10 h⁻¹) under different growth limitations. Data are presented as average ± S.D. of two independent steady-state chemostat cultures.

Growth limitation	Y_{xs}	Residual substrate concentration	Protein	In vivo flux			
				qO ₂	qCO ₂	qGlucose	qEthanol
	<i>g · g⁻¹</i>	<i>mM</i>	<i>g · g⁻¹</i>	<i>mmol · (g of dry biomass)⁻¹ · h⁻¹</i>			
Ethanol (aerobic)	0.60 ± 0.01	<0.01	0.45 ± 0.01	6.3 ± 0.2	3.0 ± 0.1	0	-3.7 ± 0.02
Fructose (aerobic)	0.50 ± 0.01	0.61 ± 0.05	0.40 ± 0.01	2.5 ± 0.1	2.6 ± 0.1	0	0
Galactose (aerobic)	0.50 ± 0.01	0.19 ± 0.01	0.41 ± 0.01	2.5 ± 0.03	2.6 ± 0.02	0	0
Glucose (aerobic)	0.50 ± 0.01	0.17 ± 0.01	0.42 ± 0.01	2.6 ± 0.1	2.8 ± 0.04	1.1 ± 0.1	0
N-limitation on glucose (aerobic) ^a	0.18 ± 0.001	3.0 ± 0.4	0.28 ± 0.01	4.0 ± 0.1	7.0 ± 0.01	3.1 ± 0.1	2.6 ± 0.1
N-limitation on glucose (anaerobic) ^a	0.12 ± 0.001	154.3 ± 1.7	0.27 ± 0.01	0	7.1 ± 0.3	4.6 ± 0.2	6.9 ± 0.1
Glucose (anaerobic)	0.10 ± 0.001	0.43 ± 0.05	0.48 ± 0.01	0	8.7 ± 0.6	5.6 ± 0.2	8.5 ± 0.4

^a Residual [NH₄⁺] < 0.01 mM in nitrogen-limited chemostat cultures.