

TABLE 1. List of parameters^a

Symbol	Description	Unit
X	Cell density	Milligrams (dry wt)/liter of medium
k	Specific rate of exponential growth ($X = X_0 e^{kt}$)	1/hour
Y_s	Growth yield on substrate	Grams (dry wt)/mole of substrate
Y_{SC}	Growth yield on substrate carbon	Grams (dry wt)/mole of substrate carbon
V_{O_2}	Rate of O_2 exchange in the fermentor	Millimoles of O_2 /hour per liter of medium
V_{CO_2}	Rate of CO_2 exchange in the fermentor	Millimoles of CO_2 /hour per liter of medium
Q_{O_2}	Specific rate of O_2 consumption	Millimoles of O_2 /hour per gram (dry wt)
Q_{CO_2}	Specific rate of CO_2 production	Millimoles of CO_2 /hour per gram (dry wt)
Q_s	Specific rate of substrate consumption	Millimoles of substrate/hour per gram (dry wt)
Q_{SC}	Specific rate of substrate carbon consumption	Millimoles of substrate carbon/hour per gram (dry wt)
Q_{CC}	Specific rate of carbon incorporation into cell material	Millimoles of carbon/hour per gram (dry wt)
Q_{BC}	Specific rate of by-product carbon production	Millimoles of by-product carbon/hour per gram (dry wt)
$Q_{acetate}$	Specific rate of acetate production	Millimoles of acetate/hour per gram (dry wt)
RQ	Respiratory quotient	Moles of CO_2 /mole of O_2
BQ	By-product quotient	Moles of by-product carbon/mole of substrate carbon
CC	Carbon content of cells	Millimoles of carbon/gram (dry wt)
T	ATP utilization in transport	Moles of ATP/mole of substrate
C	ATP utilization in catabolism	Moles of ATP/mole of substrate
S	Substrate utilization in anabolism	Moles of substrate/gram (dry wt)
K	ATP utilization in the synthesis of key metabolites	Millimoles of ATP/gram (dry wt)
M	ATP utilization in the production of cell material from key metabolites	Millimoles of ATP/gram (dry wt)
$Y_{ATP(ox.phosp.)}$	Growth yield on ATP formed in the oxidative phosphorylation	Grams (dry wt)/mole of ATP
$Q_{ATP(ox.phosp.)}$	Specific rate of ATP production in the oxidative phosphorylation	Millimoles of ATP/hour per gram (dry wt)
P/O'	Apparent P/O ratio	Moles of ATP/mole of O

^a For exponential balanced growth, the following relationship between a specific rate of metabolism of a compound i and the growth yield on the same compound exists: $Q_i = k/Y_i$.