Effects of Dissolved Oxygen Concentration and Iron Addition on Immediate-early Gene Expression of Magnetospirillum gryphiswaldense MSR-1

We report effects of dissolved oxygen (DO) concentration and iron addition on gene expression of Magnetospirillum gryphiswaldense MSR-1 cells during fermentations, focusing on 0.25-24 h after iron addition. The DO was strictly controlled at 0.5% or 5% O2, and compared with aerobic condition. Uptake of iron (and formation of magnetosomes) was only observed in the 0.5% O2 condition where there was little difference in cell growth and carbon consumption compared to the 5% O2 condition. Quantitative reverse transcription PCR analysis showed a rapid (within 0.25 h) genetic response of MSR-1 cells after iron addition for all the genes studied, except for MgFnr (oxygen sensor gene) and fur (ferric uptake regulator family gene), and which in some cases was oxygen-dependent. In particular, expression of sodB1 (superoxide dismutase gene) and feoB1 (ferrous transport protein B1 gene) were markedly reduced in cultures at 0.5% O2 compared to those at higher oxygen tensions. Moreover, expression of katG (catalase-peroxidase gene) and feoB2 (ferrous transport protein B2 gene) was reduced markedly by iron addition, regardless of oxygen conditions. The data provides a greater understanding of molecular response of MSR-1 cells to environmental conditions associated with oxygen and iron metabolisms, especially relevant to immediate-early stage of fermentation.
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.081 SNIP 0.754
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.13 SNIP 0.834
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.084 SNIP 0.834
Scopus rating (2007): SJR 1.103 SNIP 0.864
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.105 SNIP 0.86
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1 SNIP 0.8
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.005 SNIP 0.725
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 1.018 SNIP 0.866
Scopus rating (2002): SJR 0.902 SNIP 0.791
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.944 SNIP 0.752
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.936 SNIP 0.739
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.979 SNIP 0.748
Original language: English
carbon consumption, cell growth, iron metabolism, magnetosome, magnetotactic bacteria, oxygen
Electronic versions:
fnx079.pdf
DOIs:
10.1093/femsle/fnx079
Source: FindIt
Source-ID: 2356937954
Publication: Research - peer-review › Journal article – Annual report year: 2017