

Appendix 1. Partial sequence of p9E12, a cosmid that confers Fe(II) oxidation activity to *Rhodobacter capsulatus* SB1003

To identify the genes responsible for the observed Fe(II) oxidation activity conferred onto *Rhodobacter capsulatus* SB1003 by p9E12, the insert of this cosmid was sub-cloned and partially sequenced. The sequence data obtained are presented here and represent ~78% of the p9E12 insert. pP1, pP2, pP3, pP4, pP5, pP6, pP7 are clones with *Pst*I restriction fragments of pE12 in pBBR1MCS3 (Tc^R) and pH5 and pH6 are clones with *Hind*III restriction fragments of pE12 in pBBR1MCS2 (Km^R). For further details see Chapter 5.

pP1 – 397 bp from T3 end 66% GC

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CTTAATCGCCTTG CAGCACATCCCCCTTTCGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCCGAAC
ACGAGCACGGCACCCGCGACCACTATGCCAAGAATGCCAAGGTAATAAATTGCCGGCCCCGCCATGAAGTCCGTGA
ATGCCCGACGGCCGAAGTGAAGGGCAGGCCGCCACCCAGGCCGCCCTCACTGCCCGGCACCTGGTCGCTG
AATGTCGATGCCAGCACCTGCGGCACGTCAATGCTTCCGGGCGTCGCGCTCGGGCTGATCGCCCATCCCGTTACTG
CCCCGATCCCGGCAATGGNAAGGACTGCCAGCGTGCCATTTTTGGGGTGAGGCCGTTTCGGGCCGAGGGGGCGCA
GCCCCGGGGGGATGGGAGG
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pP1 – 709 bp from T7 end 66% GC

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TTGCCGAAACCAGCGGTTCCGGGCGCAAACCTGATGCTGAAGGGAGGGCCCCCTTGCCGGGGCCTTCCCCCTTTCCACA
AGGAATGGCTGCGATGACCTACGACACCATGCTTCCCGACCCCGACCGCCATGCCGAGTTCTATGCCGGCGTGCCG
ACCAAGCGCGCGCTGGCCTGGGTGGCGGATATGGTGCTGATCGCCGTGGTCACCGCGATCATCGTGCCGTTCCACC
GCCTTACC GCGCTGTTTTCTGCCCTTCTGTATCTGGTGGTGGGCTTTGTCTATCGCACCTGACCTTGCGGG
CGGCTCTGCCACCTGGGGGATGCGGCTGATGGCGATCGAGTTGCGCGACTATCGCGGCCAGCGGTTTGATCTGGC
CACCGCATCTGCACACGCTGGGCTACAGCATTTCCATCGGCATGGTGGCGCCGCGAGGTGCTTTCCGGCCGGGCT
GATGCTGGTACGCCC GCGGGCGCAGGGGCTGACCGACCTTTGATGGGCAGCGTGCCGATCAACCGCGCCGCC
GCTACTGACCTTGGGGGCGCGGCAAAGACAGTCCTTGGCGGCAGCCGCGCGGCTTGCTAACGTGGCGGGCGGATC
CCCTTTGAATGTGATCATGCGCCACACTCTGCCGATCCACGAGACCCTGAAACGCGGCCATACCAAGCCCCGCGCC
CTGGACGGTGATCCGCTCCTTGCCGCCCA
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**pP2 – 7264 bp from the T3 end
68% GC**

ATTCGTTGTGCCTTGCCAGTGTCTTGCCCTGTGCGGGCTGTGTCCCGCCGCCCGCCGCTGGTGACGATGACCCG
CGCCACCGCCGCTGCTGGCGCTGGACGGTTGCCCGCGATGAAAACCTTCGGGGCCGACGCGGCCCGCCCGCCCA
CCCGCAGCAATGCCGAGATCGCGCAGGACTTCTGGCGCTGGAGTTTCGCATGAAAGCGGGCGGGCGCTGCCGG
TGCTACGCCGCTTTGACGGCCCGATACCGTGGCGCTGACCGGCCCGCTGCCACCGCCGCCCGCGATCTGG
CCGCGTGGTGCCTTCCGGGGCGAGGCCGGATCGACATCCGCCAGACCGACAGCGCCCGCCCGCATCACC
GTTGAATTCATCCCGCGGGCGCAAATCCAGGGCGTCTATGCCAATGTGCGCTGTTTCGTGGTGCCAAAGGGTGTCT
CCTGGGGCGACTACCGCGCTGCCCGTGGCGCGGCCAGGCTGGATTGGGCCACAGTGACCGCCCGCGAGCAGGCC
GCGATCTTCGTGCCCGCCGACACCAGCCCGCAAGAGGTGCGCGACTGTCTGCACGAGGAAGTGGCGCAGGCGATG
GGGGCGCTCAACGATCTGTATTGCTGTGCGATTGCGTGTCAACGACGACAATTTCCACACCAGCTGACCGGCTT
CGATAAGCTGGTCTGCGCGCGCATTACGCGCCGAACTGCGATCCGGCATGACCGGATGACCGGCGCGCCGCTT
GTTGCCCGACTGCTGGCGCGACTGAACCCAGGCGGCCCGCATGCGGGAAACCCGGTCAGCAGCGCCACGCCG
GGGCTGGATCGACGCGATGAAAAGGCGCTTGGCGGGCAGGACCGGTCGCCGCCCGCCGGGGCGCCGCCG
CCGCACGCTGAAAATTGCCACGGCGCAAGGCTGGCAGCAGCCGCTTGCCTTACGCCAGTTCCGGTGGGGCG
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GGCGGCCAGATCCAwGsaGCsmATgTCsAkAtgCAgCTkGcsGCCgTtacTaGCCCTGCGGCAGGGCGATGCCAAGGG
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 CCTTGCAGCCCTGGTGCATGGCCTGGGTGCCAGTGGCAAAGGCTTCTCGAAGATCGCCTTGACCTGGGCATGGC
 GGTGCGCCAGCGGTTGCGCGGCCAGACGATATCGCGCATCGGATAGAACATGTTGGCTTCCGACACCCCGCAGGTT
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 GTTCCAGCGCCCCGACAGGATAACGCCCGCGCGGAAGGCAGCAGTTGTTAGCGGTAACAGCATCTGCTAGACCCG
 GCGCAACCAGAGCTCGCGAGGACGCAAATGACGTTGACCCGACCATCGCCCGGTTACCCGACCCGATCCCGCC
 CGCTCGGAAACAGCCGCGGGCGTATCTGGAGCGGTTGGGAAGGCCCGCCGCGGGGGCCGCGGGCGC
 ATCTGTCTTGGCGAACCGGCGCATGCCTATCGGGCGATGGGGGTGGACAAGCGGCGACTGGCGGCCGACGG
 GCACCAATCTGGGCATCG

**pP2 – 1822 bp from the T7 end
 64% GC**

CACACAGGAAACAGCTATGACCATGATTACGCCAAGCTTGGTACCGAGCTCGGATCCACTAGTAACGGCCGCCAGT
 GTGCTGGAATTCGCCCTTGGCCCTCGATGGTTTCCGCGCTTTGCGACATCAATTCCTGTTTCCAGACCACCAGCTTG
 CGGCGGAAATACTCCAGTTGCCGCTCGTTTCATGAACGGCTCGGTTTCCGCGGACGGTAGTCTTCCGGAATAAAGA
 CCTCTGCCCTTCACTGCACTTCCATCTCCCGGACCCGACAGGCGCGGTTTGGGTGCGGCTTCCGCTCGCTG
 TGGCGGTGCCATATCGCAAGCCAAAGCCGTTGTCAGTACTAGCGTTTCCGCGGGGTTGCGGGTGGGTTGGCCGCTGCTA
 GTCTGTGCTTCCAAAGCTGCGAAGGCCAAAGATGAAATTCGCTCAACCGCCAGTTACATCGCCACCACCGACCTC
 GCCATGCGGTCAATGCGGCGGTGACGTTGCAACGCCCTTGGTGGTGAAGGGCGAGCCGGGACCCGGAAGACC
 GAATGGCGCGGAGGTGGCGCTGGCGCTGCAACTGCCGATCATCGAATGGCATGTGAAATCCACCACCAAGGCG
 CAGCAGGGGCTTACGAATACGACGCGGTGAGCCGTTGCGCGACAGCCAGTTGGGCGACGCGGGTGAACGAT
 GTCGCCAACTACATCCGCAAGGGCAAGCTGTGGCAGGCCCTTCCAGGCACCGGGCCGGTGGTCTTGTGATCGAC
 GAGGTGGACAAGGCCGATATCGAGTTTCCAAACGACCTGTTGACAGGAACTCGACCGCATGGAGTTTACGCTACG
 AGACGGCGAAACCGTGGGGCGCAGCATCGCCCGTGGTATCATCACCTCGAACCAAGAAAGGAACTGCCCG
 ACGCTTCTGCGCCGCTGTTTCTTCCACTACATCCGCTTCCCGGACATCGACACCCTGCGCGCCATCGTCGAGGTG
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 GTTCGAGCGGCTGGCCTTCATGGCGCGGCCAGGGCTAGGCGCGCGCGCGCCGCTTACCCGCGCCCGCGGGC
 TTGACCTACCCCGCGCGTGGCGCAAGGTCCAGAAGTTGCCGACCCCGGTGCGCTTGTGCCGACGCCCGGG
 GTTAGCTGCGGCAAGCCCTTTCAGAACCAGACAGATTGCGCCATGACCCAAAGCCTGCCCGTCCGATCCGCCCA
 TCACCGAAGCCGACCGCCGCTGGCAGGCGCTGTGGCAGACTATCTGTTGTTCTACAAGACCGCCCTGCCGCA
 GGCGTTTTATGACAGCACCTTCCGCGGGCTGATCGCGGGCAACGCAGGCATCCATGGCTTGTGGTCCGCAACGCG
 CGGCGTGGCGCTGGGGTTGACGCATTTTCATCTTCCACCCCTCTGCTGGAAGATCGAGCCTGCCTGCTATCTGCAAG
 ACCTGTTACCACCCCTGCCGCCGTTGGCTCGGGCGTGGGCCGGGCGCTGATCGAGGCGGTCTATGCCCGCGCCG
 ATGCCCGCGGAGCGCCCGGGTCTATTGGCTGACCGCCGAGAACAATATCCGGGGCGGATGCTTTATGATCAGGT
 TGCAA

**pP2 – 970 bp of an internal fragment
63% GC**

CACTAGTAACGGCCGCCAGTGTGCTGGAATTCGCCCTTCGCTGTTCTCGCGCGACGTGATCGCGCTGGCCGCGGCG
GTGGCGCTGTCGCACAACACCTTTGACGCCGCGCTGTTTCTGGGGTCTGCGACAAGATCGTCCCCGGTCTGGTGA
TCGCGGGCGGCCAGTTTCGGCCATATCCCGCGGTGTTCTGTCGCCGGCCGGGCGGATGGCCTCGGGCCTGCCGAATG
ACGAAAAATCCAAGGTCCGCAATGCCTTCGCCGCCGGCGAAGTGGGCCGCGAGGTGCTGATGGCGGGGAAATGG
CCAGCTATCACGGCCCCGGAACCTGCACCTTCTACGGCACCCGCAACACCAACCAGATGCTGATGGAGTTTCATGGG
GCTGCACCTGCCGGGCGCCTCTTTCTGTCATCCCGGCTCGCCCTCGCGCGGGCGCTGACCGAGGCGGGCGTGG
AACCGCGGGCGAGGATCACCGCGCTTGGCAACGATTTCCGCCCGGTGGGAGAGTTGCTGGACGAGCGGGCCTTCG
TCAAAGGCGAATTCTGCAGATATCCATCACACTGGCGGCCGCTCGAGCATGCATCTAGAGGGCCCAATTCGCCCTA
TAGTGAGTCGATTACAATTCAGTGGCCGTCGTTTTACAACGTCGTGACTGGGAAAACCTGGCGTTACCCAATTA
TCGCCTTGACGACATCCCCCTTTCCGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAG
TTGCGCAGCCTGAATGGCGAATGGACGCGCCTGTAGCGGCGCATTAAAGCGCGCGGGTGTGGTGGTTACGCGCA
GCGTGACCGCTACACTTGCCAGCGCCCTAGCGCCCGCTCCTTTCTGCTTTCTCCCTTCTTCTCGCCACGTTCCGC
GGCTTCCCCGTCAGCTCTAAATCGGGGGCTCCCTTAGGGTTCCGATTTAGTGCTTTA

**pP3 – 1095 bp from T3 end
63% GC**

CTTATCCGCCCTACGCGGTTCTGGCACATTTTGCAAGCCTGATAAGACGCGGCAAGCGTCGCATCAGGCATCGGAG
CACTTATTGCCGGATCGGGCGTGAACGCCTTATCCGCCCTACGGTTCCTGGCACCTTTTGTAGGCGTATAAGACGCG
GCAAGCGTCGCATCAGCGATGATGCGCAATTGCCTACGTTTTTACTCTTTGTGGCCATAAACCCAGCGAGCCCGCGT
ACGCGCTGGAATCACCGTGTTCGCCCTTACGCACCGGCGTTTTACATTCGCCCGCGGAACAAATGTTTAAATCAA
CTGCCAAACCGTTTGATATAAACGGTCTGGTCGACGGATCACCATATCGCGCGTGATAAGCGGCGTCAGCCCGCTA
GGAACGCCGCCATATACCTGCCGAGAAGCAGGAGAACCAGCGCGCCGCGCAGAACCAGTAACATCACCCGCGCCATCC
GAACCCCAAGAGCCTGCCGAAGCGTCGGCATGGAATTTGGCCAGCATAAATGCCGCCACCTTGGGCCGCAAGG
TCAGCGACATGACCTTTTCCCGCAGCACAGTGTTCCTGTGCAAGGGCATTGGTTTTCGAGAGTTTGGCCCTCGTCC
TGGCGTTTTCGCCAGATTATCCGCAAGGATCAGCCTGGGCGGCTGGGCGTTGCGGACTGGCCAGAGGCCGACCTG
CGGGCGGGCCTGACCCTGCTGCCGCAACGCAGCAGCCTGATGGCCGGAACCGTGGCCGAGGCGCTGCGGCTGGC
CGGCCCGCGGAGGACGCGCACCTGTGGCAGGTGCTGGCGGCCGTGCAGATGGACGGGATCATCCGCGAACGCG
ACGGCCTGGCCGCCGGATCTGCGCCACGCCATGGCCAGCCGATGCCACACCAGCGCGCCATAGGCGGCA
AACACCGCCAGCGCGCCGAGGTTGGAGGCGAAGTTCAGCAGCTTGGTATGCGCCGTGGCCTTACGACGCCATGC
CCCGCCAGCACCAAAAAGCCGATCATGTAGAACGCCCCCGCCCCGCGCCGATCAGCCCGTCATAGCCGCCGAT
CAGTGGCACCAAGGCGGTGAAAGCAGTGGGCGA

**pP3 – 7231 bp from T7 end
66% GC**

CAGCTTGATTGCTGGCCGACACCTACCGCAAATACGTGCATGACAACCTGCGCGAAGGCGCTGCCATTGCCTTTGC
CCATGGACTGAACGTGCATTTCCGGCCTGATCGAGCCGAAACCCGGCGTGCATGTCATCATGATGGCACCCAAAGGC
CCCGGCCACACCGTGCAGCGGCAATACCAAAGGCGGGCGGCTGCCCTGCCTGGTGGCGGTGCATAACGACGC
CACCGGCAAGCGATGGAAATCGGCCTGTCTACTGTTCCGCCATCGGCGCGGCCGCTCGGGCATCATCGAGAC
CAACTTCGCCAGGAATGTAAACCGACCTGTTCCGCCAAGAGGCGGTGCTGTGTGGCGGTCTGGTCAACTGATC
CGCATGGGCTTCGAGACCCTGGTCAAGCCGGTACGAGCCGAAATGGCCTATTTTCAATGCTGTCACGAGGTGA
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GGTGGACCGCTCGCGCAACTAAGCCGGAACAACTGCATTTTCAATGCACTGATTTCGAAAGGGGCGCTTTATTGGC
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CCCTCAGTTCTCGTTACCGTCAGACCATGGTCGGTATATTTTCGACCAAGTCTGTATTGAGAAGCCCTCGTCAGA
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TCACTGGCTGATCGCGCTGGATACCGGACCGGCGCGAATTGTGGCGCTTTCGCCCATCGAGGATACCATCATC
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TGCCGCGCAGCCGCCGGTCTGGGCGCATGCCATCGGCATGGGGTCTTCTCCAACGCCCTGCCGTTTGCACCTGCT
CAGTTGGGGGAGTTGCATGTGGCTCGGGCTTTGCCGGATCACCATGGCGGCGGTGCCGCTTTCACCTGCTC
TTGGCGCACCGGCTGATCCCGGGCGAGCAGATGACGGTGTGAAACTGCTGGGCCTTGGCTCGCCATCGCCGGG
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GCCCTCAGCAACATCCGCCGCAAGGCTTGACCTGATTTCACTTGTCAAATATCCTGGGGGTGAGGCGCTATG
CGCCAGGGGGGCAACGCCCCCTTCTGCTCAAACCTCAAACCGCCGCTTCCACCGCCCGCAATGCTGCCCA
CCACCTCGGCCAGCAGCAGCTCGTCTCACATTCCGCCATACCCGACCAAAGGCTCGGTGCCCGACTTGGCGAT
CAGCAGCCGCCCGAGCCCTGCAACCGCGCTTCGGCATCAGCAATACCGCCTGCACCGCCCGCCGCCAAGGG
CTGCGACCCCGCACCGTAACGCACGTTCTTACGATCTGCGCGCACGGTCTGAAAGCTTTGCGCGAGCCGATGCC
GGTGTTCGTTGCGCGCATCTCGGCCAGAACTGCAACCGCAATCAGCCGTCGCCGTGCGGCTGATGCTGCTG
GTCATCACGATATGGCCGACTGCTCGCCGCCAGGTTGAAACCGCCGCGCCGCATCGCCTCGACCACATAGCGGT
CGCCGACATTGGTGGCTCCAGCCGAGCCGCGCCGCTCCAGAAACCGCTCCAGCCGAGGTTGCACATCACCG
TGGCCACCAGCGTGGCCGCGTGCAGCCGCCCTCTCGGCCAGCGGGCGGCCAGCAGCGCCATGATCTGGTGC
CCATCCGCCACCTTCCGGTCTGATCCAGAATCATACCCGCTCGCGTCCCATCCAGACAGATCCGACATCGG
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CGGCGCCACCCCGGATCACCTCGGCGCCAAATCCACAGCACCTCGGGGGCCGACGATAGGCCGCGC
CATTGGCGCAATCTATACCACCTTACGCCATCAAGCCGACGCCGAGGGAAAGGTGGTCTTGGCATATTCTGTA
TAGCGCCCGCGGCCATCGTCGATCCGCTTGGCCCGGCCGATGTTCTGGGCTGCGCCAGCGCAATCTCGCCCGC
AGAATCGCCTCGATCTCTTTCCGCATCATCCGACAGTGTGAAGCCGTCGGGGCCGAAGAATTTGATGCCATTG
CTGATGCGGGTTGTGCGAGGCGCTGATCATACCCCCAGATCGGCGCGCATGCTGCGCGTCAGAAACCCACCGC
AGGCGTCGGCACCGGCCAGCAGCAGCAGTTCATCCCCGTCGAGGTCAACCCGGCGGTGAGCGGTTTTCCAG
CATGTAGCCCGACAGCCGCGTGTCTTCCGATACACCCCGGTGCGCCGAGTGCCGTCGCGCCGGAAGAACC
CCCCCGCCCGCCAGCCGCAAGGCCATCTCGCGGTATCGGGTATCGGGTAGGTATTGGCCCGCCGCGCACCCATC
GGTGCCGAAAAGTGTCCGTGTCATGCGCCCTACTCTTAACAACGACCGCCACAGCGCCAGCGCCTGCCGGTTT
CCCACACATCATGACCCGCGAGGATCTGCGCCCTGCGCCACCCCGGCCAGCGCCACCGCCAGCGACCCCGGGC
CGCGGCGGTGGCCCTGCGCCTCGCCGCCAATGGTGGCGATGAATTTCTTGC GCGACACCCCGAGCAATGGCGC
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GGATCAACACAGATGCGGGCGCGCGGATCCCCGCGCGCAGGCCAGCGCCACCGTCTGGCCAGATAGTCGT
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GACCGGGCGCATCCGCTGCGCCACCACCTCCGCCATGCCCGCGTCATAGCCAAAGGCCGACACGTCATTGACCATG
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CCCCCGCGAGCGCCGCAATCACCGGGCGGTGCGCGAAAATCTCTCGCCCTCCGCCACCTCGGCCCGCCCTGG
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GCAAAGGGTTCGGGTGCGGGTGCAGCAACCGCACCTCCGCGCCGACAATGCCCGGGGCTGGGCTATTACGCG
CGCCCGGTTTACCAGATTACGCCACTGACCCCGCTTTCGCTGCGCGACGGCACCCGAGTCGGTCGATCAGC
CGCCGCTTCGATCTGGCCTGAGCCGGGTTTACTTCCGCGCCGCGAGCCCGATGAAGGCTGCCAATCCCGG

TCCCGCATGTTCAAGTCAGCCTGCCCTTGCCACCCTGCTGACCCTTGCCGCCTTTGCCGCGGGGTTCTGTTGACC
CCATTGCCGGCGGTGGCGGGCTCATCACTCTGCCGGCGCTGTTGCTGGCCGGG

pP4 – 6281 bp consensus sequence
49% GC

CTCTAGAAGTGGATCCCCGGGCTGCAGAGTTCAGCTGCGGGTAGCGCAACAACGTTGGTGTGCAGATCCTG
GACAGAACGGGTGCTGCGCTGACGCTGGATGGTGCACATTTAGTTCAGAAAACAACCTGAATAACGGAACCAATAC
CATTCCGTTCCAGGCGCGTTATTTTGAACCCGGGGCCGAACCCCGGGTGTGCTAATGCGGATGCGACCTTCAAG
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CGATGAAAAAGAGAGATTATTTCTATTAGCGTCGTTGCTGCCAATGTTTGTCTGGCCGGAATAAATGGAATACCA
CGTTGCCCGGGCGAAATATGCAATTTACGGGCGTCAATTATTGCGGAACTTGCCGGATTGAAGCCGGTGATAAACAA
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GTACCTATTTAATTCATCATGGGTGGAATAATGCCGATGGTGTAAAGGATGGTGGTTTTATCGTGACGCTCCTCTGT
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TTCGTCGTAGCGCGAATTTCTGACGCTGATTAACCCGACACCCTATTACCTGACGGTAACAGAGTTGAATGCCGGA
ACCCGGTCTTGAATAATGCATTGGTGCCTCCAATGGCGAAAGCACGGTAAATTTGCCTTCTGATGCAGGAAGCAA
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CGCAACTCGCCAGTATGGGGCTGAATACGGCTTCTGTGCGCGGTATGAATCTGCTGGCGGATGATGCCTGTGTGCC
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CATTTATGAGTAATCGCGCGGTGTTATTTCTCCTCAGTTATGGGATCCCGGTATTAATGCCGGATTGCTCAATT
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AACGCGGGAAATTACAACCTACCGTTACTCAGCAACTCGGGCAGACATCAACACTGATTTTGGATGGTAGCCATA
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CGGTCCGATGACCAATCTGGCTGGTGTATACGGTACGTTCTGTTGGAAGACAACAACCTCAGCTATAGCGTGCAAACCG
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 CACCATCAGGGTGAACGGTAAGGTCTGCGCAAACCGTGTACGGTTTCCACCACCAATGCCACGGTTGATCTCGGC
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 CCGGTGGGAACGTCGAGGGTCACTGCCAGCTTACGGGGGACAGCCGACAGTACCGGATATTATAAAAAACAGGGG
 ACCGCGCAAACATCCAGTTAGAGCTACAGGATGACAGTGGCAACACATTGAATACTGGCGCAACAAAAACAGTTCA
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 GCGATGATTTCCAGTTTGTGTGGAATATTTACGCCAATAATGATGTGGTGGTGCCTACTGGCGGCTGCGATGTTTCTG
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 AAAACCTGGGGTATTACCTCTCCGGCACAACCGCAGATGCGGGCAACTCGATTTTACCAATACCGCGTCGTTTTCA
 CCTGCACAGGGCGTCGGCGTACAGTTGACGCGCAACGGTACGATTATTCCAGCGAATAACACGGTATCGTTAGGAG
 CAGTAGGGACTTCGGCGGTGAGTCTGGGATTAACGGCAAATATGCACGTACCGGAGGGCAGGTGACTGCAGGAAT
 TCGATATCAAGCTTATCGATACCGTCGAC

pP5 – 3955 bp consensus sequence 69% GC

GGGGGTGGATAGCGTCAGCGGCAGGCTCAGCGCCCAATCGACGAAGATCGAGCGGCATTGCGCGGCGGTGATGC
 CGTCGATGGCATAGCTTTGCGGCACCAGCCCTTGGGGTCCGCTCAGTCAGTTGCATCGCTGCCCGTCCCTTTTTC
 GCCCAGCCGTTCCGAAATCACCGCCCGCTGCCACCAAGCCCTCCAGCCGTGCGCAGGGCAGCCGCTCGGCGTC
 GGCCTCGCCGTTTTCGCGCACCAGAAACGCCCGGCCACCGCTGCCAGCCGGTCCAGCTCCAACCTGCGGTGCGT
 CAGAAGCCGGGTGCCCGCTGCAACCGCCAGCACAGCTGTAGGCCGCCAGCAGCGCCGTCTGCCCGCTTGGCA
 CAGGAAACCGCCCTTACGCGCGCCCGCAACTGCGCTTCCACCCGCCGCGCAGGGTGGCCAGCCGCGCAGCGCGCA
 GGTCTGCGCCAGCAGTTTCGATGCCATCAGCGCCCGCCGCTTCTCGCTCCAGGCCCTTCCGGGGGTTT
 GCGCGCTTGCAGGCGGCTGCGCATCTCGGCCAGCTCGGCCAGCACCTTCGGCCCTGCCCGTGGCGGGAACA
 CCTCGCGGGGAAAGGCTCGACCTCGGCGGCCAGATCGGGTGTGCCGCCAGCGGCCGGGCGGGTTCAGGGC
 CAGGTGTTCCAGGTCCAGGCCTCGGTATCTGGTAGGCGCGAAGGATTTCGATCGAGGTGCCACCGGCCCTTG
 CCGACCGGAGGGGCGCAGCCGATGTCACCTCGTAAAGCCGACCTTCGGCCATCGGGGCGGTTCAGGGCTGCAC
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 GCTGTCTAGATAACGATCAGGTGAGGTGCGACCCGGCGTTCAGCCGCGCCGACCCAGGCTGCCATGCCAG
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 GATCGCCACGGCACGATCCGAGCGCAGGGCGGGATAGTTGGCCAGGCATCGACGATGGCGCGGGCGCTGTCCGG
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 CGGTTCAGGGCGGCACGAAAGCCTGCCACATCCTCGGTGCCGCTGAAAAAGGCAATGCGGGCAACGCTTGGCGG
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 GCGCGGTTCAGATCCTCGGCCACCTCGGGCGGCACCCAGCCTTTTTCCGGCAGCGCCGAGGCTGCCAAGGTGG
 TCGACCGCGCAAGCGGTGTCACGGCCCCCGCGATCAACTGGCGGGTCTGGGTGAAGAACTCGATCTCGCGGA
 TGCCCGCGACCGGAGTTTCATGTTGTGACCTCGATCAGATGGGGCCGTGAAGCCCGCGATGGTTCGCGGATGC
 GCAGGCGCATGCTGTGGGCGTCTGGATGGCGGCGAAATCCAGATGCTTGCGCCAGCAGGAGGGGGTTCAGGCTGT
 GCAGGAACCGCTGCCCGCGGCAAGGTGCGCCGCGCAGGGCGGGCCTTGTATAGGCGGCGCTTCCACGGTG
 CGGCCGACGCTTTGTAATAGCTTTCCGCCCGCCATCGACAGGCACACCGGGCGTACCAGCCGATCGGGGCGC
 AGCCGACGGTTCGGTGCAGAACACGTAGCCCTCGCCGTCAGGTCCGACAGCAGGGCGGTATCCGCCGCGTAC
 GCGGATGAAGGCGCCCGCGCCTCGGGGCGATCGCCGATAGCGGGTCTCGTGAACAGACAGATCAGGTTCGAT
 GTCGGAGGAATAGTTAGTCTGTCGCGCCCATCTTGCCATGCGCCAGCGCCACCATGCCAGCCGTTTCGCGCAT
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 ATCAGCAGCCGACCCCGCGCTTGGCGATGCGCAGACCGGGCGGAGGGTATCGACGGACAGGGTGTGCGAGCGG
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 CGCATGGGTATGGCGCCAGCATGGCCGGGGCGGGTGGCGGGTCAACCGGGGGGATTGCAAGCGTACCCGGC
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 GGGATTGACGCCCGGTGCTGGAATGCCGCAAGGAAACCGCACCGCCCGCAAGTGCAGGCTGCGGGCTGT
 GCGCTGACAGATCGTGAAGTGCATCTGTTTCCGGCGAAGGCTCGGGGCGAGTTGCGGCTGTTCTGACGGCG
 GGTGGCAATCAGTCTGCGCCGACAAGGCTCGGCGCTGGCGGGCAGGCTTTGGGGCGGGCCGATGCCGATCA

GGTGC GCAAGACCACCGGCTTTGCCATCGGCGGCGTGGCCCCATCGGCCACCTGACCCCGCTGCCCTGCTGGTT
 CGACGCGCGGCTGCTGGAGTTTCCGAGGTCTGGGCCGCCGCCGCCACCCCGCGCCACATCTTCGCCGCCCGC
 CGCATCTGTGTTGCGGATCACTGCGGCGCATCTGGCCGATTTACCCGCTGAGGCCCATGTAAAAATGTTTTACAT
 CGGGTCTTGAACCTGCCCGGCAATACCGATCTCCGTTTATGTGAAACACCTTACATCGACCTGCAACCCTGAAC
 GGGAGACCGCCATATGTATACCGTCTTCCCCTGCCGCATCTGGCAGCGTCACCACGTGGTTCAACCGCGCGGTC
 GCCTGGCTGGATGACCGTGGCAAAGGCGCCTGGATCGCCGCCATGGTGCTGTCTTTCATCTTCGTCTGGCCGCTT
 GCCTGTTTCATCCTTGGCTACATGATCTGGAGCAAACGCATGTTCAAACGCAATGGCTGCGGCCACCATCACGCTTTC
 CACGGCGCTTACCGACGAGCGGCAACACCGCCTTCGACGCTACAAGGCCGAAACCATGCGCCGCTGGAAGAC
 GAACAGGACGCGTTCAATTTCTTCTGCAGGAATTCGATATCAAGCTTATCGATACCGTGC

pP6 – 1770 bp consensus sequence
66% GC

GCGGGGCGGCCGCTCNAACTAGTGATCCCCGGGCTGCAGGCAGGCCTTGCCGCGCCCTNTANAGGGNGCC
 GCAAGGGTGGCCGCTCCACCCGCGNTCGNCTTTTGGAGNGGCGCAAGCTGCGCCCGCTGGCCTGAGGTCAACCGCC
 GGCAGCGGCTCCAGTGCAGCAATGTCAATCTTACCATGCCATCATCGCCTGCATACCCGCCCCGAGGTGTCG
 GTCTGCAAAAGCCGCGGCAGACCCGCGGCGTGATCTGCCAGGACAGCCCCGAAGCGGTGCGTCAAGCCAGCCGCA
 GCGGCTTTCGACACCGCCTTCCAGCAAGGCGTCCCACAGCCGGTCCACCTCGGCCTGAGTATCGACATGCACCC
 AGCGACACCGCGGGCGTCAGCGGTAATGCGACCCCGCTTTCAGCGCCAGATAGCGCTGGCCAGCAGATCGAAA
 TACACCGCCAGCGCTGGCCTGGTCTGCGGGCTTTTGTAGGATTTAGTGATGCGGGCGCCCTCGAACAGGCTGC
 AATAGAACCAGCGCGGCGGCTTTCGGCCTGGGTGTCGAACCACAGGCAGGTGGACAGCGAAGGCTCGGTTCATCGGCA
 TTTCCCTTTTGAAGGCATTGAAAATTAGCGCAGATCGCAGGCCTCGCGGCCAGCCGGGTGATCCCGGCCA
 GTCGCCCTTGACCATCATCGCCTTGGGTGCCACCCAACTGCCGCGACGCACAGCACGTTGGACAGCGCCAGATAG
 TCCCGCGCATTGCCAGCCGATGCCGCGGTGGGGCAGAACTGACCTGCGGCAACGGCGCACCAATCGCCTTC
 AGCGCCGCCGCCCGCCGAGGCTTTCGGCGGGAAGAATTTCTGCACCGTATAGCCGCGSTcCAGCAGCGCCATC
 ACTTCGGTYGCCGTYGCCGCCCGCMAGCAGCGGcAAGCCnTCGGCCTCGCAGgNGGSCAGCAAACGGTTCGGTG
 NCCCCCGGAGACACCCCGAAGGTNGCCCCGCGCCTTGGCCGCCGACATCCTCNCGGTCAGCAATGTGCC
 CGCGCCGACCAGCCGCCCGGCACCCCGGCCATGGCACGGATCACCTCCAGCGCCGCGGGCGTGCAGCGTCA
 CCTCCAGCACCGCAAGCCGCCGCCACCAGANCTCGGCCAAAGGTNGGGCATGGCGCACATCCTCGATAACCA
 GCACCGGAATGACCGGCCAGACGGCAGATTTNGGCAGCGCGGGCGGATTGTTNGGCGGGGGTTCATCATCGGCT
 CTTGTGGTCCGCCACGGCTCGGGCGGAACTGCGGGTCCGCGCGGATTTAGAAACAGATGAAATCAGC
 AGGCATTTCATCTGTTCTCAAATATCCTCGCCGAAGGCGAGAAGTTCTCTATTTTTCNGTCAACACCACCGCGCAC
 CCTCGGTGGCCGGGCGACATTGCGGCGGAAGGCGTGAACAGATCGCGGCCCATGCCGTGACCGTTTTNGGACA
 GATCGGCGACACCGGGCTGCGGGTTGCGAAGTCTCGGCCCCAGCACGGACAGCGTGCCTCGCCGGCGCGTCC
 AGTCGCACAATGTGCCATCGCGCAGCCGGGCGAGCCGCGCACCGCAGGCAGCTTCGGGCGAGACGTGGATGGC
 GGCGGGCCTTTNNAAGGCCCCCGACATCCGGCCATCGGTACCAATGCCCNATNAAANGGCCGCGGCTCTGCA
 GGAATTCGATATCAAGCTTATCGATACCTCGACTCAGGG

pP7 – 1299 bp consensus sequence
62% GC

ANGGGCCCCCTCGANGTCGAGGTATCGATAAGCTTGATATCGAATTCCTGCAGCTCGTCCGNNTTAATGAANATG
 ATCAGGTGCGACCAGGCGGGCGGCTTCGCCNNTTNAATCACCTTCAGGCCCTCGCCCTCGGCCCTTCTGGCACTG
 GGCGAACCGGGGCGCAGCGCCACGACCAGTTTTTCGCGCGCTGTGCGCGAGGTTAGCGCGTGGGCATGGCC
 CTGGCTGCCGTAGCCGAGgATKGCAACcTTCTTgTYCTTGATCAGGTTGATgTCGCAGTCACgGTCATAATACAGCGC
 ATGGGGCGTTcTTTGTGTTGATTGCCGCGCAGCATAGGCGGTTTGGCGGATGGTTCTGTCAAAGTTTACATA
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 CGGCGGGTGTGCGGCAGTTGATGGCGGAACCTGGGCTGGCGATGGCCGATCTGGCGGAACCGCGCCGGCGTAC
 GCAGGGCAGCTGTGCGCGCGATCGAGATGGCAGGGCGCGAAGTGCATTTCCGCTCGAAATCCGATGCGGTGGC
 GCAGGGCATCGGCATCGTGTTCAGGAGCTGAACCTGTTCCCAACCTCAGCGTTGCCGAAAACATCTTCATCGCC
 GCGAGCCGGTGGGGCGGGCATCGACATCGACGCGGGTGCAGCGGGTGGCGGGCGCGGGCTTGGTGGCGGCG
 GCTGGAGCAGGACATCGACCCGATGCCGACCTTGGCACCTGCGCATCGGCCAGCAGCAGATTGTGAGATCGC
 CGCCGCCGCGAAACCGCATTTTCCGCGGCAATGCCGTGCAGCCGGGCGGATTTCGAGCACAGAAACCCGCGCAA
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 AGATCAGCATGGCGATCAGCGCAGCAGCGTGGTGAACGAGGTCATCANGTAAAGGNTCAGCGTCTGGTTGACCG
 AGATGTTTCATACCANCTATAAAGGGGCGTGGTCTTGTATTTCTGCAGCCCGGGGATCCACTAGTCAGAGCGGCC
 GCCCCGCGGTTG

**pH5 – 949 bp from T3 end
61% GC**

CCCTGAGTGAGGTATCGATAAGCTTTGCGCCAGCGCCGATGCCGGCTGTCCTTNTANAGGNNTCTCGGNCANAAC
TGCAACCCGGCAATCACCTTCTTTANGGGGGGGTGGCGTAATCGGTCATCACGATATGGCCCGACTGCTCGCCGCC
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CTCCTCGGCCAGNGGGCGGCCAGCAGCGCCATGATCTGGTCGCCATCCGCCACCTTCCCAGTCTGATCCANAATC
ATCACCCGGTGGCGTGCATCCANACAGATGCCGACATCGCGCCATGCGCCACCACCGCTCGGCGGCAGTC
TGGGTATAGGTGAGCCACAACGGTCGTTGATATTGGTGCCATTGCGCGCCACCCCAACGGGATCACCTCGGCGC
CCAATTTCCACAGCACCTNGGGGGCCGCACGATAGGCCGCGCCATTGGCGCAATCTATCACACCTTACGCCATC
AAGCCGACGCCGACGGAAAGGTGGTCTTGGCATATTCCTGATAGCGCCCGCGGCCATNNTCGATCCGCTTGGCC
CNGCNGATGTTCTGCGGCTGCGCCAGCGCAATCTCGCCNCCAGAATCGCCTCGATCTCTTTTCGGCATCATCCG
ACAGCTTGAAGCCGTGCGGGCCNAANAACCTTATGCCATTGTCCTGATGCGGGTTGTGCGAGGCGCTNATCATCAC
CCCCAGATCGNGCGNATGCTGCGNATNAAAAACCAACGGANGNGTCCGNACNGGGCCANCAACAGCANTTCAT
CCCGTCAAGTNACCNGGNGGTGAGCGCNTTTCAAATGTA

**pH5 – 912 bp from T7 end
64% GC**

ACCGCGGGCGGCCGCTCTGACTAGTGGATCCCCGGGCTGCAGGAATTCGATATCAAGCCNNTTANNTAGGGTCC
ACGGATCACATTATCGCGCGTGATAAGCCTTTTAAAGNCCGCTAGGAACGCCGCCATATACTGCCGAGAAGCAGG
AGAACCGGCGCCGAGAACCAGTAACATCACCCGCGCCATCCGAACCCCAAGAGCCTGCCGAAGCGTCGGCAT
GGAATTTTGGCCAGCATAAATGCCGCCACCTTGGGCCGCAAGGTCAGCGACATGACCTTTTGGCGCAGCACAGTG
TTTTCTGTGCAAGGGCATTGGTTTTGAGAGTTTGGCCTCGTCTGGCGTTTCGCCAGATTATCCGCAAGGATCAG
CCTGGGCGGCTGGGCGGTTGCGGACTGGCCAGAGGCCGACCTGCGGGCGGGCCTGACCCTGCTGCCGCAACGCA
GCACGCTGATGGCCGGAACCGTGGCCGAGGCGCTGCGGCTGGCCGGCCCCGCCGAGGACGCGCACCTGTGGCAG
GTGCTGGCGGCCGTGACAGATGGACGGGATCATCCGCGAACGCGACGGCCTGGCCGCCCGGATCTGCCACGCC
CATGGCCAGCCGATGCCCCACCACGGCGGCCATAGGCGCAAACACCGCCAGCGCGCCGAGGTTGGAGGCGA
AGTTACAGAGCTTGGTATGCGCGTGGCCTTACGACGCCATGCCCGCCAGCACCACAAAGCCGATCATGTAGAA
CGCCCCCGCCCCGGCCGATCAGCCCGTATAGCCCGGATCAGTGGCACCACNAAGGCGGTGAAAAGCAGTGG
GGCGAAATGCGGCGGGNGCGGTCNTCNTCGNACAGCCCCCTTCTTGAAGNAAAAANCCNGNGATGCCAATCAGGAT
CACCGGAG

**pH6 – 269 bp from T3 end
51% GC**

TCGNAANANGGGCCCCCTGNGNCGANGTATCGATAAGCTTATGCGNTGTGCTCGACCATGTGCCCTNACCGNA
GGGNTAGNNGNATTGGAACAGANNATGNGGAACCTTNTAAGGGGACAAGATCNGTTATGNGCTGCTTCCCGTAGC
CGNCGATGGCATCNCNGCCCAACCGAAAGCGCCNAGGAGANGCTGACCGCTTCCCCTGACCGGNCCTTGGCCC
GNCAGNAACCGNNANNTATAANCCNGGNCATGANCNANACCC

**pH6 – 322 bp from T7 end
64% GC**

AACCGCGGGGGCGGCCGCTCTAGAAGTGGATCCCCGGGCTGCAGGAATTCGATATCAAGCCNNTTATANGGG
CCGCAGATGCTGAAGAACGTGCGTTACGGNCCNTNGACGCAGCCCTTGGCGGCGGCGCGGTGCAGGCGGTGATT
GCTGATGCCGAAGCGCGGTTGACGGGCTCGGGGCGGCTGCTGATCCGCAAGTCGGGCACCGAGCCTTTGGTGC
GTGATGGCGGAATGTGAGGACGAGGTGCTGCTGGCCGAGGTGGTGGCAGCATTGTGGCGGCGGTGGAAGCGGC
GTTTGAAGTTTGGGCAGGAAG