

Mutant strain and phages	Accession numbers, ORF numbers and genomic coordinates of mutation region	Original DNA sequence	Original protein sequence ^{1,2}	DNA sequence following recombineering ³	Protein sequence following recombineering
<i>L. lactis</i> NZ9000 NZ9000-Cro ₇₁₂	NC_017949 782805..782833	TTGACAAGTTGCAACGA CGATGTTATAAT	N/A	TTGACAAGTTGCAACGA CGAT <u>CAGGATCC</u>	N/A
TP901-1 NZ9000-Cro ₇₁₂ -Portal _{TP901-1} ::Ter	NC_002747 ORF32; 15816..15839	AAACAAGAGCCTTTTATT TGCCGTG	KQEPLFAV	AAACAAGAGCCTT <u>GAA</u> <u>TTCT</u> ATTTGCCGTG	KQEP*ILFAV
NZ9000-Cro ₇₁₂ -MCP1 _{TP901-1} ::Ter	ORF33; 17151..17174	GGAATTCCTGGTTAAG CGTTCCA	GILGLSVP	GGAATTCCTGGTT <u>GAA</u> <u>TC</u> ATAAGCGTTCCA	GILG*IHKRS
NZ9000-Cro ₇₁₂ -MCP2 _{TP901-1} ::Ter	ORF34; 18500..18523	TATCATTACTATTTTGA CGGTGAT	YHYYFDGD	TATCATTACTATT <u>GAA</u> <u>TC</u> ATTGACGGTGAT	YHYY*IH*R*
NZ9000-Cro ₇₁₂ -Sfp _{TP901-1} ::Ter	ORF35; 19028..19051	GTTAAAGAAAAATCTG ACGAAGAA	VKEKSDEE	GTTAAAGAAAAAT <u>GAA</u> <u>TTCT</u> CGACGAAGAA	VKEK*IPDEE
NZ9000-Cro ₇₁₂ -MHP _{TP901-1} ::Ter	ORF36; 19812..19835	GCTAAGACTACCTCTCA AACTGTT	AKTTSQTV	GCTAAGACTACCT <u>GAA</u> <u>TC</u> GCTCAAACCTGTT	AKTT*IRSNC
NZ9000-Cro ₇₁₂ -MCP3 _{TP901-1} ::Ter	ORF37; 20318..20341	GATGAACCTAACGACGCT TACCGTT	DELTLTV	GATGAACCTAACG <u>TGAA</u> <u>TC</u> ACGCTTACCGTT	DELT*IHAYR
NZ9000-Cro ₇₁₂ -HTC1 _{TP901-1} ::Ter	ORF38; 20526..20549	CTTATTCTTGGTTCTGA CATTAAA	LILGSDIK	CTTATTCTTGGTT <u>GAA</u> <u>TC</u> CCTGACATTTAAA	LILG*IPDIK
NZ9000-Cro ₇₁₂ -HTC2 _{TP901-1} ::Ter	ORF39; 20900..20923	AGTGTAGAAGTTTTTGG AGATATT	SVEVFGDI	AGTGTAGAAGTTTT <u>AGAA</u> <u>TTCT</u> TGGAGATATT	SVEV*NSWRV
NZ9000-Cro ₇₁₂ -Tap _{TP901-1} ::Ter	ORF40; 21107..21130	CTTGTAAGCATTGGGA TAAAGCA	LVKHLDKA	CTTGTAAGCATT <u>GAA</u> <u>TC</u> TGGATAAAGCA	LVKH*ILDKA
NZ9000-Cro ₇₁₂ -Ttp _{TP901-1} ::Ter	ORF41; 21444..21467	TTCAAACGAATCCAAGC TTGGGG	FKRIQALG	TTCAAACGATGATGAGC TTGGGG	FKR**ALG
NZ9000-Cro ₇₁₂ -MTP _{TP901-1} ::Ter	ORF42; 22061..22084	ATGCAGCAATTATTGAA GTGTGGG	MQQLKCG	ATGCAGCAATTAT <u>GAA</u> <u>TC</u> ATGAAGTGTGGG	MQQL*IHEVW
NZ9000-Cro ₇₁₂ -gpG _{TP901-1} ::Ter	ORF43; 22579..22602	AACATTGCAACTTTATC GAATGTA	NIATLSNV	AACATTGCAACT <u>GAA</u> <u>TC</u> TATCGAATGTA	NIAT*ILSNV
NZ9000-Cro ₇₁₂ -gpT _{TP901-1} ::BamHI	ORF44; 22731..22737	GAAAGCAATACGGGAA AGTTAATC	ESNTGKLI..[6 aa].*	GAAAGCAATACG <u>GGAT</u> <u>CC</u> GGAAAAGTTAATC	ESNTGSGKLI..[6 aa].*
NZ9000-Cro ₇₁₂ -gpGfsT _{TP901-1}	ORF43-44; 22731..22737	GAAAGCAATACGGGAA AGTTAATC	ESNTGKLI..[6 aa].*	GAAAGCAATAC <u>TGGTA</u> <u>AGCTGATC</u>	ESNTGKVN..[126 aa].*

1 The original protein sequence of NZ9000-Cro₇₁₂-gpT_{TP901-1}::Ter mutant shows only the amino acid sequence of gpG. Protein sequence of gpGT (produced through a -1 frame-shift in *gpG* DNA sequence GGGAAAG, fusing it to *gpT*) is not shown.

2 The original protein sequence of NZ9000-Cro₇₁₂-gpGfsT_{TP901-1} mutant shows only the amino acid sequence of gpG.

3 Introduced DNA bases causing mutations are underlined once, while introduced bases resulting in a novel restriction site are double underlined.

N/A Not applicable

* Translation terminating stop codon