

Table 1. Strains and plasmids employed in this study

Strain or plasmid	Relevant characteristic(s)	Source and/or reference
Strains		
<i>E. coli</i> DH5α	<i>F</i> ⁻ , <i>φ80dlacZ</i> <i>Δ</i> M15, <i>Δ</i> (<i>lacZYA</i> - <i>argF</i>) <i>U</i> 169, <i>deoR</i> , <i>recA1</i> , <i>endA1</i> , <i>hsdR17</i> (<i>rK</i> ⁻ , <i>mK</i> ⁺), <i>phoA</i> , <i>supE44</i> , <i>λ</i> ⁻ , <i>thi-1</i> , <i>gyrA96</i> , <i>rel</i>	TransGen, Beijing
<i>E. coli</i> BW25113	<i>F</i> ⁻ , <i>DE</i> (<i>araD</i> - <i>araB</i>)567, <i>lacZ</i> 4787(<i>del</i>):: <i>rrnB</i> -3, <i>LAM</i> ⁻ , <i>rph</i> -1, <i>DE</i> (<i>rhaD</i> - <i>rhaB</i>)568, <i>hsdR</i> 514	Laboratory stock
<i>E. coli</i> BW25113-T7 (D0)	BW25113 <i>int</i> ::(<i>lacI</i> :: <i>PlacUV5</i> ::T7 gene) <i>ΔybhC</i>	Laboratory stock
<i>E. coli</i> D1:F	BW25113-T7 <i>ΔhemF</i>	This study
<i>E. coli</i> D1:D	BW25113-T7 <i>ΔdppA</i>	This study
<i>E. coli</i> D1:M	BW25113-T7 <i>ΔmppA</i>	This study
<i>E. coli</i> D2:FY	BW25113-T7 <i>ΔhemF</i> , <i>ΔybdK</i>	This study
<i>E. coli</i> D2:FA	BW25113-T7 <i>ΔhemF</i> , <i>ΔgdhA</i>	This study
<i>E. coli</i> D2:FB	BW25113-T7 <i>ΔhemF</i> , <i>ΔgadB</i>	This study
<i>E. coli</i> D3:FYA	BW25113-T7 <i>ΔhemF</i> , <i>ΔybdK</i> , <i>ΔgdhA</i>	This study
<i>E. coli</i> D3:FYB	BW25113-T7 <i>ΔhemF</i> , <i>ΔybdK</i> , <i>ΔgadB</i>	This study
<i>E. coli</i> D3:FAB	BW25113-T7 <i>ΔhemF</i> , <i>ΔgdhA</i> , <i>ΔgadB</i>	This study
<i>E. coli</i> D4:FYAB	BW25113-T7 <i>ΔhemF</i> , <i>ΔybdK</i> , <i>ΔgdhA</i> , <i>ΔgadB</i>	This study
<i>E. coli</i> D5:FYABD	BW25113-T7 <i>ΔhemF</i> , <i>ΔybdK</i> , <i>ΔgdhA</i> , <i>ΔgadB</i> , <i>ΔdppA</i>	This study
<i>E. coli</i> D5:FYABM	BW25113-T7 <i>ΔhemF</i> , <i>ΔybdK</i> , <i>ΔgdhA</i> , <i>ΔgadB</i> , <i>ΔmppA</i>	This study
<i>E. coli</i> D6:FYABMD	BW25113-T7 <i>ΔhemF</i> , <i>ΔybdK</i> , <i>ΔgdhA</i> , <i>ΔgadB</i> , <i>ΔmppA</i> , <i>ΔdppA</i>	This study
Plasmids		
pUC57	Cloning vector, AmpR, ColE1/pMB1/pBR322/pUC ori	Laboratory stock
pACYCD	Cloning vector, CmR, p15a ori	Laboratory stock
pET28b-ALA-LAA	plasmid for biosyntheizing ALA (f1 ori; KanR; <i>hemA</i> ; <i>hemL</i> ; <i>eamA</i> ; <i>LacI</i> gene and T7-LacI promoter)	Laboratory stock
pUC-gltX-gltD	pUC57 containing <i>gltX</i> and <i>gltD</i> genes; J23107 promoter	This study
pUC-gltB-gltX	pUC57 containing <i>gltB</i> and <i>gltX</i> genes; J23107 promoter	This study
pUC-gltB-gltD	pUC57 containing <i>gltB</i> and <i>gltD</i> genes; J23107 promoter	This study
pUC-gltB-gltD-gltX	pUC57 containing <i>gltB</i> , <i>gltD</i> and <i>gltX</i> genes; J23107 promoter	This study
pCas	plasmid for CRISPR (temperature sensitive oriR101; KanR; the <i>λ</i> -Red operon under the control of arabinose-inducible promoter; <i>S. pyogenes</i> -derived cas9; sgRNA guided to ori-p15a under the control of lac operator)	Laboratory stock
pTarget-gene	plasmid for CRISPR (p15a ori; CmR; sgRNA guided to targeted gene, such as <i>hemF</i> , <i>ybdK</i> , <i>gdhA</i> , <i>gadB</i> , <i>dppA</i> or <i>mppA</i>)	This study
pACYCD-gene	pACYCD containing targeted gene (such as <i>hemF</i> , <i>ybdK</i> , <i>gdhA</i> , <i>gadB</i> , <i>dppA</i> or <i>mppA</i>)	This study
pACYCD-Donor DNA	pACYCD containing Donor DNA for targeted gene (such as <i>hemF</i> , <i>ybdK</i> , <i>gdhA</i> , <i>gadB</i> , <i>dppA</i> or <i>mppA</i>)	This study
pACYCD-RS- <i>hemA</i>	pACYCD containing <i>hemA</i> from <i>R. sphaeroides</i> (amino acid sequence has been modified); T7-LacI promoter	This study