## Supplementary File 2. Plasmids used in this study.

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| **Plasmid** | **Description** | **References** |
| pUC19 (p)a | Cloning vector, ColE1 replicon , Ampr | Lab stock |
| *prcsDpe* | *rcsD*pe gene cloned in pUC19 | This study |
| p*rcsD*pstb | *rcsD*pstb gene cloned in pUC19 | (Sun et al., 2008) |
| p*rcsD*pe (H844A) | *rcsD*pe gene with mutated conserved Histidine (H844A) cloned in pUC19 | This study |
| p*rcsD*C-term | Fragment between 1828 and 2693 bp of *rcsD*pe cloned in pUC19 | This study |
| p*rcsD*C-term (H844A) | The conserved histidine (H844A) mutated in p*rcsD*C-term | This study |
| p*rcsD*C-term (648bp), p*rcsD*2046- 2693 | Fragment between 2045 and 2693 bp of *rcsD*pe cloned in pUC19 | This study |
| p*rcsD*pe (TTG-573**🡪**CTT) | Point mutation at a site 573 bp upstream of stop codon in p*rcsD*pe (TTG > CTT) | This study |
| p*rcsD*pe (TTG-462**🡪**TTA) | Point mutation at a site 462 bp upstream of stop codon in p*rcsD*pe (TTG > TTA) | This study |
| p*rcsD*pe (TTG-573**🡪**CTT, TTG-462**🡪**TTA) | Points mutation at two sites 573 bp and 462 bp upstream of stop codon in p*rcsD*pe (TTG > CTT, TTG > TTA) in p*rcsD*pe | This study |
| p*rcsD*pe (ATT-312**🡪**GGT) | Point mutation at the predicted initiate site, 312 bp upstream of stop codon in p*rcsD*pe (ATT> GGT) | This study |
| p*rcsD*pe (inserting stop codon before frameshift) | inserting stop codon before the 7T frameshift | This study |
| p*rcsC* | *rcsC*gene cloned in pUC19 | This study |
| p*rcsC* (H489A) | *rcsC*gene with mutated HisKA domain (H489A) cloned in pUC19 | This study |
| p*rcsC* (D885A) | *rcsC*gene with mutated REC domain (D885A) cloned in pUC19 | This study |
| p*rcsC* (T913A) | *rcsC*gene with mutated REC domain (T913A) cloned in pUC19 | This study |
| p*rcsC* (D885A, T913A) | *rcsC*gene with mutated REC domain (D885A, T913A) cloned in pUC19 | This study |
| p*rcsC* (H489A, D885A) | *rcsC*gene with HisKA and REC domains (H489A, D885A) cloned in pUC19 | This study |
| p*rcsF* | *rcsF*gene cloned in pUC19 | This study |
| p*rcsF* (C125S) | *rcsF*gene with mutated domain (C125S) cloned in pUC19 | This study |
| p*igaA* | *igaA*gene cloned in pUC19 | This study |
| p*igaA* (C413S) | *igaA*gene with mutated periplasmic domain domain (C413S) cloned in pUC19 | This study |
| p*rcsB*-Flag | *rcsB*gene with fused C-terminal Flag tag cloned in pUC19 | This study |
| p*rcsB* (D56Q)-Flag | *rcsB*gene with mutated REC domain (D56Q) and fused C-terminal Flag tag cloned in pUC19 | This study |
| p*rcsD*pe-Flag | C-terminal Flag tag fused in p*rcsD*pe | This study |
| p*rcsD*pe-Flag-His | C-terminal Flag and hexahistidine tags fused in p*rcsD*pe | This study |
| p*rcsD*C-term-Flag-His | C-terminal Flag and hexahistidine tags fused in p*rcsD*C-term | This study |
| p*rcsD*pstb-Flag | C-terminal Flag tag fused in p*rcsD*pstb | This study |
| pBAD/Myc-His A (pBAD) | Expression vector, Ampr | Invitrogen |
| pBAD*rcsD-hpt*573bp | Fragment between 2121 and 2693 bp of *rcsD*pe cloned in pBAD | This study |
| pBAD*rcsD-hpt*462bp | Fragment between 2230 and 2693 bp of *rcsD*pe cloned in pBAD | This study |
| pBAD/Myc-His A’ (pBAD’) | modified pBAD/Myc-His A without ATG | This study |
| pBAD’*rcsD-hpt* | Fragment between 2382 and 2693 bp of *rcsD*pe cloned in pBAD’ | This study |
| pBAD’ *rcsD-hpt* (H844A) | The conserved histidine (H844A) mutated in pBAD’*rcsD-hpt* | This study |
| pBAD’ *rcsD-hpt (*ATT-312**🡪**GGT) | The predicted translation start codonof *rcsD-hpt* mutated in pBAD’*rcsD-hpt (*ATT > GGT) | This study |
| hmsT::lacZ reporter | 350 bp of *hmsT* upstream sequence, together with the first seven codons of the ORF cloned in pGD926 | (Guo et al., 2015) |
| pMal-*rcsDpstb*-*lacZ* | The partial sequence of *rcsD*pstb (159 bp) containing the 8T (frameshifted region) cloned into pMAl-*lacZ* | This study |
| pMal-*rcsDpe*-*lacZ* | The partial sequence of *rcsD*pe (158 bp) containing the 7T (frameshifted region) cloned into pMAl-*lacZ* | This study |
| pMal-*rcsDpe*-stop-*lacZ* | An additional stop codon was introduced into the 158-bp *rcsD*pe sequence of pMal-*rcsDpe*-*lacZ* | This study |
| pKD46 | λ red recombination vector for gene deletion | (Datsenko and Wanner, 2000) |
| pAC-crRNA-cm | vector for ligating crRNA and gene editing | (Yan et al., 2017) |
| pKD46-Cpf1-amp | pKD46 with Cpf1, for gene editing | (Yan et al., 2017) |

pUC19 (p)a, represented as p for short. For p-derived plasmids, the fragment between 400 bp upstream of 5’ UTR DNA region of target gene and 100 bp downstream of its 3’ UTR DNA region was cloned into pUC19.