**Table S8. List of plasmids.**

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| **Plasmids** | **Short discription** | **Source** |
| pET28a-RpiB | pET28a based vector, carrying *rpiB* gene from *Brucella abortus*; Kanr | This study |
| pET28a-EcHAD | pET28a based vector, carrying *yidA* gene from *Escherichia coli* MG1655; Kanr | This study |
| pET28a-NbIMP | pET28a based vector, carrying *impase* gene from *Nocardia brasiliensis*; Kanr | This study |
| pET28a-TmHAD | pET28a based vector, carrying *had* gene from *Thermotoga,* Kanr | This study |
| pET28a-XlHAD | pET28a based vector, carrying *had* gene from *Xenopus laevis*; Kanr | This study |
| pET28a-pfHAD | pET28a based vector, carrying *had* gene from *Plasmodium falciparum*; Kanr | This study |
| pET28a-nagD | pET28a based vector, carrying *had* gene from *Corynebacterium*; Kanr | This study |
| pET28a-CpHAD | pET28a based vector, carrying *had* gene from *Candida parapsilosis*; Kanr | This study |
| pET28a-pk-1 | pET28a based vector, carrying *pk* gene from Lactobacillus baoqingensis; Kanr | This study |
| pET28a-pk-2 | pET28a based vector, carrying *pk* gene from Aspergillus niger; Kanr | This study |
| pET28a-pk-3 | pET28a based vector, carrying *pk* gene from *Pseudomonas congelans*; Kanr | This study |
| pET28a-pk-4 | pET28a based vector, carrying *pk* gene from *Bifidobacterium adolescentis;* Kanr | This study |
| pET28a-pk-5 | pET28a based vector, carrying *pk* gene from *Agrobacterium tumefaciens complex*; Kanr | This study |
| pET28a-pk-6 | pET28a based vector, carrying *pk* gene from *Nitrolancea hollandica*; Kanr | This study |
| pET28a-pk-7 | pET28a based vector, carrying *pk* gene from *Sphingomonas sp*; Kanr | This study |
| pET28a-pk-8 | pET28a based vector, carrying *pk* gene from *Parcubacteria group bacterium*; Kanr |  |
| pET28a-pk-9 | pET28a based vector, carrying *pk* gene from; *Cyanobacteria bacterium J007* Kanr |  |
| pET28a-pk-10 | pET28a based vector, carrying *pk* gene from; *Filimonas effuse* *J007* Kanr |  |
| pET28a-pk-11 | pET28a based vector, carrying *pk* gene from; *Nocardioides terrigena* Kanr |  |
| pET28a-fls | pET28a based vector, carrying *fls* gene from *Methanosarcina thermophila*; Kaner | This study |
| pET28a-PsLrhi | pET28a based vector, carrying *PsLrhi* gene from *Pseudomonas stutzeri*; Kaner | [1] |
| pET28a-gals | pET28a based vector, carrying *gals* gene; Kaner | [2] |
| pET28a-ack | pET28a based vector, carrying *ackA* gene from *E. coli* Mg1655; Kanr | [3] |
| pET28a-TIM | pET28a based vector, carrying *tpiA* gene from *E. coli* Mg1655; Kanr | This study |
| pACYC-DuetI-pk-4- *Pslrhi* | pET28a based vector, carrying *pk4* and *Pslrhi* ; Cmr | This study |
| pACYC-DuetI-pk4-fls | pET28a based vector, carrying *pk4* and *fls*gene from *Myceliophthora thermophila*; Cmr | This study |
| pTargetT-ldhA | pMB1 *ldhA* sgRNA-pMB，Specr | This study |
| pTargetT-adhE | pMB1 *adhE* sgRNA-pMB1，Specr | This study |
| pTargetT-pflB | pMB1 *pflB* sgRNA-pMB1，Specr | This study |
| pTargetT-fuco | pMB1 *fucO* sgRNA-pMB1，Specr | This study |
| pTargetT-frdBC | pMB1 *frdBC* sgRNA-pMB1，Specr | This study |
| pTargetT-yqhD | pMB1 *yqhD* sgRNA-pMB1，Specr | This study |
| pTargetT-aldA | pMB1 *aldA* sgRNA-pMB1，Specr | This study |
| pTargetT-patI | pMB1 *ptaI* sgRNA-pMB1，Specr | This study |
| pTargetT-acs | pMB1 *acs* sgRNA-pMB1，Specr | This study |
| pTargetT-zwf | pMB1 *zwf* sgRNA-pMB1，Specr | This study |
| pTargetT-epd | pMB1 *epd* sgRNA-pMB1，Specr | This study |
| pTargetT-mgsA | pMB1 *mgsA* sgRNA-pMB1，Specr | This study |
| pTargetT-glpD | pMB1 *glpD* sgRNA-pMB1，Specr | This study |
| pTargetT-gldA | pMB1 *gldA* sgRNA-pMB1，Specr | This study |
| pFN-Cas9-K | repA101(Ts) kan Pcas-cas9 ParaB-Red lacIq Ptrc-sgRNA-pMB1 pSC10 replication, temperature sensitive replication origin, Para BAD-drivenI-SceI gene, red recombinase expression plasmid, lac-inducible expression; Kanr | This study |

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