**Table S3.** Plasmids used in this study.

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| --- | --- | --- |
| **Strain/Plasmids** | **Relevant characteristic(s)** | **Reference or source** |
| pRN5101 | A 8.09 kb shuttle vector between *B. subtilis* and *E. coli* with a temperature-sensitive region; Ampr, Emr | Gifted by associate professor Yanqin Ding from Shandong Agricultural University |
| pPR9TT | A broad-host range *lacZ* promoter probe vector, RK2 replicon; Ampr, Chlr | Lab stock |
| pRN5101-Cm | A pRN5101 derivative carrying homologous arms of *hesA* gene and chloramphenicol resistance cassette; Ampr, Emr, Chlr | This study |
| pHY300PLK | A 4.87 kb shuttle vector between *B. subtilis* and *E. coli*; Ampr, Tetr | Sangon Biotech Co., cat. no. 3060 |
| pHY300PLK-78 | A pHY300PLK derivative, carrying *P*. *polymyxa* WLY78 *nif* cluster under the control of its own *nif* promoter; Ampr, Tetr | Lab stock |
| pHY300PLK-*hesA* | A pHY300PLK derivative，carrying *P. polymyxa hesA* gene driven by *P. polymyxa* WLY78 *nif* promoter; Ampr, Tetr | This study |
| pHY300PLK-*nifQ* | A pHY300PLK derivative，carrying *K. oxytoca* *nifQ* gene driven by *P*. *polymyxa* WLY78 *nif* promoter; Ampr, Tetr | This study |
| pHY300PLK-*moeB* | A pHY300PLK derivative，carrying *E. coli* *moeB* gene driven by *P*. *polymyxa* WLY78 *nif* promoter; Ampr, Tetr | This study |
| pBluescript II SK (+) | ColE1; Amp r | Lab stock |
| pBluescript II SK (+)-Cm | A pBluescript II SK (+) derivative, carrying chloramphenicol resistance cassette; Ampr, Chlr | This Study |
| pBluescript II SK (+)-*hesA* | ＡpBluescript II SK (+) derivative, carrying chloramphenicol resistance cassette and *P. polymyxa hesA* gene driven by *P. polymyxa* WLY78 *nif* promoter; Ampr, Chlr | This Study |