

**TABLE S1 A list of plasmids and primers**

<b>Plasmids and primers</b>	<b>Derivation, relevant characteristics<sup>a</sup> or sequences</b>
<b>Plasmids</b>	<b>Derivation, relevant characteristics</b>
pHB1462	Sm <sup>r</sup> Sp <sup>r</sup> , P <sub>hetZ</sub> - <i>hetZ</i> cloned upstream of <i>gfp</i> in a pDU1-based shuttle vector (Zhang et al., 2007).
pHB3729	Nm <sup>r</sup> Sm <sup>r</sup> Sp <sup>r</sup> , the Ω cassette excised with DraI from pRL57, blunted with T4 DNA polymerase, cloned into BamHI-cut and T4 DNA polymerase-blunted pRL25C, a pDU1-based shuttle vector (Wolk et al., 1988)
pHB4198	Ap <sup>r</sup> , the PCR fragment ( <i>Anabaena</i> sp. chromosomal bp 277818-278291) containing P <sub>petE</sub> amplified using primers PpetE-F and PpetE-R, cut with PstI/XbaI, cloned into PstI/XbaI-cut pTA2
pHB4219a	Ap <sup>r</sup> , the PCR fragment ( <i>Anabaena</i> sp. chromosomal bp 3432367-3432843) containing the <i>hetP</i> coding region amplified using primers 2818-F and 2818-R, cloned into pMD18-T
pHB4219b	Ap <sup>r</sup> , <i>hetP</i> coding region excised with NdeI/EcoRI from pHB4219a, cloned into NdeI/EcoRI-cut pHB4198
pHB4220	Ap <sup>r</sup> , the PCR fragment ( <i>Anabaena</i> sp. chromosomal bp 1784801-1785483) containing P <sub>rbcL</sub> amplified using primers PrbcL-1 and PrbcL-2, cloned into pMD18-T
pHB4221	Ap <sup>r</sup> , P <sub>petE</sub> excised with BamHI/EcoRI from pHB4198, cloned into BamHI/EcoRI-cut pHB4220, generating P <sub>rbcL</sub> P <sub>petE</sub>
pHB4331	Ap <sup>r</sup> , P <sub>rbcL</sub> P <sub>petE</sub> - <i>hetP</i> , generated by overlap PCR (Horton et al., 1989) using two primer pairs PrbcL-1/2818-PpetE-1 and PpetE-2818-2/2818-R, pHB4221 as the template for P <sub>rbcL</sub> P <sub>petE</sub> and chromosomal DNA as the template for <i>hetP</i> , cloned into pMD18-T
pHB4332	Ap <sup>r</sup> , P <sub>rbcL</sub> P <sub>petE</sub> - <i>hetZ</i> , generated by overlap PCR using two primer pairs PrbcL-1/0099-PpetE-1 and PpetE-0099-2/0099-R, pHB4221 as the template for P <sub>rbcL</sub> P <sub>petE</sub> and chromosomal DNA as the template

	for <i>hetZ</i> , cloned into pMD18-T
pHB4343	Ap <sup>r</sup> Cm <sup>r</sup> Em <sup>r</sup> , C.CE2 excised with Sall from pRL598, inserted into Sall-cut pHB4332, upstream of P <sub><i>rbcL</i></sub> P <sub><i>petE</i></sub> - <i>hetZ</i>
pHB4382	Cm <sup>r</sup> Em <sup>r</sup> Km <sup>r</sup> , C.CE2-P <sub><i>rbcL</i></sub> P <sub><i>petE</i></sub> - <i>hetZ</i> excised with KpnI/SphI from pHB4343, blunted with T4 DNA polymerase, cloned into BamHI-cut and T4 DNA polymerase-blunted pRL25C
pHB4409	Km <sup>r</sup> Sm <sup>r</sup> Sp <sup>r</sup> , P <sub><i>rbcL</i></sub> P <sub><i>petE</i></sub> - <i>hetP</i> excised with PvuII from pHB4331, cloned into EcoRI-cut and T4 DNA polymerase blunted pHB3729
pHB4539	Ap <sup>r</sup> , P <sub><i>petE</i></sub> - <i>hetP</i> excised with BamHI/EcoRI from pHB4219b, blunted with T4 DNA polymerase, cloned into SmaI-cut pHB4332, oriented as P <sub><i>rbcL</i></sub> P <sub><i>petE</i></sub> - <i>hetZ</i> , generating P <sub><i>rbcL</i></sub> P <sub><i>petE</i></sub> - <i>hetZ</i> -P <sub><i>petE</i></sub> - <i>hetP</i>
pHB4550	Km <sup>r</sup> Sm <sup>r</sup> Sp <sup>r</sup> , P <sub><i>hetP</i></sub> - <i>hetP</i> carried on a pDU1-based shuttle vector (Zhang et al., 2018)
pHB4551	Km <sup>r</sup> Sm <sup>r</sup> Sp <sup>r</sup> , P <sub><i>rbcL</i></sub> P <sub><i>petE</i></sub> - <i>hetZ</i> -P <sub><i>petE</i></sub> - <i>hetP</i> excised with KpnI/SphI from pHB4539, blunted with T4 DNA polymerase, cloned into EcoRI-cut and T4 DNA polymerase blunted pHB3729
pMD18-T	Ap <sup>r</sup> , T-vector (TaKaRa)
pRL25C	Km <sup>r</sup> (Nm <sup>r</sup> ), pDU1-based shuttle vector (Wolk et al., 1988)
pRL598	Cm <sup>r</sup> Em <sup>r</sup> , cloning vector with the C.CE2 cassette (Black and Wolk, 1994)
pTA2	Ap <sup>r</sup> , T-vector (Toyobo)

### Primers

### Sequences (5'→3')

0099-PpetE-1	taggagaacgcatatgaactcagccgcaac
0099-R	aaagaattcctgagtcactattcatgag
2818-PpetE-1	taggagaacgcatatgaacaaaactacaggc
2818-F	aaacatatgaacaaaactacaggcataac
2818-R	ggcgaattctcaattatgaataaaatctaggtctgac
PpetE-0099-2	gttcggctgagttcatatgcgttctcta

PpetE-2818-2	gcctgtagtgtttggttcatatgcgttctccta
PpetE-F	cttctagaggatcctaaagcctgtgaa (Sakr et al., 2006)
PpetE-R	cttctgcagcatatgcgttctcctaacctgtagttt (Sakr et al., 2006)
PrbcL-1	aagatatccgccaagaacctaccag
PrbcL-2	acagatctccacgtaatttgaacttg

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<sup>a</sup> Ap, ampicillin; Cm, chloramphenicol; Em, erythromycin; Km, kanamycin; Nm, neomycin; Sm, streptomycin; Sp, spectinomycin.

## REFERENCES

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