**Table S1. Primers used in this study**

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| **Primer name** | **Sequence (5′ to 3′)a** | **Application or target** |
| DoeAF  DoeAR | AACATATGATTGAACGCGACGACA  TTAAGCTTAGCCCCGTATTCGGGT | *doeA* gene |
| DoeBF  DoeBR | AACATATGGCCATACAGTGGGATCA  TTAAGCTTTGCTCGTTCCTTAACGTCA | *doeB* gene |
| doeAmutF1  doeAmutR1 | TTAGATCTGCATGGATTTGGAACCGGACA  TTGGTACCAGTTCGTCGATTCGGCGTT | upstream and 5′-fragment of *doeA* for deletion of the gene |
| doeAmutF2  doeAmutR2 | TACCGCGGACGAAGGTTACATCATCA  TTGAGCTCTCCAATCGGCATAGG | downstream and 3′-fragment of *doeA* for deletion of the gene |
| doeBmutF 1  doeBmutR1 | ATAGATCTATGGAGTAGTTCAAAATTCGGC  TTGGTACCGGACATGACGGCCACA | upstream and 5′-fragment of *doeB* for deletion of the gene |
| doeBmutF 2  doeBmutR2 | TTGGGCCCTTTCGCTTTAATCGGCAC  TTGAGCTCTGTTGTGGCCGAAATTGAGTAC | downstream and 3′-fragment of *doeB* for deletion of the gene |
| DoeA(HSG575)  DoeA(HSGstop) | TTGGATCCTGATGGAGGAGATATTATGATTGAACGCGACGACATGAC  TCAAGCTTTCAAGCCCCGTATTCGGGTTTC | for cloning of the *doeA* in pHSG575 |
| ectABC\_F(Sac)  ectABC\_R(Vsp) | AGAGCTCAGGAGTATTTATATGTTGCCTGAT  AATTAATCCTCTCTTACTTCGTGGAT | for cloning of *ectABC* operon |

a Restriction enzyme recognition sites are underlined