**Supplementary File 1.** Bacteria strains used in this study.

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| **Strains** | **Relevant genotypes or characteristics** | **Reference** |
| MC4100 | *F- araD139* Δ(*argF-lac*) *U169 rpsL150 relA1 flbB5301 ptsF25 deoC1 ptsF25 thi* | Lab collection |
| BW25113 | *F*- ∆(*araD-araB*)*567* ∆*lacZ4787::rrnB-3 λ- rph-1* ∆(*rhaD-rhaB*)*568 hsdR514* |  |
| Novablue | *endA1 hsdR17* (rK12– mK12+) *supE44 thi-1 recA1 gyrA96 relA1 lac* F′ [*proA+B+lacIqZ*Δ*M15*::Tn*10*] | Novagen |
| BL21(λDE3) | *F–* *ompT* *gal* *dcm* *lon* *hsdSB*(rB–mB–) *λ(DE3* [*lacI* *lacUV5*-*T7 gene 1* *ind1* *sam7* *nin5*]) [*malB*+]K-12(λS) | Novagen |
| JW3160 | BW25113 ∆*mlaD::kan* | (Baba et al., 2006) |
| JW3161 | BW25113 ∆*mlaE::kan* | (Baba et al., 2006) |
| JW3162 | BW25113 ∆*mlaF::kan* | (Baba et al., 2006) |
| TSH001 | BW25113 ∆*mlaB::cam* | This study |
| CZS012 | MC4100 ∆*mlaD::kan* | This study |
| CZS013 | MC4100 ∆*mlaE::kan* | This study |
| CZS014 | MC4100 ∆*mlaF::kan* | This study |
| TSH002 | MC4100 ∆*mlaB::cam* | This study |
| EH150 | *psd-2(ts)**purA*+ | (Hawrot et al., 1975) |