|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Strains** | **Systematic Name** | **Gene Name** | **Genotype** | **Description\*\*\*\*** | **Biofilm** **Formation\*** | **Biofilm Resistance\*\*** | **Matrix Glucan\*\*\* (pg/ml)** | **Planktonic MIC (µg/ml)** |
| SN250 DAY185 | - | - | Reference |  | 100% | 100 | 1700 | 0.5 |
| FB63 HTT111 URZ5.2 | 19.4565 | BGL2 | -/- | β 1,3 glucanosyltransferase | 120% | 30% | 890 | 0.5 |
| GKO229 HTT117 | 19.2990 | XOG1 | -/- | Exo β 1,3 glucanase | 110% | 65% | 570 | 0.5 |
| KMR101 | 19.3829 | PHR1 | -/- | β 1,3 glucanosyltransferase | 75% | 40% | 190 | 0.25 |
| JEN152 | 19.2952 | EXG2 | -/- | Exo 1,3 beta glucosidase | 150% | 87% | 1400 | 0.25 |
| JEN120 | 19.6081 | PHR2 | -/- | β 1,3 glucanosyltransferase | 110% | 86% | 1800 | 0.5 |
| SCW11-U1 | 19.3893 | SCW11 | -/+ | β 1,3 glucosidase | 115% | 84% | 2000 | 1.0 |
| SPR1 | 19.2237 | SPR1 | -/- | Exo 1,3 β glucanase | 97% | 82% | 1400 | 0.5 |
| ENG1-U1 | 19.3066 | ENG1 | -/- | Endo 1,3 β glucanase | 80% | 80% | 1700 | 0.5 |
| JEN146 | 19.4668 | - | -/- | Glucosidase | 94% | 80% | 1600 | 1.0 |
| CU87-1 | 19.744 | GDB1 | -/- | Glucanotransferase | 100% | 77% | 1500 | 0.25 |
| I463-2 | 19.7339 | BGL22 | -/- | Glucanase | 95% | 76% | 1300 | 0.5 |
| GKO237 | 19.2237 | SPR1 | -/- | Exo 1,3 β glucanase | 90% | 76% | 1800 | 1.0 |
| ENG2-HM | 19.3417 | ENG2 | -/- | Endo 1,3 β glucanase | 90% | 78% | 1600 | 2.0 |
| JJH17 | 19.1779 | MP65 | -/- | Glucanase | 75% | 71% | 1700 | 0.5 |
| JEN153 | 19.1719 | SGA1 | -/- | Glucosidase | 110% | 70% | 1500 | 0.25 |

**Table S1. Select Strain Phenotypes.**

\*Percent biofilm formation compared to reference strain. \*\*Percent of biofilm remaining after exposure to fluconazole at 1000 µg/ml, \*\*\*Matrix β-1,3 glucan concentration normalized to biofilm burden, \*\*\*\*Based upon Candida or Saccharomyces Genome Database

**Table S2. Strain Genotypes.**

|  |  |  |  |
| --- | --- | --- | --- |
| Gene | Strain | Genotype | Ref |
| Reference | SN152 | *URA3 IRO1 arg4 his1 leu2**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2* |  |
| *phr1 -/-* | KMR101 | *URA3 IRO1 arg4 his1 leu2 phr1::C.d HIS1**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 phr1::C.m LEU2* | This study |
| *phr1 -/-* | URZ302 | *URA3 IRO1 arg4 his1 leu2 phr1::HygBR**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 phr1::NouR* | This study |
| *phr1 -/-, +* | KMR148 | *URA3 IRO1 arg4 his1 leu2::PHR1::C.d ARG4 phr1::C.d HIS1**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 phr1::C.m LEU2* | This study |
| phr1 *-/-, TDH3-FKS1* | HTT121 | *URA3 IRO1 arg4 his1 leu2 phr1::C.d HIS1* FKS1::pAgTEF1-NAT1-AgTEF1UTR-TDH3-PHR1*ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 phr1::C.mLEU2 FKS1* | This study |
| *bgl2 -/-* | FB63-1 | *ura3::λimm434 arg4::hisG his1::hisG bgl2::URA3**ura3::λimm434 arg4::hisG his1::hisG bgl2::ARG4*  | This study |
| *bgl2 -/-* | HTT111 | *URA3 IRO1 arg4 his1 leu2 bgl2::C.d HIS1**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 bgl2::C.m LEU2* | This study |
| *bgl2 -/-* | URZ271 | *URA3 IRO1 arg4 his1 leu2 bgl2::HygBR**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 bgl2::NouR* | This study |
| *blg2 -/-, +BGL2* | HTT118 | *URA3 IRO1 arg4 his1 leu2::BGL2::C.d ARG4 bgl2::C.d HIS1**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 bgl2::C.m LEU2* | This study |
| *bgl2 -/-, TDH3-FKS1* | HTT122 | *URA3 IRO1 arg4 his1 leu2 bgl2::C.d HIS1* FKS1::pAgTEF1-NAT1-AgTEF1UTR-TDH3-BGL2*ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 bgl2::C.mLEU2 FKS1* | This study |
| *xog1 -/-* | GKO229 | *ura3::λimm434 arg4::hisG his1::hisG xog1::URA3**ura3::λimm434 arg4::hisG his1::hisG xog1::ARG4* | This study |
| *xog1 -/-* | HTT117 | *URA3 IRO1 arg4 his1 leu2 xog1::C.d HIS1**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 xog1::C.m LEU2* | This study |
| *xog1 -/-* | URZ304 | *URA3 IRO1 arg4 his1 leu2 xog1::HygBR**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 xog1::NouR* | This study |
| *Xog1 -/-, +* | HTT125 | *URA3 IRO1 arg4 his1 leu2::XOG1::C.d ARG4 xog1::C.d HIS1**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 xog1::C.m LEU2* | This study |
| *Spr1 -/-* | SPR1-KO#1 | *ura3::λimm434 arg4::hisG his1::hisG spr1::URA3**ura3::λimm434 arg4::hisG his1::hisG spr1::ARG4* | This study |
| *Eng1 -/-* | ENG1-U1-A1 | *ura3::λimm434 arg4::hisG his1::hisG eng1::URA3**ura3::λimm434 arg4::hisG his1::hisG eng1::ARG4* | This study |
| *Orf 19.4668 -/-* | JEN146 | *URA3 IRO1 arg4 his1 leu2 orf 19.4668::C.d HIS1**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 orf 19.4668::C.m LEU2* | This study |
| *gdb1 -/-* | CU87 - 1 | *ura3::λimm434 arg4::hisG his1::hisG gdb1::URA3**ura3::λimm434 arg4::hisG his1::hisG gdb1::ARG4* | This study |
| *Spr1 -/-* | GKO237 | *ura3::λimm434 arg4::hisG his1::hisG spr1::URA3**ura3::λimm434 arg4::hisG his1::hisG spr1::ARG4* | This study |
| *Bgl22 -/-* | I463-2 | *ura3::λimm434 arg4::hisG his1::hisG bgl22::URA3**ura3::λimm434 arg4::hisG his1::hisG bgl22::ARG4* | This study |
| *Eng2 -/-* | ENG2 #2HM | *ura3::λimm434 arg4::hisG his1::hisG eng2::URA3**ura3::λimm434 arg4::hisG his1::hisG eng2::ARG4* | This study |
| *Mp65 -/-* | JJH17 | *ura3::λimm434 arg4::hisG his1::hisG mp65::URA3**ura3::λimm434 arg4::hisG his1::hisG mp65::ARG4* | This study |
| *Cas5 -/-* | JEN153 | ura3::λimm434 *arg4::hisG his1::hisG* cas5::URA3ura3::λimm434 arg4::hisG his1::hisG *cas5::ARG4* | [[59](#_ENREF_59)] |
| *FKS1 - /+* | FKS1/fks1Δ | ura3::λimm434 *arg4::hisG his1::hisG* fks1::URA3ura3::λimm434 arg4::hisG his1::hisG *FKS1* | [[62](#_ENREF_62)] |
| *FKS1 - /+, TDH3 – BGL2* | HTT128 | ura3::λimm434 *arg4::hisG his1::hisG* fks1::URA3 BGL2::pAgTEF1-NAT1-AgTEF1UTR-TDH3-FKS1ura3::λimm434 arg4::hisG his1::hisG *FKS1 BGL2* | This study |
| *FKS1 - /+, TDH3 – PHR1* | HTT131 | ura3::λimm434 *arg4::hisG his1::hisG* fks1::URA3 PHR1::pAgTEF1-NAT1-AgTEF1UTR-TDH3-FKS1ura3::λimm434 arg4::hisG his1::hisG *FKS1 PHR1* | This study |
| *FKS1 - /+, TDH3 – XOG1* | HTT132 | ura3::λimm434 *arg4::hisG his1::hisG* fks1::URA3 XOG1::pAgTEF1-NAT1-AgTEF1UTR-TDH3-FKS1ura3::λimm434 arg4::hisG his1::hisG *FKS1 XOG1* | This study |
| *bgl2 -/-, TDH3-PHR1* | HTT139 | *URA3 IRO1 arg4 his1 leu2 bgl2::C.d HIS1* PHR1::pAgTEF1-NAT1-AgTEF1UTR-TDH3-FKS1*ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 bgl2::C.m LEU2* PHR1 | This study |
| *xog1 -/-, TDH3-BGL2* | HTT136 | *URA3 IRO1 arg4 his1 leu2 xog1::C.d HIS1 BGL2*::pAgTEF1-NAT1-AgTEF1UTR-TDH3-FKS1*ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 xog1::C.m LEU2 BGL2* | This study |
| *phr1 -/-, TDH3-BGL2* | HTT134 | *URA3 IRO1 arg4 his1 leu2 bgl2::C.d HIS1 BGL2*::pAgTEF1-NAT1-AgTEF1UTR-TDH3-FKS1*ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 bgl2::C.m LEU2 BGL2* | This study |
| *bgl2 -/-,xog1 -/-* | URZ290 | *URA3 IRO1 arg4 his1 leu2 bgl2::HygBR xog1::C.d. HIS1**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 bgl2::NouR xog1::C.m.LEU2* | This study |
| *bgl2 -/-,phr1 -/-* | URZ296 | *URA3 IRO1 arg4 his1 leu2 bgl2::HygBR phr1::C.d. HIS1**ura3::λimm434 iro1::* λimm434 *arg4 his1 leu2 bgl2::NouR phr1::C.m.LEU2* | This study |

**Table S3. Primers for Strain Creation.**

|  |  |  |
| --- | --- | --- |
|  | **Function** | **Primers** |
| *BGL2* | Knockout | Upstream F: 5’ - TTTATTTTCTTGCTTGTACCUpstream R: 5’ - cacggcgcgcctagcagcggAGTGGGTATAAGAATGAAGTAuxotrophic marker F: 5’ – ccgctgctaggcgcgccgtgACCAGTGTGATGGATATCTGCAuxotrophic marker R: 5’ – gcagggatgcggccgctgacAGCTCGGATCCACTAGTAACGDownstream F: 5’ – gtcagcggccgcatccctgcACTTGGATTTTTCTTATTTCDownstream R: 5’ – GTCAAAGCAATGTATAAAAGNested Fusion F: 5’ – AATTGCTACTGCGGAGGAAGGNested Fusion R: 5’ – TTCCAGGAAAAGGTGTTTGGUpstream Check F: 5’ – AAGAAAAGTAAAATCTGACGDownstream Check R: 5’ – TAATTACTCGTTCACTTTGAInternal Check F: 5’ - TTTGAAGCTGAAAAGGAAGCInternal Check R: 5’ - TTCAAAGTTTTGTCGGATTGC |
|  *BGL2* | Complement | BamHI F: 5’ - GTAGGATCCTTTTTCTTCTCCTGCTGCTGAscI R: 5’ - GGTGGCGCGCCCAATTCCTTCTGGGGATCAA |
| *BGL2* | Overexpression  | TDH3 OE F: 5’ – TAATTCTTGTCCCAAAATAGACCCAAGTTCTAGATTTGGAGATGCACGATGTTGCTATAAATAGTACTCACATGAAAAACATACCCAAATTAGGAAGTCAATCAAGCTTGCCTCGTCCCCTDH3 OE R: 5’ - TACCGTCATCATTTTTAACACCAAGGTTGAAAGCCAAATCACCCATGGCGGCAACTGAAGTAAGAACAGTTGCGAGAGTAGTCAAGAATTTGATTTGCATATTTGAATTCAATTGTGATGOE determinant F: 5’ - GCCACAGGGAATGTATTGATClonNAT marker R: 5’ - GAAACAACAACGAAACCAGC |
| *PHR1* | Knockout | Upstream F: 5’ - CATTTTTAACCAACCCTTGTTUpstream R: 5’ - cacggcgcgcctagcagcggTTTTTGGCTTCAACCTGTAGAuxotrophic marker F: 5’ – ccgctgctaggcgcgccgtgACCAGTGTGATGGATATCTGCAuxotrophic marker R: 5’ – gcagggatgcggccgctgacAGCTCGGATCCACTAGTAACGDownstream F: 5’ – gtcagcggccgcatccctgcCCGATATGAAGGGTTCTGTTDownstream R: 5’ – CAGTGATGGATTCAAAAGCA Upstream Check F: 5’ – CAAATCATTCCACCTTGAAADownstream Check R: 5’ - AGCAGAAAGAGGAAAGCTGAInternal Check F: 5’ - AAACAACCCAGAATGGAACTInternal Check R: 5’ - GCACTGGATTTCTTGTCTTG |
| *PHR1* | Complement | BamHI F: 5’ – AAGGATCCTTCCATCTTTATAACCCAAATGAAAAscI R: 5’ - AAGGCGCGCCGCTGATGAAAGTGAAACTAAGGAAG |
| *PHR1* | Overexpression  | TDH3 OE F: 5’ - CGATTCCAGTCCAATACAATAGTTGTCACAAAACACGAAATACAATACTATTTTATTCTAATAATAGT TTTGTTTTTTTCTTTCTTTTATTTCGTCTTACATCAAGCTTGCCTCGTCCCCTDH3 OE R: 5’ - TACCAACAACTTCAACTGGTGGAGTGGACGATTCAAACTTGGCTAAAGTTAATGAAAAGAGTGTGGCAAATGTAACCAATGATTTGATTAATGAATACATATTTGAATTCAATTGTGATGOE determinant F: 5’ – CGGTCAAGTTTTCGGCTAAGClonNAT marker R: 5’ - GAAACAACAACGAAACCAGC |
| *XOG1* | Knockout | Upstream F: 5’ - TCCACCCCTGTTAAAATCCAUpstream R: 5’ - cacggcgcgcctagcagcggACCGCAAATTGGAAAAATCGAuxotrophic marker F: 5’ – ccgctgctaggcgcgccgtgACCAGTGTGATGGATATCTGCAuxotrophic marker R: 5’ – gcagggatgcggccgctgacAGCTCGGATCCACTAGTAACGDownstream F: 5’ – gtcagcggccgcatccctgcCCACTTGAAAATCTACCAAGCDownstream R: 5’ – GTTTTTCTTTGTCGCGTCGTNested Fusion F: 5’ – GCTTTGTTGATCCAGTTTCAGNested Fusion R: 5’ – GGCTGTGCGATTCTAGAGTC Upstream Check F: 5’ – AAGAAAAAGGGCAAGGAAAAADownstream Check R: 5’ – CTGAAGTCGTTGCCAGTTGTInternal Check F: 5’ - AGGAGGCGGACATAATGTTGInternal Check R: 5’ - AGCCAAAGACTTGGAAAGCA |
| *XOG1* | Complement | AscI F: 5’ - ATAGGCGCGCCGAAAAATAAAAGAGCCCACACGAscI R: 5’ - TCAGGCGCGCCGTTTTTCTTTGTCGCGTCGT |
| *XOG1* | Overexpression  | TDH3 OE F: 5’ - GCAAATTGATTTTTAAAACACTTTACACACATTTCGGAATTTTCAAGTAGGTTTTAGCTTTCTACAATTTGTTAATATAAAAGTGCAGAAAGTCCACCCCATCAAGCTTGCCTCGTCCCCTDH3 OE R: 5’ - ATTTCAAGTTTCCATTTGGTTTAAATGGATTAGAAATAACCAGGGCTTTAACAAATTCAAGCAATAATATAAATACCGATGATGTTAAGATAAATGATAAATTTGAATTCAATTGTGATGOE determinant F: 5’ – AAGAAAAAGGGCAAGGAAAAAClonNAT marker R: 5’ - GAAACAACAACGAAACCAGC |
| *FKS1* | Knockout | Described in [[62](#_ENREF_62)] |
| *FKS1* | Overexpression | Described in [[62](#_ENREF_62)]  |