

Supplementary materials

# GAT1 Gene, the GATA Transcription Activator, Regulates the Production of Higher Alcohol during Wheat Beer Fermentation by *Saccharomyces cerevisiae*

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**Table S1.** Oligonucleotides used in this study for the construction of gene deletions.

Name	5'–3' DNA Sequence
<b>Oligos used for construction of gene deletion cassettes</b>	
SST1-U-F	GGTCCCGCTTTCCGATTT
SST1-U-R	CCTGCAGCGTACGAAGCTTCAGCTGGTGCGACTCATAGTGCTGTTATT
SST1-Kan-F	AATAACAGCACTATGAGTCGCACCAGCTGAAGCTTCGTACGCTGCAGG
SST1-Kan-R	AATAGATGTTGGGTCACAGCATAGGCCACTAGTGGATCTGATA
SST1-D-F	TATCAGATCCACTAGTGGCCTATGCTGTGACCCAACATCTATT
SST1-D-R	TTTCAGACACGACCAAA
SDT1-U-F	CCCTGTTCTGTTCATCGC
SDT1-U-R	CCTGCAGCGTACGAAGCTTCAGCTGGCACAATGGAGTGCCTCT
SDT1-Kan-F	AGACGCACTCCATTGTGCCAGCTGAAGCTTCGTACGCTGCAGG
SDT1-Kan-R	AGGTGCGACAATGTTTCAGTGGCATAGGCCACTAGTGGATCTGATA
SDT1-D-F	TATCAGATCCACTAGTGGCCTATGCCACTGAACATTGTTCGCACCT
SDT1-D-R	TGAAGCGGACATGGAAAG
SSP1-U-F	GGCAGCCTCACTAATCT
SSP1-U-R	CCTGCAGCGTACGAAGCTTCAGCTGTGTCCTTGGTCTGTTCT
SSP1-Kan-F	AGAACAGACCAAGGACACAGCTGAAGCTTCGTACGCTGCAGG
SSP1-Kan-R	CAAATACAGATACCACCCGCATAGGCCACTAGTGGATCTGATA
SSP1-D-F	TATCAGATCCACTAGTGGCCTATGCGGGTGGTATCTGTATTG
SSP1-D-R	TTCATCTCGCTGTCTACT
SDP1-U-F	TTCTAACTCAGGAGCCAATA
SDP1-U-R	CCTGCAGCGTACGAAGCTTCAGCTGCAGCCAACCTACCCAGAG
SDP1-Kan-F	CTCTGGGTGAGTTGGCTGCAGCTGAAGCTTCGTACGCTGCAGG
SDP1-Kan-R	GCTCTACGGATTCACTGGGCATAGGCCACTAGTGGATCTGATA
SDP1-D-F	TATCAGATCCACTAGTGGCCTATGCCAGTGAATCCGTAGAGC
SDP1-D-R	ATGACAACCCAGACAAGG
SSA9-U-F	CCCATGGGAAGTCATAG

Name	5'–3' DNA Sequence
SSA9-U-R	CCTGCAGCGTACGAAGCTTCAGCTGTGTTTCCTACCCCAATG
SSA9-Kan-F	CATTGGGGTAGGAAACACAGCTGAAGCTTCGTACGCTGCAGG
SSA9-Kan-R	CGCGACTATAACTTTTTCCCGCATAGGCCACTAGTGGATCTGATA
SSA9-D-F	TATCAGATCCACTAGTGGCCTATGCGGGAAAAAGTTATAGTCGCG
SSA9-D-R	CGCTACCAAAAAGAGGC
SDA9-U-F	CGACTCAATGACTGCTGGTT
SDA9-U-R	CCTGCAGCGTACGAAGCTTCAGCTGGAAAAGGCTGGGCGATTA
SDA9-Kan-F	TAATCGCCCAGCCTTTTCCAGCTGAAGCTTCGTACGCTGCAGG
SDA9-Kan-R	TCTTATCCAACCCTCAAAGCATAGGCCACTAGTGGATCTGATA
SDA9-D-F	TATCAGATCCACTAGTGGCCTATGCTTTGAGGGTTGGATAAGA
SDA9-D-R	GCATAGGCGATGGTGAGT
SSA10-U-F	TATGAGCCGTTTCGTATGG
SSA10-U-R	CAGCGTACGAAGCTTCAGCTGAGTGAGCTGCCGCTGTAG
SSA10-Kan-F	CTACAGCGGCAGCTCACTCAGCTGAAGCTTCGTACGCTG
SSA10-Kan-R	TGTGGTAGTGGTAAATAGCATAGGCCACTAGTGGATCTG
SSA10-D-F	CAGATCCACTAGTGGCCTATGCTATTTTACCACTACCACA
SSA10-D-R	ATACTCTTACAGCATCCT
SDA10-U-F	AGTTGACGCGACTTCTGT
SDA10-U-R	CCTGCAGCGTACGAAGCTTCAGCTGTGTAGGTTCCGATCACTA
SDA10-Kan-F	TAGTGATCGGAACCTACACAGCTGAAGCTTCGTACGCTGCAGG
SDA10-Kan-R	TGTCATCTGTGCTGCACCGCATAGGCCACTAGTGGATCTGATA
SDA10-D-F	TATCAGATCCACTAGTGGCCTATGCGGTGCAGCACAGATGACA
SDA10-D-R	CGCCCACAAGTTTCTATTTT
<b>Oligos used for diagnostic purposes</b>	
SST1-1-F	CGATGGACCCGAATCTCC
SST1-1-KanR	CTCAGTGGCAAATCCTAA
SST1-2-KanF	GGATTTGCCACTGAGGTT
SST1-2-R	GCCGACCAAGTTACCAGA
SDT1-1-F	CGCAGCATAGTGTTAGTG
SDT1-1-KanR	TTCCGTCAGCCAGTTTAG
SDT1-2-KanF	GAATAAAGTGGCTGACGG
SDT1-2-R	AGGTCTCGGTTGCTCTTA
SSP1-1-F	GATCCGGTGGAATCTATG
SSP1-1-KanR	TTGATGGTCGGAAGAGGC
SSP1-2-KanF	CGTATGTGAATGCTGGTC
SSP1-2-R	TTAGTTATCGGAGTGGC
SDP1-1-F	GGGGAAGTTGATTTGGTA
SDP1-1-KanR	CGATAGATTGTTCGCACCT
SDP1-2-KanF	ATGCGTCAATCGTATGTG
SDP1-2-R	TACCATCTTGGCTTTGTG
SSA9-1-F	GGCTCTCTGTAAATACCC
SSA9-1-KanR	TTGATGGTCGGAAGAGGC
SSA9-2-KanF	CGTATTTTCGTCTCGCTCA
SSA9-2-R	GATACATCACGCGCTTC
SDA9-1-F	GGCTCTCTGTAAATACCC
SDA9-1-KanR	TTGATGGTCGGAAGAGGC
SDA9-2-KanF	ACCGGATTCAGTCGTCAC
SDA9-2-R	TGCCACTACCGATTCTTT
SSA10-1-F	AGGGTGTGAAAAGGTGGC
SSA10-1-KanR	TTGATGGTCGGAAGAGGC

Name	5'–3' DNA Sequence
SSA10-2-KanF	CGTATTTTCGTCTCGCTCA
SSA10-2-R	GCGAGTAACTAAACAAAT
SDA10-1-F	TTAACTGATCAACCCCTCT
SDA10-1-KanR	GTGAGTCTTTTCCTTACC
SDA10-2-KanF	ATGCGTCAATCGTATGTG
SDA10-2-R	TTGGTATGGTTGGCTTAT
K-U	CAGCTGAAGCTTCGTACGC
K-D	GCATAGGCCACTAGTGGATCTG
<b>For real-time qPCR</b>	
<i>GAT1</i> -F	CACTTCCTGCTCGTCCTC
<i>GAT1</i> -R	GTATTATTGGCGATGCTG
<i>GAP1</i> -F	GTCCAACAGGTGGTTACAT
<i>GAP1</i> -R	AGCGGTGACGAAGACAGA
<i>ARO9</i> -F	AATGTGGAGGCTACAGGA
<i>ARO9</i> -R	ACCAATTATCGAGCAACT
<i>ARO10</i> -F	AACCCTGGTGATGTTGTC
<i>ARO10</i> -R	ATGTGAGCGTTTGAGTGG
<i>ARO80</i> -F	TGAGACCTCCACCTACCC
<i>ARO80</i> -R	TCAATCGCCTCCTCTTA
<i>UBC6</i> -F	GGACCTGCGGATACTCCTTAC
<i>UBC6</i> -R	TAATCGTGTGTTGGGCTTGA

Deletion or disruption was confirmed by PCR using diagnostic primers 1-F combined with 1-KanR and 2-KanF combined with 2-R.