SUMMARY

[0007] In one example, the present disclosure refers to a modified galactose oxidase comprising a polypeptide sequence having at least 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, or 99% sequence identity to SEQ ID NO: 6, wherein SEQ ID NO: 6 is a polypeptide sequence of galactose oxidase variant M3-5, wherein the galactose oxidase variant M3-5 comprises mutations of S33P, M93V, G218E, W313F, R353M, Q429T, V517A, and N558D relative to the wildtype galactose oxidase from *Fusarium graminearum* (SEQ ID NO: 4), and wherein the polypeptide sequence of the modified galactose oxidase further comprises at least one mutation at one or more positions selected from the group consisting of 24, 26, 28, 45, 49, 65, 69, 104, 114, 117, 153, 157, 172, 173, 175, 193, 194, 195, 197, 198, 202, 214, 217, 218, 220, 224, 226, 239, 240, 250, 259, 265, 268, 269, 284, 294, 313, 314, 325, 341, 346, 348, 352, 353, 356, 389, 401, 429, 447, 485, 487, 537, 538, 546, 559, 576, 599, and 662, wherein the position of the mutation is numbered with reference to SEQ ID NO: 6.

[0007a] In one aspect, the present disclosure refers to a modified galactose oxidase comprising a polypeptide sequence having at least 95%, 96%, 97%, 98%, or 99% sequence identity to SEQ ID NO: 6, wherein SEQ ID NO: 6 is a polypeptide sequence of galactose oxidase variant M3-5, wherein the galactose oxidase variant M3-5 comprises mutations of S33P, M93V, G218E, W313F, R353M, Q429T, V517A, and N558D relative to the wildtype galactose oxidase from *Fusarium graminearum* (SEQ ID NO: 4), and wherein the polypeptide sequence of the modified galactose oxidase further comprises at least one mutation at one or more positions selected from the group consisting of 217, 268, and 616, wherein the position of the mutation is numbered with reference to SEQ ID NO: 6, wherein the mutation is selected from the group consisting of:

- T616V; and
- a combination of F217A, N268W and T616V.

[0008] In one aspect, the present disclosure refers to a polynucleotide sequence encoding the modified galactose oxidase disclosed herein.

[0009] In one aspect, the present disclosure refers to an expression vector comprising the polynucleotide sequence disclosed herein.

[0010] In one aspect, the present disclosure refers to a host cell comprising the polynucleotide sequence disclosed herein or the expression vector disclosed herein.

[0011] In one aspect, the present disclosure refers to a method of producing a modified galactose oxidase, comprising culturing the host cell disclosed herein under suitable culture conditions such that the modified galactose oxidase is produced.

[0012] In one aspect, the present disclosure refers to a method of producing a ketone from a secondary alcohol, comprising contacting the secondary alcohol with the modified galactose oxidase disclosed herein under suitable conditions for an oxidation reaction.

[0013] In one aspect, the present disclosure refers to a kit for use in the method disclosed herein, wherein the kit comprises the modified galactose oxidase disclosed herein.

BRIEF DESCRIPTION OF DRAWINGS

[0014] The invention will be better understood with reference to the detailed description when considered in conjunction with the non-limiting examples and the accompanying drawings, in which:

		ccagtccgtcaaagtgggcggccgcattacgatcagtaccgacagcagcattaccaaagcgtcactgattcgttac ggcaccgcaacccatacagtcaacacggaccagcgccgtattccgttaaccctgaccaataacggtggcaattcgt atagcttccaggtaccgtcggactcgggcgtggcgctgccaggatactggatgctgtttgtgatgaatagcgcggg cgtcccgagcgtagcgagcacgatccgtgtgacccaggccgcagcttgataa
298	GOh3049	MGSSHHHHHHSSGLVPRGSHMGTASAPIGSAIPRNNWAVTCDSAQSGNECNKAI DGNKDTFWHTFYGANGDPKPPHTYTIDMKTTQNVNGLSVLPRQDGNQNGWIG RHEVYLSSDGTNWGSPVASGSWFADSTTKYSNFETRPARYVRLVAVREANGQP WTSIAEINVFQASSYTAPQPGLGRWGPTIDLPIVPAAAAIEPTSGRVLMWSSYRN DAAEGSPGGITLTSSWDPSTGIVSDRTVTVTKHDMFCPGISMDGNGQIVVTGGW DAKKTSLYDSSSDSWIPGPDMQVARGYQSSATMSDGRVFTIGGSFSGGVFEKNG EVYSPSSKTWTSLPNAKVWPMLTADKQGLYMSDNHAWLFGWKKGSVFQAGPS TAMNWYYTSGSGDVKSAGKRQSNRGVAPDAMCGNAVMYDAVKGKILTFGGS PDYTDSDATTNAHIITLGEPGTSPNTVFASNGLYFARTFHTSVVLPDGSTFITGGQ RRGIPFEDSTPVFTPEIYVPEQDTFYKQNPNSIVRAYHSISLLLPDGRVFNGGGGLC GDCTTNHFDAQIFTPNYLYDSNGNLATRPKITRTSTQSVKVGGRITISTDSSITKAS LIRYGTATHTVNTDQRRIPLTLTNNGGNSYSFQVPSDSGVALPGYWMLFVMNSA GVPSVASTIRVTQAAA
299	GOh2095	atgggcagcagccatcatcatcatcacagcagcggcctggtgccgcgcggcagccatatgggtaccgcctctgcccctat cggctcagccatcccgcgcaataactgggccgtaacgtgcgacagcgcgcagagcggcaacgagtgcaataaagccatcga cggcaataaagacaccttctggcacacgttttatggcgcaaatggcgacccgaagccaccgcatacctataccattgacatgaa aaccacccagaatgtgaacgggctgtccgtgctgccgcgccaggacggcaatcagaacggatggatcggccgtcacgaggt atatttaagctccgacggcaccaactggggatccccggtcgcgtcgggcagctggttcgccgacagcaccaccaagtattcca attttgaaacccgtcctgcacgctacgtgcgcttagtggccgtgacagaggcgaacggccagccatggacctcaatcgccgaa atcaatgtattccaagccagctcctataccgcgccgcagccaggacttgggcgttggggcccgaccatcgacctgcctatcgta cccgcagccgcggcgattgaaccaacgtcaggccgcgtactgatgtggagcagctaccgtaacgacgcggcggaaggcag cccgggcggcatcactctgacgtcgagttgggatccatccacgggcatcgtctccgaccgcaccgtgaccgtcacgaaacac gacatgttttgcccggggatcagcatggacggcaacggccagatcgtcgtcacgggcggctgggacgccaagaagacgagc ctctatgacagtagcagcgacagttggatcccggggccggacatgcaggtggcacgcgggtaccagtccagcgcgaccatgt cagacggccgtgtctttacaatcggcggctcatttagtggcggagtgtttgagaagaatggcgaagtctatagcccctcatccaa aacgtggacgtcacttccgaacgcgaaggtgaatcccatgttaaccgccgacaaacagggcctgtacatgagcgacaaccatg cgtggctgttcggctggaagaaggggagcgtctttcaggcgggcccgtcgaccgcaatgaattggtattacacgtcaggaagc ggggacgtgaaatcagccggcaagcgccagtcgaaccgcggcgtggcgccggacgcaatgtgcggcaatgccgtgatgtat gacgcggtcaaaggcaagatcctgacatttggcgggagtccggactacaccgacagtgacgcgacaaccaatgcccacattat tacccttggggagccggggacgagcccgaacacggtcttcgcgtccaatggcctctatttcgcgcgtacctttcatacgtcggtg gtcctgccggacggatcaacctttatcaccggcggacagcgccgtggcatccccttcgaagactcgacccccgtctttacaccg gagatttatgtgccggaacaggacacgttttataaacagaatccgaactcgattgtacgcgcgtatcactccatcagccttcttctc ccggacggacgtgtctttaatggcggaggaggactgtgcggggactgcacgaccaatcattttgacgcgcagatctttaccccg aattatctgtatgattcaaatgggaatctcgcgacccgtccgaaaattacccgtacatcaacccagtccgtcaaagtgggcggcc gcattacgatcagtaccgacagcagcattaccaaagcgtcactgattcgttacggcaccgcaacccatacagtcaacacggacc agcgccgtattccgttagttctgaccaataacggtggcaattcgtatagcttccaggtaccgtcggactcgggcgtggcgctgcc aggatactggatgctgtttgtgatgaatagcgcgggcgtcccgagcgtagcgagcacgatccgtgtgacccaggccgcagctt gataa
300	GOh2095	MGSSHHHHHHSSGLVPRGSHMGTASAPIGSAIPRNNWAVTCDSAQSGNECNKAI DGNKDTFWHTFYGANGDPKPPHTYTIDMKTTQNVNGLSVLPRQDGNQNGWIG RHEVYLSSDGTNWGSPVASGSWFADSTTKYSNFETRPARYVRLVAVTEANGQP WTSIAEINVFQASSYTAPQPGLGRWGPTIDLPIVPAAAAIEPTSGRVLMWSSYRN DAAEGSPGGITLTSSWDPSTGIVSDRTVTVTKHDMFCPGISMDGNGQIVVTGGW DAKKTSLYDSSSDSWIPGPDMQVARGYQSSATMSDGRVFTIGGSFSGGVFEKNG EVYSPSSKTWTSLPNAKVNPMLTADKQGLYMSDNHAWLFGWKKGSVFQAGPS TAMNWYYTSGSGDVKSAGKRQSNRGVAPDAMCGNAVMYDAVKGKILTFGGS PDYTDSDATTNAHIITLGEPGTSPNTVFASNGLYFARTFHTSVVLPDGSTFITGGQ RRGIPFEDSTPVFTPEIYVPEQDTFYKQNPNSIVRAYHSISLLLPDGRVFNGGGGLC GDCTTNHFDAQIFTPNYLYDSNGNLATRPKITRTSTQSVKVGGRITISTDSSITKAS LIRYGTATHTVNTDQRRIPLVLTNNGGNSYSFQVPSDSGVALPGYWMLFVMNSA GVPSVASTIRVTQAAA