Supplementary information

Pyrroloquinoline quinone production defines the ability of the *Devosia* species to degrade Deoxynivalenol

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Table S1. Accession number of genome sequences in NCBI database

Strain	Accession number
Devosia sp. 17-2-E-8	GCF_000743515.1
Devosia insulae strain A16	GCF_001402915.1
Devosia sp. D6-9	GCF_014083885.1
Devosia aurantiaca strain H239 1	GCF_011058215.1
Devosia beringensis strain S02	GCF_014926585.1
Devosia chinhatensis strain IPL18	GCF_000969445.1
Devosia crocina strain IPL20	GCF_900116545.1
Devosia elaeis strain S37 DIN_R1	GCF_001650025.1
Devosia enhydra strain ATCC 23634	GCF_900119845.1
Devosia epidermidihirudinis strain E84	GCF_000971295.1
Devosia equisanguinis strain CIP 111628	GCF_900631955.1
Devosia faecipullorum strain CC-YST69 6	GCF_015158295.1
Devosia geojensis strain BD-c194	GCF_000969415.1
Devosia ginsengisoli strain Gsoil 520	GCF_007859655.1
Devosia indica strain IO390501	GCF_003056405.1
Devosia insulae strain DS-56	GCF_000970465.2
Devosia limi DSM 17137	GCF_900128975.1
Devosia litorisediminis strain BSSL-BM10 1	GCF_018334155.1
Devosia lucknowensis strain L15	GCF_900177655.1
Devosia marina strain L53-10-65	GCF_009758415.1
Devosia naphthalenivorans strain CM5-1	GCF_003056355.1
Devosia neptuniae strain G21611-S1	GCF_027214225.1
Devosia oryziradicis strain G19	GCF_016698645.1
Devosia oryzisoli strain PTR5	GCF_014837245.1
Devosia pacifica strain KCTC 32437	GCF_014652635.1
Devosia psychrophila strain CGMCC 1.10210	GCF_900112505.1
Devosia rhizoryzae strain LEGU1	GCF_016698665.1
Devosia riboflavina strain IFO13584	GCF_000743575.1
Devosia salina strain SCS-3	GCF_019504385.1
Devosia sediminis strain MSA67	GCF_016411825.1
Devosia soli strain GH2-10	GCF_000970455.1
Devosia subaequoris strain DSM 23447	GCF_014197055.1
Devosia submarina strain JCM 18935	GCF_003056345.1
Devosia ureilytica strain XJ19-45	GCF_024273205.1

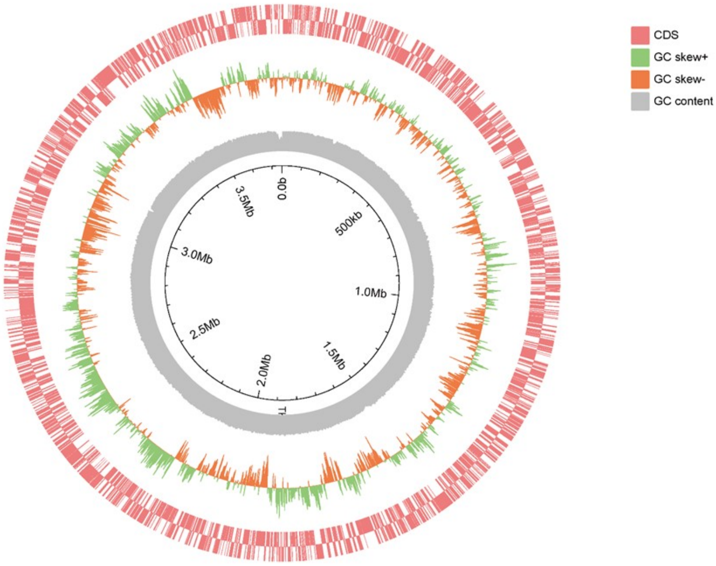

Fig. S1. D-G15 Genome Circular Diagram: The circular chart provides six distinct types of information, arranged from the outermost to the innermost layers. The first and second layers depict coding genes on the positive and negative DNA strands, respectively. The third and fourth layers demonstrate the GC composition across the genome. The fifth layer exhbits the GC content, while the sixth layer indicates the overall genome size.

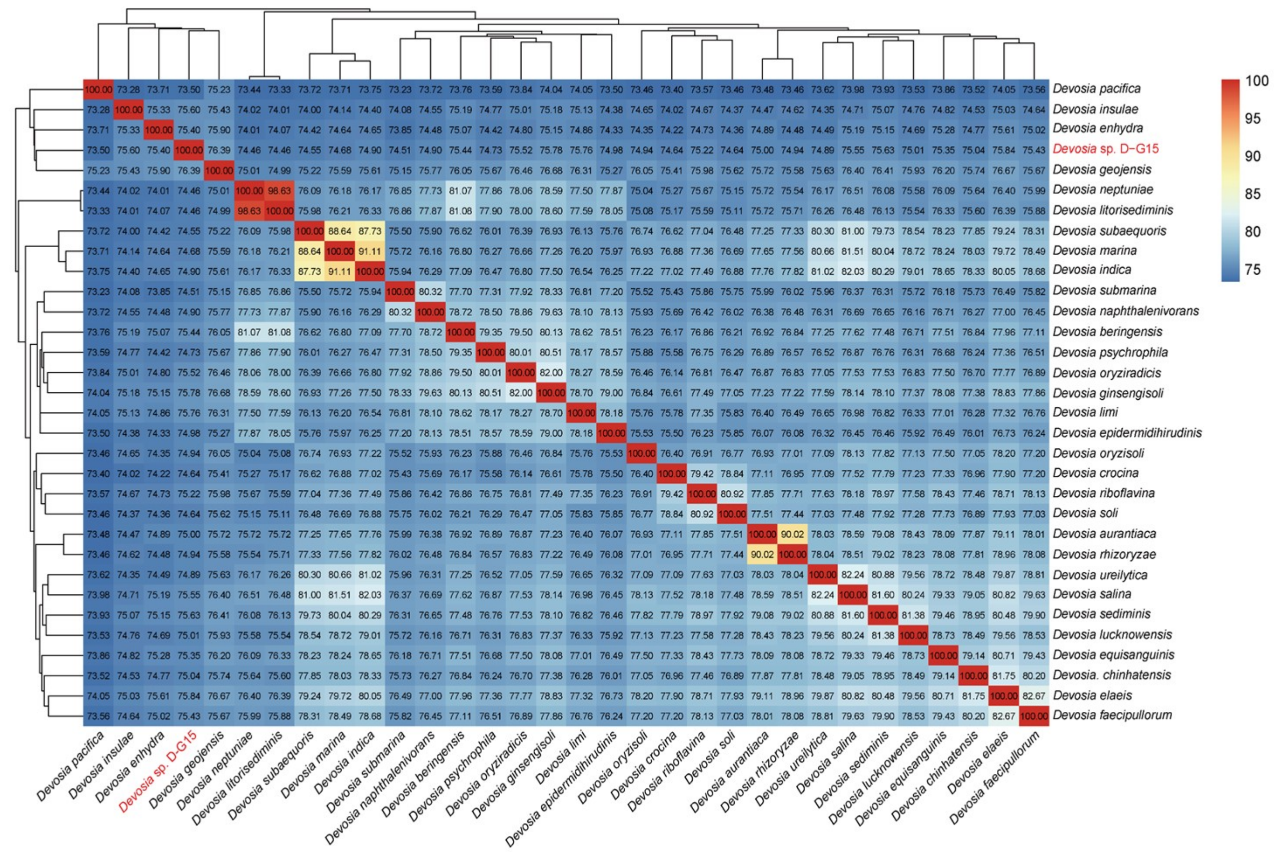

Fig. S2. The average nucleotide identity comparison between D-G15 and other *Devosia* strains with genome sequence in NCBI data base.

Table S2. Mass spectrum fragmentation of DON using LC-MS/MS analysis

m/z	Height	Height %	Formula & Ion Species	Loss Formula	Loss Mass
249.1118	7098.61	100	$[C_{14}\,H_{17}\,O_4]^+$	CH_3O_2	47
231.1007	6299.14	88.74	$[C_{14}\,H_{15}\,O_3]^+$	CH_5O	65
203.1058	4550.01	64.1	$[C_{13}\,H_{15}\,O_2]^+$	$C_2H_5O_4$	93
279.1211	3881.75	54.68	$[C_{15}\,H_{19}\,O_5]^+$	HO	17
261.111	2717.57	38.28	$[C_{15}\,H_{17}\,O_4]^+$	H_3O_2	35
175.0756	2477.89	34.91	$[C_{11}\,H_{11}\,O_2]^+$	$C_4H_9O_4$	121.1
219.1012	2154.41	30.35	$[C_{13}\,H_{15}\,O_3]^+$	$C_2H_5O_3$	77
133.0856	1779.84	25.07	$[C_6\,H_{13}\,O_3]^+$	$C_9H_7O_3$	163
125.0592	1742.3	24.54	$[C_7\,H_9\,O_2]^+$	$C_8H_{11}O_4$	171.1
250.1142	1694.9	23.88	$[C_{14}\,H_{17}\,O_4]^+$	CH_3O_2	47
189.0905	1391.11	19.6	$[C_{12}\,H_{13}\,O_2]^+$	$C_3H_7O_4$	107
251.1282	1358.77	19.14	$[C_{14}\,H_{19}\,O_4]^+$	CHO_2	45
201.0914	1357.83	19.13	$[C_{13}\,H_{13}\,O_2]^+$	$C_2H_7O_4$	95
137.0582	1278.98	18.02	$[C_8\,H_9\,O_2]^+$	$C_7H_{11}O_4$	159.1
232.1038	1259.8	17.75	$[C_{14}\,H_{15}\,O_3]^+$	CH_5O_3	65
233.1163	1175.38	16.56	$[C_{14}\,H_{17}\,O_3]^+$	CH_3O_3	63
213.0907	1142.03	16.09	$[C_{14}\,H_{13}\,O_2]^+$	CH_7O_4	83
280.126	1068.66	15.05	$[C_{15}\,H_{19}\,O_5]^+$	HO	17
187.1135	1057.05	14.89	$[C_{13}\,H_{15}\,O]^+$	$C_2H_5O_5$	109
177.112	933.51	13.15	$[C_8\,H_{17}\,O_4]^+$	$C_7H_3O_2$	119
159.08	929.42	13.09	$[C_{11}\,H_{11}\,O]^+$	$C_4H_9O_5$	137
204.1106	924.31	13.02	$[C_{13}\,H_{15}\,O_2]^+$	$C_2H_5O_4$	93
173.0939	869.08	12.24	$[C_{12}\,H_{13}\,O]^+$	$C_3H_7O_5$	123
215.1041	868.11	12.23	$[C_{14}\,H_{15}\,O_2]^+$	CH_5O_4	81
175.1096	837.13	11.79	$[C_{12}\,H_{15}\,O]^+$	$C_3H_5O_5$	121
267.1194	802.51	11.31	$[C_{14}\,H_{19}\,O_5]^+$	CHO	29
161.0944	756.75	10.66	$[C_{11}\,H_{13}\,O]^+$	$C_4H_7O_5$	135
185.0953	735.73	10.36	$[C_{13}\,H_{13}\,O]^+$	$C_2H_7O_5$	111
229.0695	725.79	10.22	$[C_{10}\,H_{13}\,O_6]^+$	C_5H_7	67.1
177.0898	700.76	9.87	$[C_{11}\,H_{13}\,O_2]^+$	$C_4H_7O_4$	119
243.1034	533.56	7.52	$[C_{15}\,H_{15}\,O_3]^+$	H_5O_3	53
109.0646	506.66	7.14	$[C_7\,H_9\,O]^+$	$C_8H_{11}O_5$	187.1
262.1151	501.89	7.07	$[C_{15}\,H_{17}\,O_4]^+$	H_3O_2	35
121.0641	499.06	7.03	$[C8\ H9\ O]^+$	$C_7H_{11}O_5$	175.1
165.0892	481.51	6.78	$[C_{10}\,H_{13}\,O_2]^+$	$C_5H_7O_4$	131
161.0598	466.11	6.57	$[C_{10}\,H_9\,O_2]^+$	$C_5H_{11}O_4$	135.1
105.0703	421.46	5.94	$[C_8\,H_9]^+$	$C_7H_{11}O_6$	191.1
163.0732	412.49	5.81	$[C_{10}\,H_{11}\,O_2]^+$	$C_5H_9O_4$	133.1
205.0828	406.22	5.72	$[C_{12}\,H_{13}\,O_3]^+$	$C_3H_7O_3$	91
176.0758	405.52	5.71	$[C_{11}\,H_{11}\,O_2]^+$	$C_4H_9O_4$	121.1
197.0963	403.17	5.68	$[C_{14}\,H_{13}\,O]^+$	CH_7O_5	99
231.1443	386.71	5.45	$[C_{15}\,H_{19}\,O_2]^+$	HO_4	65

149.0956	382.17	5.38	$[C_{10} H_{13} O]^+$	$C_5H_7O_5$	147
159.1184	372.88	5.25	$[C_{12} H_{15}]^+$	$C_3H_5O_6$	137
145.1009	358.28	5.05	$[C_{11} H_{13}]^+$	$C_4H_7O_6$	151
203.0703	355.24	5	$[C_{12} H_{11} O_3]^+$	$C_3H_9O_3$	93.1
123.0434	341.25	4.81	$[C_7 H_7 O_2]^+$	$C_8H_{13}O_4$	173.1
191.1062	321.87	4.53	$[C_{12} H_{15} O_2]^+$	$C_3H_5O_4$	105
252.131	291.32	4.1	$[C_{14} H_{19} O_4]^+$	CHO_2	45
220.1049	275.16	3.88	$[C_{13} H_{15} O_3]^+$	$C_2H_5O_3$	77
135.0793	274.51	3.87	$[C_9 H_{11} O]^+$	$C_6H_9O_5$	161
221.1191	258.71	3.64	$[C_{13} H_{17} O_3]^+$	$C_2H_3O_3$	75
107.0504	256.41	3.61	$[C_7 H_7 O]^+$	$C_8H_{13}O_5$	189.1
142.0774	250.53	3.53	$[C_{11} H_{10}]^+$	$C_4H_{10}O_6$	154
157.1007	247.69	3.49	$[C_{12} H_{13}]^+$	$C_3H_7O_6$	139
129.0687	246.5	3.47	$[C_{10} H_9]^+$	$C_5H_{11}O_6$	167.1
190.0939	242.57	3.42	$[C_{12} H_{13} O_2]^+$	$C_3H_7O_4$	107
169.1009	224.07	3.16	$[C_{13} H_{13}]^+$	$C_2H_7O_6$	127
145.0633	216.46	3.05	$[C_{10} H_9 O]^+$	$C_5H_{11}O_5$	151.1
183.0807	216.17	3.05	$[C_{13} H_{11} O]^+$	$C_2H_9O_5$	113
126.065	212.74	3	$[C_7 H_9 O_2]^+$	$C_8H_{11}O_4$	171.1
205.1205	213.01	3	$[C_{13} H_{17} O_2]^+$	$C_2H_3O_4$	91
123.0806	211.5	2.98	$[C_8 H_{11} O]^+$	$C_7H_9O_5$	173
119.0855	204.28	2.88	$[C_9 H_{11}]^+$	$C_6H_9O_6$	177
131.0873	202.11	2.85	$[C_{10} H_{11}]^+$	$C_5H_9O_6$	165
151.0758	189.99	2.68	$[C_9 H_{11} O_2]^+$	$C_6H_9O_4$	145.1
162.0689	186.3	2.62	$[C_{10} H_{10} O_2]^+$	$C_5H_{10}O_4$	134.1
177.0522	185.25	2.61	$[C_{10} H_9 O_3]^+$	$C_5H_{11}O_3$	119.1
109.0274	184.79	2.6	$[C_6 H_5 O_2]^+$	$C_9H_{15}O_4$	187.1
187.0746	182.51	2.57	$[C_{12} H_{11} O_2]^+$	$C_3H_9O_4$	109.1
113.058	177.43	2.5	$[C_6 H_9 O_2]^+$	$C_9H_{11}O_4$	183.1
147.0801	176.97	2.49	$[C_{10} H_{11} O]^+$	$C_5H_9O_5$	149
234.1192	177.03	2.49	$[C_{14} H_{17} O_3]^+$	CH_3O_3	63
149.0591	175.85	2.48	$[C_9 H_9 O_2]^+$	$C_6H_{11}O_4$	147.1

Table S3. Mass spectrum fragmentation of Compound A using LC-MS/MS analysis

m/z	Height	Height %	Formula & Ion Species	Loss Formula	Loss Mass
205.0856	3642	100.00	$[C_{12}\ H_{13}\ O_3]^+$	$C_3H_5O_3$	89
247.0957	1329.32	36.50	$[C_{14}\ H_{15}\ O_4]^+$	CH_3O_2	47
187.0753	878.15	24.11	$[C_{12}\ H_{11}\ O_2]^+$	$C_3H_7O_4$	107
201.0889	733.27	20.13	$[C_{13}\ H_{13}\ O_2]^+$	$C_2H_5O_4$	93
277.1062	661.08	18.15	$[C_{15}\ H_{17}\ O_5]^+$	HO	17
229.0851	581.93	15.98	$[C_{14}\ H_{13}\ O_3]^+$	CH_5O_3	65
206.0891	511.14	14.03	$[C_{12}\ H_{13}\ O_3]^+$	$C_3H_5O_3$	89
107.9658	459.8	12.62	$[C\ O_6]^+$	$C_{14}H_{18}$	186.1
137.059	397.97	10.93	$[C_8\ H_9\ O_2]^+$	$C_7H_9O_4$	157.1
248.097	362.22	9.95	$[C_{14}\ H_{15}\ O_4]^+$	CH_3O_2	47
219.0997	342.81	9.41	$[C_{13}\ H_{15}\ O_3]^+$	$C_2H_3O_3$	75
125.0585	319.92	8.78	$[C_7\ H_9\ O_2]^+$	$C_8H_9O_4$	169.1
217.0861	272.15	7.47	$[C_{13}\ H_{13}\ O_3]^+$	$C_2H_5O_3$	77
173.0962	229.63	6.31	$[C_{12}\ H_{13}\ O]^+$	$C_3H_5O_5$	121
189.0895	229.61	6.30	$[C_{12}\ H_{13}\ O_2]^+$	$C_3H_5O_4$	105
203.1034	225.66	6.20	$[C_{13}\ H_{15}\ O_2]^+$	$C_2H_3O_4$	91
222.1187	224.6	6.17	$[C_{13}\ H_{18}\ O_3]^+$	C_2O_3	72
175.075	218.39	6.00	$[C_{11}\ H_{11}\ O_2]^+$	$C_4H_7O_4$	119
221.1153	199.18	5.47	$[C_{13}\ H_{17}\ O_3]^+$	C_2HO_3	73
265.108	192.15	5.28	$[C_{14}\ H_{17}\ O_5]^+$	CHO	29
249.1081	185.59	5.10	$[C_{14}\ H_{17}\ O_4]^+$	CHO_2	45
153.0566	182.16	5.00	$[C_8\ H_9\ O_3]^+$	$C_7H_9O_3$	141.1
231.1023	180.1	4.95	$[C_{14}\ H_{15}\ O_3]^+$	CH_3O_3	63
259.097	172.38	4.73	$[C_{15}\ H_{15}\ O_4]^+$	H_3O_2	35
188.0786	166.54	4.57	$[C_{12}\ H_{11}\ O_2]^+$	$C_3H_7O_4$	107
230.0913	134.47	3.69	$[C_{14}\ H_{13}\ O_3]^+$	CH_5O_3	65
109.0645	133.06	3.65	$[C_{13}\ H_{15}\ O_4]^+$	$C_2H_3O_2$	59
235.0936	132.96	3.65	$[C_7\ H_9\ O]^+$	$C_8H_9O_5$	185
191.0719	123.44	3.39	$[C_{11}\ H_{11}\ O_3]^+$	$C_4H_7O_3$	103
175.112	117.76	3.23	$[C_{12}\ H_{15}\ O]^+$	$C_3H_3O_5$	119
278.107	115.28	3.17	$[C_{15}\ H_{17}\ O_5]^+$	HO	17
257.1013	103.19	2.83	$[C_{12}\ H_{17}\ O_6]^+$	C_3H	37
159.0813	100.37	2.76	$[C_{11}\ H_{11}\ O]^+$	$C_4H_7O_5$	135
213.0902	97.29	2.67	$[C_{14}\ H_{13}\ O_2]^+$	CH_5O_4	81
255.0235	96.78	2.66	$[C_{14}\ H_7\ O_5]^+$	$CH_{11}O$	39.1
237.1147	95.86	2.63	$[C_{13}\ H_{17}\ O_4]^+$	C_2HO_2	57
123.0445	92.53	2.54	$[C_9\ H_{11}\ O_2]^+$	$C_6H_7O_4$	143
151.0734	92.44	2.54	$[C_7\ H_7\ O_2]^+$	$C_8H_{11}O_4$	171.1
185.0982	89.15	2.45	$[C_{13}\ H_{13}\ O]^+$	$C_2H_5O_5$	109
204.1143	81.11	2.23	$[C_{13}\ H_{16}\ O_2]^+$	$C_2H_2O_4$	90
165.0912	77.02	2.11	$[C_{10}\ H_{13}\ O_2]^+$	$C_5H_5O_4$	129
201.1298	76.21	2.09	$[C_{14}\ H_{17}\ O]^+$	CHO_5	93

163.0738	72.88	2.00	$[C_{10} H_{11} O_2]^+$	$C_5H_7O_4$	131
126.0653	67.06	1.84	$[C_7 H_{10} O_2]^+$	$C_8H_8O_4$	168
263.095	60.48	1.66	$[C_{14} H_{15} O_5]^+$	CH_3O	31
210.1081	58.06	1.59	$[C_8 H_{18} O_6]^+$	C_7	84

Table S4. Mass spectrum fragmentation of Compound B using LC-MS/MS analysis

m/z	Height	Height %	Formula & Ion Species	Loss Formula	Loss Mass
279.1222	4683.68	100	$[C_{15} H_{19} O_5]^+$	HO	17
231.1015	4126.91	88.11	$[C_{14} H_{15} O_3]^+$	CH_5O_3	65
175.0736	1944.28	41.51	$[C_{11} H_{11} O_2]^+$	$C_4H_9O_4$	121.1
249.1097	1046.59	22.35	$[C_{14} H_{17} O_4]^+$	CH_3O_2	47
213.0897	953.23	20.35	$[C_{14} H_{13} O_2]^+$	CH_7O_4	83
280.1254	937.41	20.01	$[C_{15} H_{19} O_5]^+$	HO	17
203.1067	840.7	17.95	$[C_{13} H_{15} O_2]^+$	$C_2H_5O_4$	93
177.0909	806.88	17.23	$[C_{11} H_{13} O_2]^+$	$C_4H_7O_4$	119
232.1053	671.23	14.33	$[C_{14} H_{15} O_3]^+$	CH_5O_3	65
219.1029	590.28	12.6	$[C_{13} H_{15} O_3]^+$	$C_2H_5O_3$	77
261.1132	587.25	12.54	$[C_{15} H_{17} O_4]^+$	H_3O_2	35
201.0906	511.18	10.91	$[C_{13} H_{13} O_2]^+$	$C_2H_7O_4$	95
205.0843	484.55	10.35	$[C_{12} H_{13} O_3]^+$	$C_3H_7O_3$	91
189.0915	484.52	10.34	$[C_{12} H_{13} O_2]^+$	$C_3H_7O_4$	107
215.1087	364.74	7.79	$[C_{14} H_{15} O_2]^+$	CH_5O_4	81
151.0758	316.09	6.75	$[C_9 H_{11} O_2]^+$	$C_6H_9O_4$	145.1
125.0602	313.61	6.7	$[C_7 H_9 O_2]^+$	$C_8H_{11}O_4$	171.1
137.0578	298.11	6.36	$[C_8 H_9 O_2]^+$	$C_7H_{11}O_4$	159.1
173.0953	276.86	5.91	$[C_{12} H_{13} O]^+$	$C_3H_7O_5$	123
201.1231	274.1	5.85	$[C_{14} H_{17} O]^+$	CH_3O_5	95
231.1367	271.83	5.8	$[C_{15} H_{19} O_2]^+$	HO_4	65
185.0949	270.47	5.77	$[C_{13} H_{13} O]^+$	$C_2H_7O_5$	111
233.1139	267.16	5.7	$[C_{14} H_{17} O_3]^+$	CH_3O_3	63
251.1278	226.08	4.83	$[C_{14} H_{19} O_4]^+$	CHO_2	45
207.1003	185.48	3.96	$[C_{12} H_{15} O_3]^+$	$C_3H_5O_3$	89
175.1086	171.78	3.67	$[C_{12} H_{15} O]^+$	$C_3H_5O_5$	121
243.0996	165.14	3.53	$[C_{15} H_{15} O_3]^+$	H_5O_3	53
171.0801	154.84	3.31	$[C_{12} H_{11} O]^+$	$C_3H_9O_5$	125
220.104	145.17	3.1	$[C_{13} H_{15} O_3]^+$	$C_2H_5O_3$	77
163.0744	143.37	3.06	$[C_{10} H_{11} O_2]^+$	$C_5H_9O_4$	133.1
193.0868	141.72	3.03	$[C_{11} H_{13} O_3]^+$	$C_4H_7O_3$	103
151.0395	137.14	2.93	$[C_8 H_7 O_3]^+$	$C_7H_{13}O_3$	145.1
127.0777	136.82	2.92	$[C_7 H_{11} O_2]^+$	$C_8H_9O_4$	169.1
159.0824	130.41	2.78	$[C_{11} H_{11} O]^+$	$C_4H_9O_5$	137
153.0541	120.28	2.57	$[C_8 H_9 O_3]^+$	$C_7H_{11}O_3$	143.1
173.131	110.16	2.35	$[C_{13} H_{17}]^+$	$C_2H_3O_6$	123
191.1032	104.68	2.23	$[C_{12} H_{15} O_2]^+$	$C_3H_5O_4$	105
205.1196	102.3	2.18	$[C_{13} H_{17} O_2]^+$	$C_2H_3O_4$	91
178.0948	95.16	2.03	$[C_{11} H_{13} O_2]^+$	$C_4H_7O_4$	119
107.0496	93.64	2	$[C_7 H_7 O]^+$	$C_8H_{13}O_5$	189.1
216.1091	92.91	1.98	$[C_{14} H_{15} O_2]^+$	CH_5O_4	81
225.0892	83.17	1.78	$[C_{15} H_{13} O_2]^+$	H_7O_4	71

202.0955	80.69	1.72	$[C_{13}H_{13}O_2]^+$	$C_2H_7O_4$	95
234.1191	79.96	1.71	$[C_{14}H_{17}O_3]^+$	CH_3O_3	63
133.0982	79.8	1.7	$[C_{10}H_{13}]^+$	$C_5H_7O_6$	163
197.0977	71.2	1.52	$[C_{14}H_{13}O]^+$	CH_7O_5	99
203.0681	70.03	1.5	$[C_{12}H_{11}O_3]^+$	$C_3H_9O_3$	93.1
165.055	65.81	1.41	$[C_9H_9O_3]^+$	$C_6H_{11}O_3$	131.1
111.0455	63.8	1.36	$[C_6H_7O_2]^+$	$C_9H_{13}O_4$	185.1

Table S5. Mass spectrum fragmentation of Compound C using LC-MS/MS analysis

m/z	Height	Height %	Formula & Ion Species	Loss Formula	Loss Mass
217.0847	1451.92	100	$[C_{13} H_{13} O_3]^+$	$C_2H_5O_4$	93
293.1015	1345.52	92.67	$[C_{15} H_{17} O_6]^+$	HO	17
189.0905	1271.1	87.55	$[C_{12} H_{13} O_2]^+$	$C_3H_5O_5$	121
137.0584	980.77	67.55	$[C_8 H_9 O_2]^+$	$C_7H_9O_5$	173
175.0757	894.64	61.62	$[C_{11} H_{11} O_2]^+$	$C_4H_7O_5$	135
201.0891	714.15	49.19	$[C_{13} H_{13} O_2]^+$	$C_2H_5O_5$	109
263.091	706.78	48.68	$[C_{14} H_{15} O_5]^+$	CH_3O_2	47
205.083	676.38	46.58	$[C_{12} H_{13} O_3]^+$	$C_3H_5O_4$	105
247.0955	637.92	43.94	$[C_{14} H_{15} O_4]^+$	CH_3O_3	63
265.1053	633.19	43.61	$[C_{14} H_{17} O_5]^+$	CHO_2	45
221.0772	579.56	39.92	$[C_{12} H_{13} O_4]^+$	$C_3H_5O_3$	89
109.0646	471.7	32.49	$[C_7 H_9 O]^+$	$C_8H_9O_6$	201
173.0961	466.83	32.15	$[C_{12} H_{13} O]^+$	$C_3H_5O_6$	137
233.079	454.76	31.32	$[C_{13} H_{13} O_4]^+$	$C_2H_5O_3$	77
111.044	426.03	29.34	$[C_6 H_7 O_2]^+$	$C_9H_{11}O_5$	199.1
294.1056	418.05	28.79	$[C_{15} H_{17} O_6]^+$	HO	17
218.0888	374.12	25.77	$[C_{13} H_{13} O_3]^+$	$C_2H_5O_4$	93
190.0958	364.13	25.08	$[C_{12} H_{14} O_2]^+$	$C_3H_4O_5$	120
275.0882	348.91	24.03	$[C_{15} H_{15} O_5]^+$	H_3O_2	35
229.0852	336.11	23.15	$[C_{14} H_{13} O_3]^+$	CH_5O_4	81
191.0691	333.45	22.97	$[C_{11} H_{11} O_3]^+$	$C_4H_7O_4$	119
215.0713	328.14	22.6	$[C_{13} H_{11} O_3]^+$	$C_2H_7O_4$	95
121.0645	324.19	22.33	$[C_8 H_9 O]^+$	$C_7H_9O_6$	189
219.0992	294.29	20.27	$[C_{13} H_{15} O_3]^+$	$C_2H_3O_4$	91
159.0798	290.12	19.98	$[C_{11} H_{11} O]^+$	$C_4H_7O_6$	151
278.1106	266.62	18.36	$[C_{15} H_{18} O_5]^+$	O_2	32
171.0809	253.7	17.47	$[C_{12} H_{11} O]^+$	$C_3H_7O_6$	139
193.0847	250.11	17.23	$[C_{11} H_{13} O_3]^+$	$C_4H_5O_4$	117
191.1064	246.19	16.96	$[C_{12} H_{15} O_2]^+$	$C_3H_3O_5$	119
235.096	244.4	16.83	$[C_{13} H_{15} O_4]^+$	$C_2H_3O_3$	75
245.0786	232.15	15.99	$[C_{14} H_{13} O_4]^+$	CH_5O_3	65
161.0945	193.42	13.32	$[C_{11} H_{13} O]^+$	$C_4H_5O_6$	149
195.065	175.18	12.07	$[C_{10} H_{11} O_4]^+$	$C_5H_7O_3$	115
176.0782	170.27	11.73	$[C_{11} H_{11} O_2]^+$	$C_4H_7O_5$	135
207.0982	162.88	11.22	$[C_{12} H_{15} O_3]^+$	$C_3H_3O_4$	103
264.098	162.6	11.2	$[C_{14} H_{15} O_5]^+$	CH_3O_2	47
145.1012	146.85	10.11	$[C_{11} H_{13}]^+$	$C_4H_5O_7$	165
203.1047	136.9	9.43	$[C_{13} H_{15} O_2]^+$	$C_2H_3O_5$	107
277.1048	135.28	9.32	$[C_{15} H_{17} O_5]^+$	HO_2	33
223.0941	133.82	9.22	$[C_{12} H_{15} O_4]^+$	$C_3H_3O_3$	87
222.0823	121.97	8.4	$[C_{12} H_{13} O_4]^+$	$C_3H_5O_3$	89
248.1011	121.61	8.38	$[C_{14} H_{15} O_4]^+$	CH_3O_3	63

187.0764	121.52	8.37	$[C_{12} H_{11} O_2]^+$	$C_3H_7O_5$	123
237.1129	114.62	7.89	$[C_{13} H_{17} O_4]^+$	C_2HO_3	73
153.0571	105	7.23	$[C_8 H_9 O_3]^+$	$C_7H_9O_4$	157.1
199.0739	104.5	7.2	$[C_{13} H_{11} O_2]^+$	$C_2H_7O_5$	111
163.0764	101.62	7	$[C_{10} H_{11} O_2]^+$	$C_5H_7O_5$	147
128.0644	98.38	6.78	$[C_{10} H_8]^+$	$C_5H_{10}O_7$	182
189.1246	98.04	6.75	$[C_{13} H_{17} O]^+$	C_2HO_6	121
123.0458	96.36	6.64	$[C_7 H_7 O_2]^+$	$C_8H_{11}O_5$	187.1
175.1119	94.56	6.51	$[C_{12} H_{15} O]^+$	$C_3H_3O_6$	135
171.1046	88.97	6.13	$[C_9 H_{15} O_3]^+$	$C_6H_3O_4$	139
232.1073	89.01	6.13	$[C_{14} H_{16} O_3]^+$	CH_2O_4	78
145.0638	88.62	6.1	$[C_{10} H_9 O]^+$	$C_5H_9O_6$	165
110.0701	86.45	5.95	$[C_7 H_{10} O]^+$	$C_8H_8O_6$	200
157.051	83.11	5.72	$[C_7 H_9 O_4]^+$	$C_8H_9O_3$	153.1
234.0828	81.96	5.65	$[C_{13} H_{13} O_4]^+$	$C_2H_5O_3$	77
186.1029	81.22	5.59	$[C_{13} H_{14} O]^+$	$C_2H_4O_6$	124

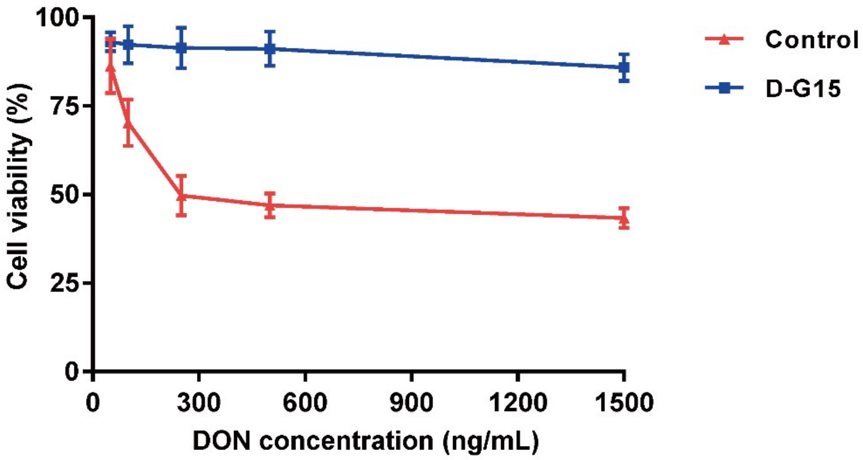

Fig. S3. Effects of DON and D-G15 degradation products on HEK 293T cell viability. The concentration represents the initial concentration of DON before D-G15 incubation. Error bars indicate standard deviation.

Table S6. D-G15 candidate enzyme pimers sequence

Candidate	Primers (5'-3')
No. 1-F	CTGGTGCCGCGCGGCAGCCATATGATGGAATACCGCAAGCTCGG
No. 1-R	TTTGTTAGCAGCCGGATCCTCGAGCTACCGCCCGCCTTCCAT
No. 2-F	GGATATCGGAATTAATTCGGATCCCATGAGATTTGAGTGTTTGCG
No. 2-R	GTGGTGGTGGTGGTGGTGAAGCTTCTTGGAAGCGACAGTGGC
No. 3-F	CTGGTGCCGCGCGGCAGCCATATGATGCGCTACAAGCTTCTCGG
No. 3-R	TTTGTTAGCAGCCGGATCCTCGAGCTATTGCGCCGCGGGGAG
No. 4-F	CTGGTGCCGCGCGGCAGCCATATGATGGAATACCGGCTGCTC
No. 4-R	TTTGTTAGCAGCCGGATCCTCGAGTTAGTGCTCCAGATGTGGGG
No. 5-F	CTGGTGCCGCGCGGCAGCCATATGATGACCTACCGTGCCCATTC
No. 5-R	TTTGTTAGCAGCCGGATCCTCGAGTCAGCGCTTGAGCGGGTA
No. 6-F	CTGGTGCCGCGCGGCAGCCATATGATGGAATACCGTCGTCTCGG
No. 6-R	TTTGTTAGCAGCCGGATCCTCGAGTCAATACCGCAGCGGGCC
No. 7-F	CTGGTGCCGCGCGGCAGCCATATGATGGTTGACTACCGTTACCTGGG
No. 7-R	TTTGTTAGCAGCCGGATCCTCGAGTCAGGCGACGGCGCGGAC
No. 8-F	GGATATCGGAATTAATTCGGATCCCATGACTTCGCGTCTCACCGC
No. 8-R	GTGGTGGTGGTGGTGGTGAAGCTTGTTGCTGGCGGTCTTGGGC
No. 9-F	CTGGTGCCGCGCGGCAGCCATATGATGCCCGTGCCCGATGCA
No. 9-R	TTTGTTAGCAGCCGGATCCTCGAGCTAGGCCGCATCGAGGACGG
No. 10-F	CTGGTGCCGCGCGGCAGCCATATGATGAAATATGTGAATTTGGGC
No. 10-R	TTTGTTAGCAGCCGGATCCTCGAGTTAGTGGTTGAGGGAGGC
No. 11-F	CTGGTGCCGCGCGGCAGCCATATGATGCTCGCCGAGCACGGC
No. 11-R	TTTGTTAGCAGCCGGATCCTCGAGCTAGCAAGGCAAGCCGGCGA

Table S7. Homology between the candidate enzyme and the reported DON dehydrogenase

Candidate	Identity (%)				
	DepA	QDDH	DDH	SDH	AKR18A1
No. 2	86.08	85.57	56.64	58.20	/
No. 3	/	/	/	/	58.08
No. 8	36.68	36.68	36.47	33.93	/

" / " represents that no significant similarity was found.

Table S8. Homology of candidate DON isomerases with reported DON isomerases

Candidate	Identity (%)		
	DepB	AKR6D1	AKR13B2
No. 1	84.55	38.63	28.81
No. 4	43.71	35.14	30.12
No. 5	33.23	34.26	25.58
No. 6	37.07	92.10	24.83
No. 7	38.07	35.15	28.43
No. 9	29.02	26.09	78.09
No. 10	30.51	30.65	34.23
No. 11	24.76	24.12	36.53

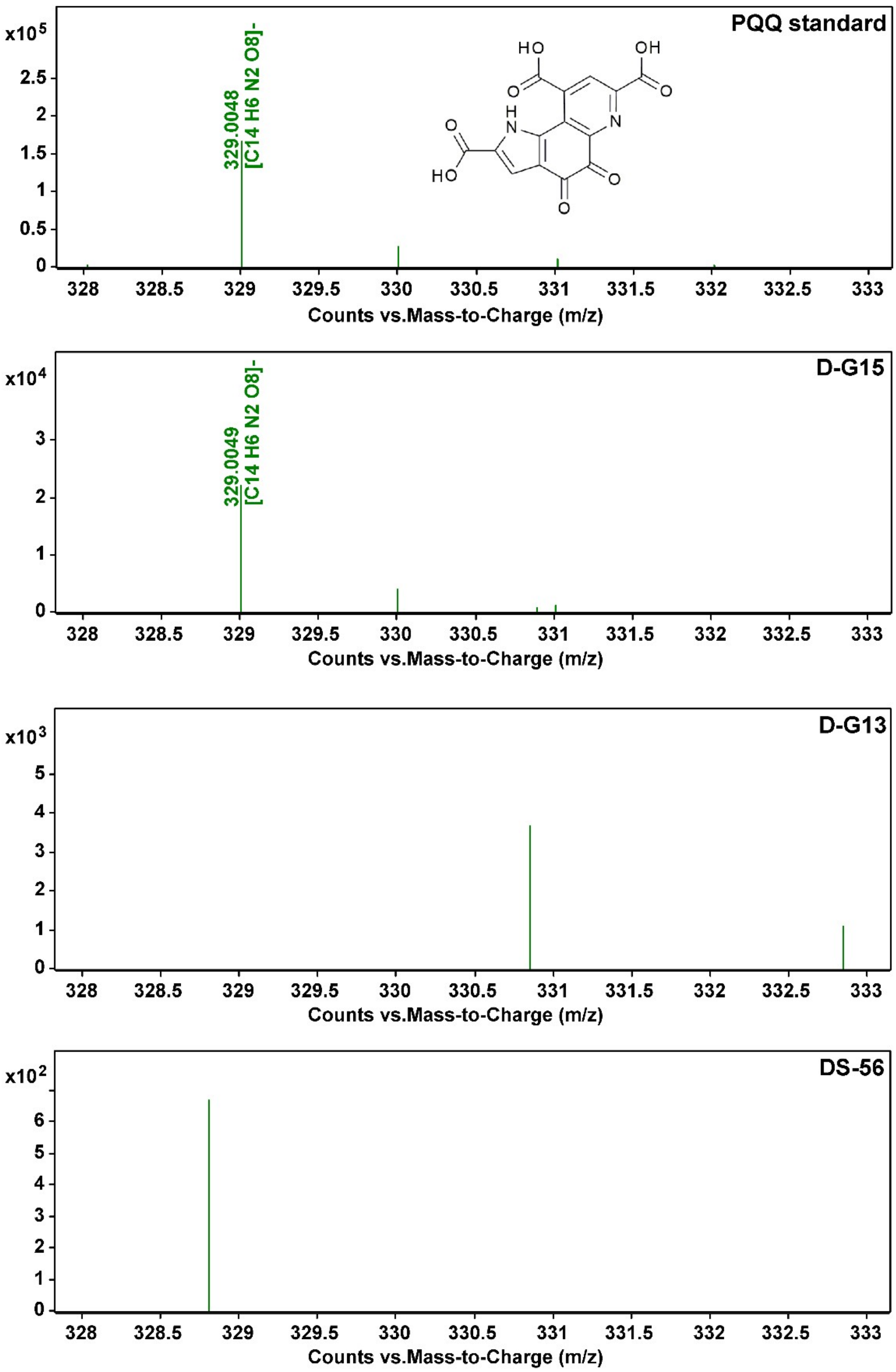

Fig. S4. The analysis of PQQ in D-G15, D-G13, and DS-56 media by LC-MS.

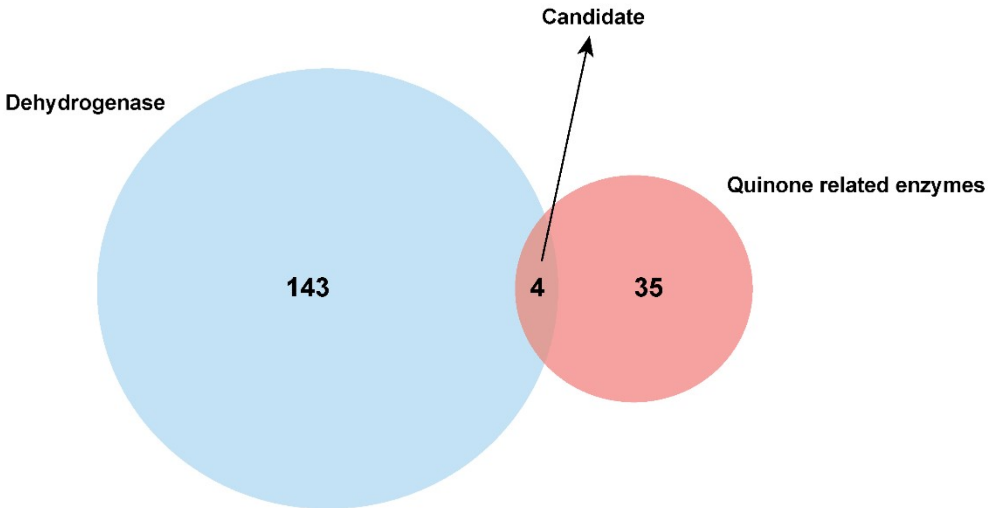

Fig. S5. Analyzing candidate enzymes for DON degradation in D-G13.

Table S9. D-G13candidate enzyme pimers sequence

Candidate	Primers (5'-3')
No. 1-F	TCGGAATTAATTCGGATCCCATGACAAAGCAGACTATCTCTCGTGCG
No. 1-R	TGGTGGTGGTGGTGAAGCTTGAGCCCGAAGACCACGACCTG
No. 2-F	TCGGAATTAATTCGGATCCCGTGCCCACTTTAGACCTGATTGACGATC
No. 2-R	TGGTGGTGGTGGTGAAGCTTCTAGTGGGCGTGGCCGTG
No. 3-F	TGCCGCGCGGCAGCCATATGGCCGACGTGACCGCCGCG
No. 3-R	TTAGCAGCCGGATCCTCGAGGAGCGCGAACACGTAGAGCACGTTGGC
No. 4-F	TCGGAATTAATTCGGATCCCATGATCTTCTCGCGCCTCTCGCC
No. 4-R	TGGTGGTGGTGGTGAAGCTTCTAGAGCGACGCCTTCCCGC

Table S10. Homology between D-G13 candidate gene and reported DON dehydrogenase

Candidate	Identity (%)				
	DepA	QDDH	DDH	SDH	G15-DDH
No. 1	26.91	26.91	27.47	28.48	29.05
No. 2	/	/	/	/	/
No. 3	28.20	28.20	26.27	27.18	27.75
No. 4	/	/	/	/	/

" / " represents that no significant similarity was found.

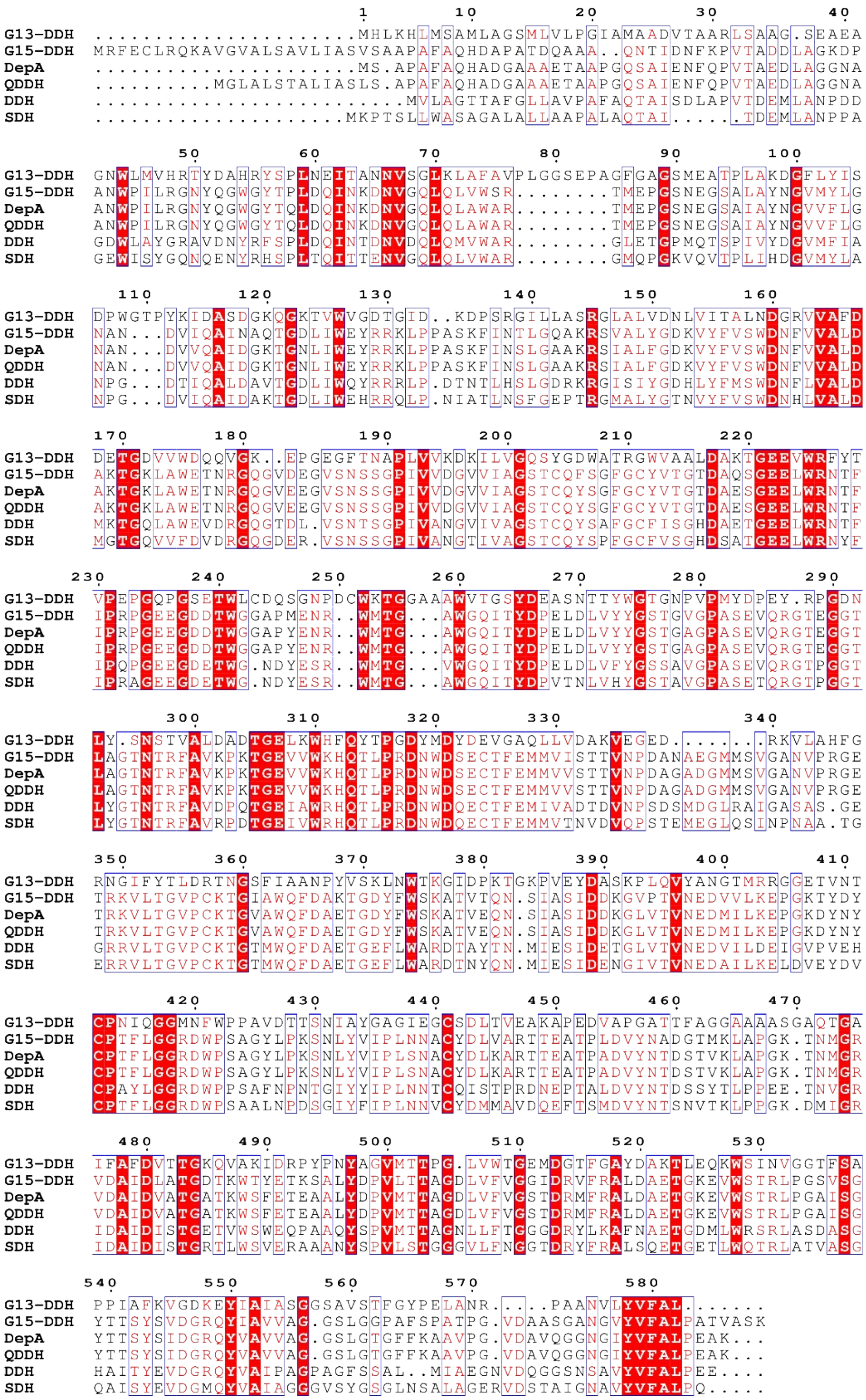

Fig. S6. Multiple sequence alignments of G13-DDH, G15-DDH, DepA, QDDH, DDH and SDH by Clustal W. Strictly conserved residues are shown in red background, highly conserved regions are shown in red and boxed in blue.