

Supplementary Figure 1. Two hundred and sixty amino acid sequences with percentage identities ranging from 99% to 20% at E-scores <10–10 and bit score >50 carrying bacterial luciferase family domain (PF00296) aligned by MUSCLE.

	1	10	20	30	40
LADA_Geobacillus_thermodenitrificans_WP_011888513	MTKKTHINAFEMNCV	GHIAGHLWRHPEN	QRHR	YTDLNYWTELA	
Geobacillus_sp._LEMMY01_WP_079935807.1:1-440	MTKKTHINAFEMNCV	GHIAGHLWRHPEN	QRHR	YTDLNYWTELA	
Geobacillus_stearothermophilus_ABV66256.1:1-440	MTKEIHINAFEMNCV	GHIAGHLWRHPEN	QRHR	YTDLNYWTELA	
Geobacillus_sp._B4113_201601_WP_061912600.1:1-440	MVKKIYINAFEMNCV	GHIAGHLWRHPEN	QRHR	YTDLNYWTELA	
Geobacillus_sp._B4113_201601_5WP_061912600.1:1-440	MVKKIYINAFEMNCV	GHIAGHLWRHPEN	QRHR	YTDLNYWTELA	
Bacillus_thuringiensis_6WP_029441578.1:1-435	MKKIYINAFEMNCV	GHIAGHLWRHPEN	QRHR	YTDLNYWTELA	
Lysinibacillus_sphaericus_WP_103976887.1:2-422	KKIYWNAFEMNCV	GHINHGLWKPEN	KRIN	YKNLNYWTELA	
Lysinibacillus_sphaericus_WP_069508309.1:2-422	KKIYWNAFEMNCV	GHINHGLWKPEN	KRIN	YKNLNYWTELA	
Rummeliibacillus_sp._SL167_10_WP_146551437.1:2-42	KKIYWNAFEMNCV	GHINHGLWKPEN	KRIN	YKNLNYWTELA	
Paenibacillus_sp._DXL2_WP_110843609.1:1-459	MAKKIHLNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYWTELA	
Paenibacillus_naphthalenovorans_WP_074730028.1:1-459	MPKKIHLNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYWTELA	
Cohnella_sp._HS21_WP_130606586.1:1-453	MCKIHLNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYWTELA	
Streptosporangium_subroseum_15_WP_089205784.1:1-4	MTDKIHLNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYWTELA	
Arthrobacter_sp._Hz2_WP_120147654.1:1-455	MTKQIAFNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Nonomuraea_solani_WP_103963668.1:1-453	MSGIHLNLFEMNCV	GHIHSHGLWHPEN	NRHR	YTDLDYFWVETA	
Arthrobacter_ruber_WP_105030338.1:1-455	MTKQIAFNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Bacillus_aciditolerans_20_WP_121446947.1:1-456	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	YTDLDYFWVETA	
WP_137163763.1:1-458	MPKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	YTDLDYFWVETA	
Aeribacillus_pallidus_WP_130157503.1:4-457	KRIYLNLFEMNCV	AHQSPGLWHPED	QSYR	YKDIYFWVETA	
Bacillus_megaterium_24WP_098602848.1:4-460	KRIYLNLFEMNCV	AHQSPGLWHPED	QSYR	YKDIYFWVETA	
Streptomyces_sp._150FB_WP_078877664.1:5-455	KKLHVNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Arthrobacter_sp._DWC3_WP_104051071.1:1-454	MTKQIAFNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Cohnella_thermotolerans_WP_027093898.1:1-456	MTKQIAFNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Paenibacillus_bovis_28WP_144921429.1:1-452	MTKQIAFNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Bacillus_aciditolerans_WP_121447760.1:1-452	MTKQIAFNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Leifsonia_sp._ALI-44-B_30_WP_077053645.1:1-455	MTDNIAFNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Parageobacillus_thermogluconasaccharum_WP_064552269	MAKKIHLNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYFWVETA	
Geobacillus_sp._Y4_1MC1_WP_013399886.1:1-459	MAKKIHLNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYFWVETA	
Bacillus_methanolicus_35WP_004434428.1:1-462	MCKIHLNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYFWVETA	
Terribacillus_halophilus_WP_077309754.1:1-448	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Paraburkholderia_kururiensis_WP_01777532.1:1-453	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Gracilibacillus_massiliensis_WP_058308419.1:1-456	MTKEIHINAFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Streptomyces_yanglinensis_WP_103888551.1:5-452	KKLHVNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Trinickia_sp._7GSK02_40_WP_136896361.1:1-452	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Cryobacterium_sp._NEAU-85_WP_123045138.1:1-448	MSQIHLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Alicyclobacillus_acidoterrestis_WP_021298468.1:4	RRMYLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Oceanobacillus_senegalensis_WP_085994229.1:1-452	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Bacillus_sinalouensis_WP_077620983.1:1-449	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Halopenitium_persicus_WP_021074147.1:6-457	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Microbacteriaceae_bacterium	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Lysinibacillus_sinduriensis_WP_036201100.1:1-458	MAKKIHLNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYFWVETA	
Bacillus_endophyticus_WP_113749053.1:5-457	MAKKIHLNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYFWVETA	
Pseudomonas_monteilii_WP_119371117.1:1-455	MPREIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Bacillus_endophyticus_50_WP_061801645.1:5-457	MPREIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Planococcus_maitriensis_WP_112233285.1:1-457	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Oceanobacillus_profundus_WP_118889880.1:1-447	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Burkholderia_pseudomallei_WP_141404579.1:1-452	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Terribacillus_saccharophilus_WP_095261886.1:1-455	MCKIHLNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYFWVETA	
Sediminibacillus_albus_WP_093212831.1:4-453	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Sciscionella_marina_WP_020496929.1:1-448	MARILHFNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Mycetocolla_saprophilus_WP_043321267.1:1-452	MSQIHLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Lysinibacillus_macroides_WP_053993569.1:4-460	KRIYLNLFEMNCV	AHQSPGLWHPED	QSYR	YKDIYFWVETA	
Pseudomonas_putida_WP_086978777.1:1-458	MPREIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Sediminibacillus_halophilus_60_WP_074598704.1:4-4	KRIYLNLFEMNCV	AHQSPGLWHPED	QSYR	YKDIYFWVETA	
Rhizobium_oryzae_WP_085420425.1:1-450	MAREIWFNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_extremorientalis_WP_071491956.1:1-455	MSREIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_fluorescens_WP_016977452.1:1-454	MSREIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Neorhizobium_sp._T25_27_WP_105419890.1:1-450	MTRERIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_extremaustralis_WP_078833627.1:1-457	MAREIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Fictibacillus_aquaticus_WP_094253544.1:1-455	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_extremaustralis_KAA8559760.1:1-456	MTRERIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Mycobacterium_sp._ACS1612_WP_067812332.1:1-454	MTRERIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Bacillus_megaterium_WP_116075167.1:1-455	MEKHILNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYFWVETA	
Pseudomonas_frederiksborgensis_70_WP_123409596.1	MAREIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_citronellolis_SF6C1163.1:1-452	MSKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Herbaspirillum_chlorophenolicum_WP_050468599.1:4	KQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Arthrobacter_crystallopoietes_WP_074700854.1:1-45	MSKEIHLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Terribacillus_goriensis_WP_038558686.1:1-438	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Bacillus_megaterium_WP_025749753.1:1-455	MCKIHLNFAEMNCV	GHLAHGLWRHPEN	NRHR	YTDLDYFWVETA	
Neorhizobium_sp._T7_12_WP_105403044.1:1-451	MTRERIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Rummeliibacillus_sp._SL167_WP_146553619.1:4-459	KRIYLNLFEMNCV	AHQSPGLWHPED	QSYR	YKDIYFWVETA	
Burkholderia_sp._PAMC	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_koreensis_WP_064585463.1:4-449	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_fluorescens_80_WP_064116961.1:6-451	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_rhodesiae_WP_040265276.1:4-450	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Collimonas_sp._OK412_WP_092393355.1:4-454	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_marginalis_WP_058415544.1:1-456	MSREIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_antarctica_WP_064452947.1:1-458	MSREIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_protegens_WP_041115159.1:9-454	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_synxantha_WP_057024776.1:4-449	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Rhizobium_leguminosarum_WP_128409501.1:2-451	KTQIYAFNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_chlororaphis_WP_038359779.1:6-451	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_syringae_90_WP_024642725.1:1-456	MSREIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Collimonas_fungivorans_WP_061540754.1:4-453	KQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Rhizobium_leguminosarum_WP_116409027.1:2-451	KTQIYAFNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Microvirga_ossetica_WP_099511173.1:1-454	MTKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_caspiana_WP_087268376.1:4-451	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_lundensis_WP_048375063.1:4-451	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Caballeronia_mineralivorans_WP_047894899.1:4-456	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_paralactis_WP_057702387.1:4-450	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_taetrolens_WP_048381143.1:4-453	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_psyrophila_WP_123750761.1:4-450	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Collimonas_arenae_100_WP_061532973.1:4-454	KQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_viridiflava_WP_122210720.1:4-451	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Kocuria_varians_WP_068470402.1:1-454	MSKQIRLNLFEMNCV	GHIHSHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_wadsworthensis_WP_115084816.1:4-455	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_syringae_WP_011266344.1:4-452	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_sp._286_105WP_122415793.1:4-453	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Geobacillus_vulcani_WP_031406843.1:1-461	MDQPLLFNFAEMNCV	MHNAHGLWHPED	ERHRR	YKELHYWTELA	
Geobacillus_iscigianus_WP_033018365.1:1-461	MDQPLLFNFAEMNCV	MHNAHGLWHPED	ERHRR	YKELHYWTELA	
Pseudomonas_floridensis_WP_083182568.1:4-453	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Pseudomonas_asturiensis_WP_073167523.1:4-451	KKIILNFAEMNCV	GHINHGLWHPEN	NRHR	FNDLDYFWVETA	
Geobacillus_vulcani_110_WP_031406843.1:1-461	MDQPLLFNFAEMNCV	MHNAHGLWHPED	ERHRR	YKELHYWTELA	

Pseudomonas syringae WP_024682626.1:4-452
LadAalpha_Geobacillus thermoleovorans BAM76377.1
Tsakumurella pseudospumae WP_068746786.1:1-457
Kocuria sp. *Marseille*-P3598 WP_085529073.1:5-456
Microvirga aerophila WP_114188789.1:1-456
Burkholderia ubonensis WP_071760483.1:5-455
Achromobacter marplatensis WP_006226823.1:4-450
Acinetobacter baumannii WP_070165746.1:1-443
Labeledella phragmitis WP_128496094.1:1-453
Nocardia cyriacigeorgica 120 WP_130918184.1:1-453
Nocardia cyriacigeorgica WP_130918184.1:1-453
Mycobacterium sp. 1164985.4 WP_067298521.1:1-453
Rhodococcus sp. 1R11 WP_135042739.1:1-449
Erwinia amylovora WP_004157587.1:5-459
Ralstonia mannitolilytica WP_102079134.1:4-451
Leifsonia flava WP_135120808.1:15-465
Cryobacterium roopkundense WP_084141147.1:1-453
Cupriavidus pauculus WP_101681197.1:1-455
Rhizobium sp. BK333_130 WP_133704837.1:2-454
Caballeronia mineralivorans WP_047846789.1:1-454
Nocardia altamirensis WP_069163049.1:1-454
Cupriavidus sp. P-10 WP_116322758.1:1-452
Serratia sp. S1B WP_116726564.1:1-452
Pseudomonas putida WP_043864435.1:1-452
Pseudomonas aeruginosa WP_023084248.1:4-453
Pseudomonas mucidolens WP_084381795.1:9-455
Pseudomonas poae WP_060549803.1:4-450
Pseudomonas chlororaphis WP_123573412.1:9-454
Janthinobacterium lividum 140 WP_072454679.1:1-44
Haladaptatus cibarius WP_049970513.1:4-446
Arthrobacter luteolus WP_066298473.1:1-443
Geobacillus sp. ZGt-1 WP_047758532.1:1-436
Lysinibacillus composti WP_124766485.1:4-458
Microcella putealis WP_130486201.1:20-474
Pseudomonas nitroreducens WP_037016976.1:1-453
Acinetobacter wuhouensis WP_130168784.1:1-453
Bradyrhizobium sp. YR681 WP_008144663.1:1-454
Schumannella sp. 10F1D-1 WP_141164655.1:10-460
Pseudomonas coronafaciens 150 WP_122355187.1:4-45
Pseudomonas syringae WP_003430238.1:4-452
unclassified Rhodococcus WP_094682261.1:1-449
Hafnia alvei WP_0464449330.1:6-449
AS9A_3890_Hoyosella subflava WP_013808677.1:1-453
Acinetobacter baumannii WP_000995600.1:1-443
Agrobacterium sp. B133/95 WP_065696417.1:2-454
Microbacterium sp. KROCY2 WP_024289149.1:1-453
Variovorax paradoxus WP_012747040.1:6-452
Methylobacterium radiotolerans WP_076730229.1:5-4
Streptomyces sp. BK215 WP_132915265.1:7-452
Geobacillus thermodenitrificans 160 WP_008880416
Pseudomonas aeruginosa WP_132556951.1:356-785
Penicillium solitum OQE02104.1:14-471
Penicillium vulpinum OQE05502.1:12-469
Clavibacter michiganensis WP_045526194.1:1-454
Glutamibacter creatinolyticus WP_054821484.1:6-
Campylobacter sp. P0078 WP_086237522.1:4-454
Pseudomonas furukawai WP_003454569.1:1-447
Leucobacter triazinivorans WP_130111548.1:1-442
Aspergillus brasiliensis CBS_101740 OJ368286.1:12
Aspergillus udagawae 170 GAO89440.1:15-472
Aspergillus flavus RM237351.1:15-472
Aspergillus flavus RAQ54081.1:15-472
Penicillium arizonense XP_022490779.1:12-469
Salinibacterium sp. CGMCC
Aspergillus fumigatus OXN06785.1:14-471
Aspergillus lentulus GAQ10210.1:7-464
Aspergillus flavus RAQ66103.1:15-472
Aspergillus fumigatus OXN22894.1:14-471
Aspergillus nidulans
Penicillium nalgiovense OQE79848.1:14-471
Aspergillus wentii
Gordonia iterans WP_105943624.1:1-453
Azotobacter beijerinckii WP_090735436.1:4-454
Staphylococcus sp. NAM3COL9 WP_057513692.1:4-453
Acidovorax sp. 56 WP_099656603.1:11-450
Paenibacillus sp. BIHB4019 WP_099518466.1:1-456
Penicillium antarcticum QOD90033.1:5-465
Aspergillus oryzae RIB40_190 XP_001823703.1:9-463
Fusarium oxysporum f. sp. pisi
Colletotrichum fructicola Nara_gc5 ELA35345.1:18-
Micrococcus luteus WP_041104460.1:19-468
Aspergillus awamori GCB21923.1:12-469
Aspergillus niger CBS
Aspergillus lacticooffeatus CBS_101883 XP_02545389
Aspergillus wentii DTO_134E9 OJ340237.1:14-471
Aspergillus indologenus CBS_114_80 PYI31207.1:11-
Aspergillus fischeri NRRL_181 XP_001264002.1:14-4
Penicillium coprophilum 200 OQE46388.1:11-466
Cupriavidus taiwanensis WP_116379876.1:8-454
Penicillium digitatum
Aspergillus niger GAQ46262.1:12-469
Aspergillus nomius NRRL_13137 XP_015412385.1:15-4
Aspergillus aculeatus ATCC_16872 XP_020055010.1:1
Penicillium brasilianum OQO84969.1:19-474
Penicillium subrubescens OKP15100.1:19-474
Trichoderma arundinaceum RFU80530.1:19-474
Aspergillus thermomutatus 210 XP_026614594.1:15-4
Serratia liquefaciens WP_044551273.1:4-449
Micrococcus luteus WP_065572847.1:19-468
Halolamina rubra WP_049979911.1:1-449
Acinetobacter pittii WP_075382847.1:7-452
Corynebacterium variabile WP_052302534.1:2-464
Aspergillus luchuensis GAT21254.1:12-471

Aspergillus luchuensis
Aspergillus bombycis XP_022386026.1:15-472
Agrobacterium vitis WP_070163524.1:1-454
Pseudomonas psychrotolerans_220_WP_074584491.1:5-
Micrococcus yunnanensis WP_135040276.1:19-468
Acinetobacter calcoaceticus WP_004642549.1:7-452
Penicillium brasilianum CEO59775.1:15-472
Aspergillus cristatus ODM22551.1:12-469
Pseudomonas taiwanensis WP_027907363.1:1-446
Acidovorax avenae
Staphylococcus pseudintermedius WP_101431388.1:4-
Rhodococcus triatomae WP_081607437.1:2-451
Alcaligenes sp. RS4_230 WP_128393375.1:4-450
Gibbsiella quercineans WP_121552947.1:7-454
Acinetobacter ursingii WP_044435211.1:5-452
Erwinia typographi WP_034887712.1:4-447
Trichoderma harzianum KKP01913.1:14-470
Fusarium graminearum_235_CEF79766.1:12-466
Gordonia alkanivorans WP_006357654.1:10-461
Acinetobacter radioresistens WP_111281495.1:5-455
Mesorhizobium plurifarum WP_073985566.1:5-458
Oceanobacillus halophilus WP_121203049.1:1-454
Acinetobacter tandoii_240_WP_100241535.1:7-457
Burkholderia plantarii WP_042624083.1:1-457
Alcaligenes faecalis WP_094195208.1:6-457
Bradyrhizobium arachidis WP_092214516.1:1-453
Cupriavidus plantarum WP_109583068.1:1-458
Variovorax sp. 770b2_245_WP_093443018.1:5-461
RZJ22128.1:4-447
LadB_Geobacillus_thermoleovorans_BAM76371.1
LadBeta_Geobacillus_thermoleovorans_BAM76372.1
Af1 AFLA_024140_XP_002373925.1
Af3 AFLA_58870_XP_002378631.1
Af4 AFLA_049780_XP_002383105.1
Af5 AFLA_126060_XP_002381799.1
Af2_QMW32876.1:9-463
Yarrowia lipolytica_CLIB122_YALI0C07546p_XP_50156
Rhizobium sp. CF122_WP007794079.1
Acinetobacter sp. NIPH_2100_ILM
Nostoc sp. PCC_7107_WP_015115963.1
Aspergillus flavus_NRR13357_uncharacterized
Paenibacillus_curdlanolyticus_WP006037998.1
LadBeta_Geobacillus_thermoleovorans_FMN-dependen
SsuD_1M41
Paenibacillus_curdlanolyticus_WP006037998.1
Bacillus
Pseudomonas
LadB_Geobacillus_thermoleovorans_FMN-dependent
Pseudomonas_aeruginosa_PA01_NP_251290.1
Alkanesulfonate
Alkanesulfonate
Aspergillus_niger_ATCC13496_RDH19503.1
Penicillium_digitatum_Pdl_XP014534980.1
Acinetobacter_rudis_WP_016657872.1

	50	60	70	80	90	100
LADA_Geobacillus_thermohydrotrophicans_WP_011888513	Q LLEK G K F D A L F L A D V V G I Y D V Y R Q S R D T A V R E A V Q I P V N D P L M L I S A M A Y V K H L A F					
Geobacillus_sp._LEMMY01_WP_079935807.1:1-440	Q LLEK G K F D A L F L A D V V G I Y D V Y R Q S R D T A V R E A V Q I P V N D P L M L I S A M A Y V K H L A F					
Geobacillus_stearothermophilus_ABV66256.1:1-440	Q LLEK G K F D A L F L A D V V G I Y D V Y R Q S R D T A V R E A V Q I P V N D P L M L I S A M A Y V K H L A F					
Geobacillus_sp._B4113_201601_WP_061912600.1:1-440	Q LLENG K F D A L F L A D V V G I Y D V Y R Q S R D T A V R E A V Q I P V N D P F M L V S A M A Y V K H L A F					
Geobacillus_sp._B4113_201601_5WP_061912600.1:1-44	Q LLENG K F D A L F L A D V V G I Y D V Y R Q S R D T A V R E A V Q I P V N D P F M L V S A M A Y V K H L A F					
Bacillus_thuringiensis_6WP_029441578.1:1-435	Q LLEK G M F D S L F L A D V V G I Y D T Y R Q N K D T A V R E A V Q I P A N D P L M I T S A M A N V K H L G F					
Lysinibacillus_sphaericus_WP_103976887.1:2-422	K T L E K G K F D S L F L A D V V G I Y D V Y K G G F D T S V K E A V Q I P A N D P L I P I S A M A H V T N L C F					
Lysinibacillus_sphaericus_WP_069508309.1:2-422	K T L E K G K F D S L F L A D V V G I Y D V Y K G G F D T S V K E A V Q I P A N D P L I P I S A M A H V T N L C F					
Rummeliibacillus_sp._SL167_10_WP_146551437.1:2-42	K T L E K G R F D A L F L A D V V G I Y D V Y K G G L D T S I K E A V Q I P A N D P F I P I S A M A H V T S N L S F					
Paenibacillus_sp._DXL2_WP_110843609.1:1-459	Q L L E R G K F D A L F L A D V V G I Y D V Y K G G D E T A L R E S V Q L P C N D P F V F V P M A L V K H L G F					
Paenibacillus_naphthalenorans_WP_074730028.1:1-40	Q L L E R G K F D A L F L A D V V G I Y D V Y K G G D E T A L R E S V Q I P C N D P F V F V P M A L V K H L G F					
Cohnella_sp._HS21_WP_130606586.1:1-453	K L L E R G K F D A L F L A D V V G I Y D I F G G N R D A A L R D A V Q A P V N D P S L I T P M A Y A E N L S F					
Streptoporangium_subroseum_15_WP_089205784.1:1-4	T L L E R G L F D A V F L A D V V G A Y D R Y R G G P E T A I S E A V Q I P A N D P L L V V P A M A A V R H L G F					
Arthrobacter_sp._Hz2_WP_120147654.1:1-455	K L L E A G L F D S V F L A D V I G T Y D G Y R G G P E T A I R E A V Q I P S N D P L L I P I A M A A V K H L G F					
Nonomuraea_solani_WP_103963668.1:1-453	K L L E R G L F D A V F L A D V V G A Y D R F R G G P E T A I R E A V Q I P A N D P L L V V P A M A A V R H L G F					
Arthrobacter_ruber_WP_105030338.1:1-455	K L L E A G L F D S V F L A D V I G T Y D G Y R G G P E T A I R E A V Q I P S N D P L L V I P A M A A V R H L G F					
Bacillus_aciditolerans_20_WP_121446947.1:1-456	K L L E R G K F D A V F F A D V L G I Y D V Y K S K H P S I R D G V Q V P L N D P A F V I P A M A S V E H L S F					
WP_137163763.1:1-458	R L L E R G L F D A L F L A D V V G I Y D V Y Q G G P E A A L R G G V Q V P V N D P L L V P A M A G V E H L G F					
Aeribacillus_pallidus_WP_130157503.1:4-457	Q L L E K G R F D G L F I A D V I G I Y D V Y G N D K T T A V R E A T Q I P V N D P I L L V S A M A H A E H L G F					
Bacillus_megaterium_24WP_098602848.1:4-460	Q I L E K G R F D G L F I A D V I G I Y D V Y G G D K T V T V R E A T Q V P V N D P M M L V S A M A R E E H L G F					
Streptomycetes_sp._150FB_WP_078877664.1:5-455	Q L L E Y G T F D A V F L A D V I G A Y D G F R G G P A T A L T E A V Q I P N N D P L L I P I A M A A V K G L G F					
Arthrobacter_sp._DWC3_WP_104051071.1:1-454	K L L E A G L F D S V F L A D V I G T Y D G Y R G G P E T A I R E A V Q I P S N D P L L V I P A M A A A R H L G F					
Cohnella_thermotolerans_WP_027093898.1:1-456	R L L E R G K F D A I F F A D V I G V Y D V Y K G S R D P A I R E G V Q V P L N D P A F A I P I M A Q A K H L S F					
Paenibacillus_bovis_28WP_144921429.1:1-452	K I L E K G R F D A V F L A D V L G T Y D V Y N G S R D A A V R Q G A Q S P V N D P L L V V P L M S S V K H L G F					
Bacillus_aciditolerans_WP_121447760.1:1-452	K L L E K G R F D A I F L A D V L G T Y D V Y Q G S R D A A I R Q G T Q T P V N D P S L V V P L M S A V K H L G F					
Leifsonia_sp._ALI-44-B_30_WP_077053645.1:1-455	K L L E E G L F E A V F L A D V I G T Y D G Y R D G P E T A I K E A V Q I P N D P L L V I P A M A A A K N L G F					
Parageobacillus_thermoglucoasidasius_WP_064552269.	K L L E R C K F D A V F F A D V L G V Y D T Y R Q S K A P S I R D G L Q F P V N D A A L I P I M A S V K H L S F					
Geobacillus_sp._Y4_1MC1_WP_013399886.1:1-459	K L L E R G K F D A V F F A D V L G V Y D T Y R Q S K A P S I R D G L Q F P V N D A S L V I P V M A S V K H L S F					
Bacillus_methanolicus_35WP_004434428.1:1-462	K L L E R G K F D A V F F A D V L G V Y D T Y R Q S K E P S I R D G M Q I P L I D A S L V I P V M A S V K H L S F					
Terribacillus_halophilus_WP_077309754.1:1-448	Q I L E K G Q F D T L F L A D V L G T Y D V Y Q S S R E G A V R Q A A Q V P V N D P L L V V P A M A Q V K H L G F					
Paraburkholderia_kururiensis_WP_01777532.1:1-453	K L L E R G L F D G L F I A D V L G I Y D V Y Q S G S E A A I R Q A T Q V P V N D P I L L V S A M A H V Q H L G F					
Gracilbacillus_massiliensis_WP_058308419.1:1-456	K L L E R G K F D A V F F A D V L G I Y D V Y Q S K A P S I R D G L Q V P L N D P A L L V S A M A S V K H L A F					
Streptomyces_yanglinensis_WP_103888551.1:5-452	R L L E Y G T F D A V F L A D V I G T Y D G F R G G P Q T A L T E A V Q I P N N D P L L V I P A M A A V R C L G F					
Trinickia_sp._7GSK02_40_WP_136896361.1:1-452	K L L E R G K F D G L F I A D V					

Aspergillus luchuensis	KLLESAKFHGIFIAADVLG	YDVYK	GP	RNLEPA	IVSGA	QWPVNEPLAVVP	AMAAAT	QNI	IGF
Aspergillus bombycis_XP_022386026.1:15-472	KLLESAKFHGIFIAADVLG	YDVYK	GP	RNLEPA	IVSGA	QWPVNEPLAVVP	AMAAAT	QNI	IGF
Agrobacterium vitis_WP_070163524.1:1-454	RTLLERGI	FDDGIFIAADV	GYDVYK	GNF	AI	RQA	QIPVNDPLLVA	IPAL	TEHGI
Pseudomonas psychrotolerans_220_WP_074584491.1:5-	QLLERGLFDDGLFIADILG	YDVYK	GNVDL	TLRESI		QIPVNDPFLVL	AMAA	TEH	GLF
Micrococcus yunnanensis_WP_135040276.1:19-468	QTTLEKGLFDDGLFIADVLG	PYSVY	GGTSEA	AIKTA		QIPVNDPFLVL	AMAAV	TEH	GLF
Acinetobacter calcoaceticus_WP_004642549.1:7-452	KTLESGLFDDGLFIADITG	VYDVY	QNGIDL	TLKESI		QIPSHDPSTLI	AMAAV	QNI	LSF
Penicillium brasilianum_CEO59775.1:15-472	QLLESAKFHGIFIAADVLG	YDVYK	GP	RNLEPA	IVSGA	QWPVNEPLAVVP	AMAAAT	QNI	IGF
Aspergillus cristatus_ODM22551.1:12-469	KLLESAKFHGIFIAADVLG	YDVYK	GP	RNLEPA	IVSGA	QWPVNEPLAVVP	AMAAAT	QNI	IGF
Pseudomonas taiwanensis_WP_027907363.1:1-446	RLLERGLFDDGLFIADVLG	IYDVY	GGPQA	ALRGV		QIPVNDPFLVL	AMAGV	TEH	GLF
Acidovorax avenae	RELERGLFDDGLFLADIVG	YDVY	YQGSADV	TLRESV		QIPVNDPVLVL	AMAAAT	TEH	LS
Staphylococcus pseudintermedius_WP_101431388.1:4-	QTTLEKGLFDDGLFIADVLG	TYSVY	NQSHDA	AVKHAV		QIPAHDPPIPLV	SAIAV	TEH	IG
Rhodococcus triatmae_WP_081607437.1:2-451	RALERGMFDDGLFLADFP	GINDVY	QSGNEA	SLREAI		AVFINDPMSAVA	AMASV	TEH	GLF
Alcaligenes_sp._RS4_230_WP_128393375.1:4-450	RVLERGMFDDGLFIADIG	YDVFE	EGNVDL	TLKEAI		QIPVNDPWLVL	AMAAV	TEH	GLF
Gibbsiella quercinecans_WP_121552917.1:7-454	RLLERGLFDDGLFIADILG	VYDVY	QNGIDL	TAREAI		QIPVNDPWLVL	AMASV	TEH	GLF
Acinetobacter ursingii_WP_044435221.1:5-452	KTLEAGLFDDGLFIADITG	VYDVY	QNNIDL	TLRESI		QIPSHDPSTLV	AMASV	TEH	GLF
Erwinia typographi_WP_034887712.1:4-447	QLLERGLFDDGLFIADILG	YDVY	QNGINL	TASESI		QIPVNDPWLVL	AMAGV	TEH	GLF
Trichoderma harzianum_KKP01913.1:14-470	QLLLESAHFHGIFIAADVLP	YDVYK	GP	RNPDP	PAIVSGA	QIPVNEPLVLV	AMAAAT	QNI	IGF
Fusarium graminearum_235_CEF79766.1:12-466	KLLESAKFHGIFIAADVLG	YDVYK	KSLDP	AIISGA		QWPVTEPLSVIP	AMAAV	QNI	ISF
Gordonia alkanivorans_WP_006357654.1:10-461	RLLTEGGFDDGLFIADVLG	TYDVY	LSGTDEA	AI	RQA	QIPVNDPWLVL	AMAHAT	QNI	LSF
Acinetobacter radioresistens_WP_111281495.1:5-455	KTLEQGLFDDGLFLADITG	VYDVY	QNGIEL	TLKESI		QIPSHDPSTLV	AMAAV	QNI	LSF
Mesorhizobium plurifarum_WP_073985566.1:5-458	KTLEEGLFDDGLFLADVLG	VLDT	YSGSIA	TL	QGV	QTPSTDPLLVA	AMAAAT	TEH	GLF
Oceanobacillus halophilus_WP_121203049.1:1-454	KVLERGMFDDGLFIADVLG	TYSVY	GNHES	ALRHAV		QIPAHDPPLPI	AMAAV	TEH	IGF
Acinetobacter tandoii_240_WP_100241535.1:7-457	KTLEQGLFDDGLFIADITG	VYDVY	QNGIDL	TLKESI		QIPSHDPSTLV	AMAAV	TEH	GLF
Burkholderia plantarii_WP_042624083.1:1-457	RTLEAGLFDDGLFLDG	VYDVFE	GNAPDA	ALRTAA		QIPVNDPVLIP	LMHAAT	TEH	GLF
Alcaligenes faecalis_WP_094195208.1:6-457	KTLEKGLFDDGLFLADVLG	YDVY	QGVDL	TLREGI		QIPVNNPWLVL	AMAAV	TEH	IGF
Bradyrhizobium arachidis_WP_092214516.1:1-453	KILEAKGFDDGLFIADIG	IHDVY	AGTADA	ALNTGA		QIPKLDPMPLVL	AMAHV	TEH	GLF
Cupriavidus plantarum_WP_109583068.1:1-458	KLLERGRFDDGLFLDITG	IYDVY	AGGSAEM	ALRTAA		QIPMNDPAPLIP	LMHAAT	TEH	GLF
Variovorax_sp._770b2_245_WP_093443018.1:5-461	RTTLERGLFDDGLFLADVLG	YDVY	GGSPDA	ALRHAI		QIPINDPVLVL	AMASV	TEH	GLF
RZJ22128.1:4-447	KTAEKGLFDDGLFLADGLSV	RW	GS	AI	EG	ELGLGD	KGVGF	EPVTLF	ALS
LadB_Geobacillus thermoleovorans_BAM76371.1	KAAEAHGFSTLLPTGAG	CL						DSLAVA	YLAAR
LadAbeta_Geobacillus thermoleovorans_BAM76372.1	EIAEQKGLDMFLVSDGLAIE					PLSHPA	EIVRL	EPFTLL	ALAAV
Af1_AFLA_024140_XP_002373925.1	KLLESAKFHGIFIAADVLG	YDVYK	GP	RNLEPA	IVSGA	QWPVNEPLAVVP	AMAAAT	QNI	IGF
Af3_AFLA_58870_XP_002378631.1	QKLEAAKFHAIFFADVLG	YDVYK	GP	RNLDPT	IPAGA	QEPINDPLVSV	AMAAAT	TES	IGF
Af4_AFLA_049780_XP_002383105.1	KLLERGCINALFLADITG	YDGY	ESLDE	CIRRAA		QWPVTDPTIPIS	AMAAV	QNI	LSF
Af5_AFLA_126060_XP_002381799.1	KVLKKGKFGHGLFLADHLG	IYDVYK	GP	GNKEPAL	LSGA	QEPIGDPFLIS	AMASV	TES	LSF
Af2_QMW32876.1:9-463	QLLDNAGFHAMFIADITLG	YDVYK	GP	RNVPT	LSGA	QEPVNDPLVLV	AMAAV	QNI	LSF
Yarrowia lipolytica_CLIB122_YALI0C07546p_XP_50156	KTLEKKGKFAHFIADHLG	IFREY	GGDPI	GLEKKI		QEPCHDPLFLV	IMASV	TEH	LSF

	110	120	130	140	150	
LADA Geobacillus_thermodenitrificans WP_011888513	AVTFSTTYE	HPYGHARRMSTLDHLTK	GRIAWNVT	SHLP	SADKNF	GKKKILEHDERYD
Geobacillus_sp. LEMMY01 WP_079935807.1:1-440	AVTFSTTYE	HPYGHARRMSTLDHLTK	GRIAWNVT	SHLP	SADKNF	GKKKILEHDERYD
Geobacillus_stearothermophilus ABV66256.1:1-440	AVTFSTTYE	HPYGHARRMSTLDHLTK	GRIAWNVT	SHLP	SAHKNF	GKKKILEHDERYD
Geobacillus_sp. B4113_201601 WP_061912600.1:1-440	AVTFSTTYE	HPYGHARRMSTLDHLTK	GRIAWNVT	SHLP	SADKNF	GKKKILEHDERYD
Geobacillus_sp. B4113_201601_5WP_061912600.1:1-44	AVTFSTTYE	HPYGHARRMSTLDHLTK	GRIAWNVT	SHLP	SADKNF	GKKKILEHDERYD
Bacillus_thuringiensis_6WP_029441578.1:1-435	AVTFSTSYE	HPYGYARRMSTLDHLTK	GRMAWNV	SHLS	SAEKNF	G1ETKLNHDEKYD
Lysinibacillus_sphaericus WP_103976887.1:2-422	AVTFSTSYE	HPYGFARRMSTLDHLTK	GRMAWNV	SHLD	SADKNF	ETKHLLTHDEKYD
Lysinibacillus_sphaericus WP_069508309.1:2-422	AVTFSTSYE	HPYGFARRMSTLDHLTK	GRMAWNV	SHLD	SADKNF	ETKHLLTHDEKYD
Rummeliibacillus_sp. SL167_10 WP_146551437.1:2-42	AVTFSTSYE	HPYGFARRMSTLDHLTK	GRIAWNVT	SHLE	SADKNF	EVKQYLDHDEKYD
Paenibacillus_sp. DXL2 WP_110843609.1:1-459	AVTFSTTYE	HPFAHARRMSTLDHLTK	GRIAWNVT	SYLP	SAARNF	GLDRMVRHDERYE
Paenibacillus_napthalenovorans WP_074730028.1:1-1	AVTSTSTTYE	HPYGHARRMSTLDHLTK	GRIAWNVT	SYLP	SAARNF	GLEHMVRHDERYE
Cohnella_sp. H521 WP_130606586.1:1-453	AVTPTPTTYE	HPYAHARRMSTLDHLTK	GRVGNIVT	FLP	SAALNF	GLDMRVTHDERYE
Streptoporangium_subroseum_15 WP_089205784.1:1-4	AVTFSTTYE	PPFGHARRMSTLDHLTK	GRVAVNV	SYLP	SAARNF	GLDDEIEHDLRYE
Arthrobacter_sp. H22 WP_120147654.1:1-455	AATFSTTYE	PPFAFARRASTLDHLTK	GRFGWNV	SYLP	NAARNF	GLPDEVEHDQRYA
Nonomuraea_solani WP_103963668.1:1-453	AVTFSTTYE	PPFAFARRMSTLDHLTK	GRVAVNV	SYLP	SAARNF	GLDDEIEHDLRYE
Arthrobacter_ruber WP_105030338.1:1-455	AATFSTTYE	PPFAFARRASTLDHLTK	GRFGWNV	SYLP	NAARNF	GLADEVEHDQRYA
Bacillus_aciditolerans_20 WP_121446947.1:1-456	AVTVSTTYE	HPFGHARRFSTLDHLTK	GRIAWNVT	SYLP	NAARNF	GLPEMLKHDERYD
WP_137163763.1:1-458	GVTFSLTYYE	HPYPFARRMSTLDHLSN	GRVGNIVT	GYL	SDAARNL	GLERQLGHDERYD
Aeribacillus_pallidus WP_130157503.1:4-457	GITCSTTFE	HPYTFARRMSTLDHLTK	GRVGNIVT	SYLE	SGTKNI	DIGDRFLHSEYRN
Bacillus_megaterium_24WP_098602848.1:4-460	GITCSTTFE	HPYTFARRMSTLDHLTK	GRIAWNVT	SYLE	SGTKNI	E1GKNQVHDERYN
Streptomyces_sp. 150FB WP_078877664.1:5-455	AATFSTTYE	PPFAFARRMSTLDHLTK	GRVAVNV	SYLP	NAARNF	GLSDEVDHDERYE
Arthrobacter_sp. DWC3 WP_104051071.1:1-454	AATFSTTYE	PPFAFARRASTLDHLTK	GRFGWNV	SYLP	NAARNF	GLADEVEHDQRYA
Cohnella_thermotolerans WP_027093898.1:1-456	ALTVSTTYE	HPYAHARRMSTLDHLTK	GRVAVNV	SYLP	SAARNF	GLEEMIKHDDRYE
Paenibacillus_bovis_28WP_144921429.1:1-452	GVTASVTHE	HPYTFARRMSTLDHLTK	GRVGNIVT	SYLK	SAAVNM	GLDQINHDERYN
Bacillus_aciditolerans WP_121447760.1:1-452	GVTASVTHE	HPYTFARRMSTLDHLTK	GRVGNIVT	SYLK	SAAVNM	GLDQIKHDERYD
Leifsonia_sp. ALI-44-B_30 WP_077053645.1:1-455	AATFSTTYE	PPFAFARRASTLDHLTK	GRFGWNV	SYLP	NAARNF	GLHDEVAHDQRYA
Parageobacillus_thermoglucoasidarius WP_064552269.	ALTVSTTYE	HPFSTARRFSTLDHLTK	GRIAWNVT	SYLP	NAARNF	GLQEMIKHDERYD
Geobacillus_sp. Y4.1MCL WP_013399886.1:1-459	ALTVSTTYE	HPFNIARRFSTLDHLTK	GRIAWNVT	SYLP	NAARNF	GLPEMIKHDERYD
Bacillus_methanolicus_35WP_004434428.1:1-462	AFTVSTTYE	PPFAHARRFSTLDHLTK	GRIAWNVT	SYLP	NAARNF	GLPEMIKHDERYD
Terribacillus_halophilus WP_077309754.1:1-448	GVTASVTHE	HPYSFARRVSTLDHLTK	GRVGNIVT	SYLE	SAARNL	GLDTQIKHDERYN
Paraburkholderia_kururiensis WP_01777532.1:1-453	GVTCSLSYE	HPYPFARRMSTLDHLTK	GRVGNIVT	SYLD	SAARNV	GLPSQANHDERYA
Gracilibacillus_massiliensis WP_058308419.1:1-456	AVTVSTTYE	APFGNARRFSTLDHLTK	GRVAVNV	SYLP	NAARNF	GLDGMKHDERYD
Streptomyces_yanglinensis WP_103888501.1:5-452	AATFSTTYE	PPFAFARRMSTLDHLTK	GRVAVNV	SYLP	NAARNF	GLDEVDHDERYE
Trinickia_sp. 7GSK02_40 WP_136896361.1:1-452	GVTCSLSYE	HPYPFARRMSTLDHLTK	GRVGNIVT	SYLD	SAARNV	GLPAQANHDERYA
Cryobacterium_sp. NEAU-85 WP_123045138.1:1-448	AVTFTTYYE	PPFGNARRFSTLDHLTK	GRVAVNV	GYP	DAARNY	GLSAQVKHDDRYD
Allycyclobacillus_acidoterrestis WP_021298468.1:4	GVTASVTHE	HPYTFARRMSTLDHLTK	GRVGNIVT	SYLD	SAARNI	GLHEQVSHDERYD
Oceanobacillus_senegalensis WP_085994229.1:1-452	GVTASVTHE	HPYSFARRMSTLDHLTK	GRVGNIVT	SFL	SAAINL	GLDKEVSHDKRYE
Bacillus_sinesaloumensis WP_077620983.1:1-449	ATTVSTTYE	APFGNARRFSTLDHLTK	GRIAWNVT	SYLP	NAARNF	GLQDMIKHDERYD
Halopenitius_persicus WP_021074147.1:6-457	AATHSVTYT	KPYMTAKRLSTLDHLTK	GRIAWNVT	SYLE	DAAVNL	GLEGRIEHDERYD
Microbacteriaceae_bacterium	AVTFTTYYE	PPFNNARRFSTLDHLTK	GRVAVNV	GYP	DAAKNF	GLSEQVRHDDRYD
Lysinibacillus_sinduriensis WP_036201100.1:1-458	IVTVSTTYE	HPFSNARRFSTLDHLTK	GRVGNIVT	SYLP		

Pseudomonas_syringae_WP_024682626.1:1-4-452
 LadaAlpha_Geobacillus_thermoleovorans_BAM76377.1
 Tsukamurella_pseudospumae_WP_068746786.1:1-457
 Kocuria_sp._Marshalli-P3598_WP_085529073.1:5-456
 Microvirga_aerophila_WP_114188789.1:1-456
 Burkholderia_ubonensis_WP_071760483.1:5-455
 Achromobacter_marplatensis_WP_006226823.1:4-450
 Acinetobacter_baumannii_WP_070165746.1:1-443
 Labeledella_phragmitis_WP_128496094.1:1-453
 Nocardia_cyriaciageorgica_120_WP_130918184.1:1-453
 Nocardia_cyriaciageorgica_WP_130918184.1:1-453
 Mycobacterium_sp._1164985.4_WP_067298521.1:1-453
 Rhodococcus_sp._1R11_WP_135042739.1:1-449
 Erwinia_amylovora_WP_004157587.1:5-459
 Ralstonia_mannitolilytica_WP_102079134.1:4-451
 Leifsonia_flava_WP_135120808.1:15-465
 Cryobacterium_roopkundense_WP_084141147.1:1-453
 Cupriavidus_pauculus_WP_101681197.1:1-455
 Rhizobium_sp._BK333_130_WP_133704837.1:2-454
 Caballeronia_mineralivorans_WP_047846789.1:1-454
 Nocardia_altamirensis_WP_069163049.1:1-454
 Cupriavidus_sp._P-10_WP_116322758.1:1-452
 Serratia_sp._S1B_WP_116726564.1:1-452
 Pseudomonas_putida_WP_043864435.1:1-452
 Pseudomonas_aeruginosa_WP_023084248.1:4-453
 Pseudomonas_mucidolens_WP_084381795.1:9-455
 Pseudomonas_poae_WP_060549803.1:4-450
 Pseudomonas_chlororaphis_WP_123573412.1:9-454
 Janthinobacterium_lividum_140_WP_072454679.1:1-44
 Haladaptatus_cibarius_WP_049970513.1:4-446
 Arthrobacter_luteolus_WP_066298473.1:1-443
 Geobacillus_sp._ZGT-1_WP_047758532.1:1-436
 Lysinibacillus_composti_WP_124766485.1:4-458
 Microcella_putialis_WP_130486201.1:20-474
 Pseudomonas_nitroreducens_WP_037016976.1:1-453
 Acinetobacter_wuhouensis_WP_130168784.1:1-453
 Bradyrhizobium_sp._YR681_WP_008144663.1:1-454
 Schumannella_sp._10F1D-1_WP_141164655.1:10-460
 Pseudomonas_coronafaciens_150_WP_122355187.1:4-45
 Pseudomonas_syringae_WP_003430238.1:4-452
 unclassified_Rhodococcus_WP_094682261.1:1-449
 Hafnia_alvei_WP_046449330.1:6-449
 AS9A_3890_Hoyosella_subflava_WP_013808677.1:1-453
 Acinetobacter_baumannii_WP_000995600.1:1-443
 Agrobacterium_sp._B133/95_WP_065696417.1:2-454
 Microbacterium_sp._KROC2_WP_024289149.1:1-453
 Variovorax_paradoxus_WP_012747040.1:6-452
 Methylobacterium_radiotolerans_WP_076730229.1:5-4
 Streptomyces_sp._BK215_WP_132915265.1:7-452
 Geobacillus_thermodenitrificans_160_WP_008880416.
 Pseudomonas_aeruginosa_WP_132556951.1:356-785
 Penicillium_solitum_OQE02104.1:14-471
 Penicillium_vulpinum_OQE05502.1:12-469
 Clavibacter_michiganensis_WP_045526194.1:1-454
 Glutamibacter_creatinolyticus_WP_054821484.1:6-
 Campylobacter_sp._P0078_WP_086237522.1:4-454
 Pseudomonas_furukawaii_WP_003454569.1:1-447
 Leucobacter_triazinivorans_WP_130111548.1:1-442
 Aspergillus_brasiliensis_CBS_101740_OJG68286.1:12
 Aspergillus_udagawae_170_GAO89440.1:15-472
 Aspergillus_flavus_RMZ37351.1:15-472
 Aspergillus_flavus_RAQ54081.1:15-472
 Penicillium_arizonense_XP_022490779.1:12-469
 Salinibacterium_sp._CGMCC
 Aspergillus_fumigatus_OXN06785.1:14-471
 Aspergillus_lentulus_GAQ10210.1:7-464
 Aspergillus_flavus_RAQ66103.1:15-472
 Aspergillus_fumigatus_OXN22894.1:14-471
 Aspergillus nidulans
 Penicillium_nalgiovense_OQE79848.1:14-471
 Aspergillus_wentii
 Gordonia_iterans_WP_105943624.1:1-453
 Azotobacter_beijerinckii_WP_090735436.1:4-454
 Staphylococcus_sp._NAM3COL9_WP_057513692.1:4-453
 Acidovorax_sp._56_WP_099656603.1:11-450
 Paenibacillus_sp._BIHB4019_WP_099518466.1:1-456
 Penicillium_antarcticum_OQD90033.1:5-465
 Aspergillus_oryzae_R1B40_190_XP_001823703.1:9-463
 Fusarium_oxysporum_f.sp._pisi
 Colletotrichum_fructicola_Nara_gc5_ELA35345.1:18-
 Micrococcus_luteus_WP_041104460.1:19-468
 Aspergillus_awamori_GCB21923.1:12-469
 Aspergillus_niger_CBS
 Aspergillus_lacticofeatus_CBS_101883_XP_02545389
 Aspergillus_wentii DTO_134E9_OJ40237.1:14-471
 Aspergillus_indologenus_CBS_114.80_PYI31207.1:11-
 Aspergillus_fischeri_NRR1_181_XP_001264002.1:14-4
 Penicillium_coprophilum_200_OQE46388.1:11-466
 Cupriavidus_taiwanensis_WP_116379876.1:8-454
 Penicillium_digitatum
 Aspergillus_niger_GAQ46262.1:12-469
 Aspergillus_nomius_NRR1_13137_XP_015412385.1:15-4
 Aspergillus_aculeatus_ATCC_16872_XP_020055010.1:1
 Penicillium_brasilianum_OOQ84969.1:19-474
 Penicillium_subrubescens_OKP15100.1:19-474
 Trichoderma_arundinaceum_RFU80530.1:19-474
 Aspergillus_thermomutatus_210_XP_026614594.1:15-4
 Serratia_liquefaciens_WP_044551273.1:4-449
 Micrococcus_luteus_WP_065572847.1:19-468
 Halolamina_rubra_WP_049979911.1:1-449
 Acinetobacter_pittii_WP_075382847.1:7-452
 Corynebacterium_variabile_WP_052302534.1:2-464
 Aspergillus_luchuensis_GAT21254.1:12-471

Aspergillus luchuensis	GVTVTTT	QPYHLARRLSTIDHLLT	GRIGWNIVT	GYPD	SAARNL	GHTQQPQ	HDDRYA
Aspergillus bombycis_XP_022386026.1:15-472	GVTVTTT	QPYHLARRLSTIDHLLT	GRVGWNIVT	GYPD	SAARNL	GHTQQPQ	HDDRYE
Agrobacterium vitis_WP_070163524.1:1-454	GITASTS	HPYTFARRLATADHLLT	GRVGWNIVT	SYL	SGAKNV	QSGSLKR	HDDNRYE
Pseudomonas psychrotolerans_220_WP_074584491.1:5-452	GLTANLT	PPYPFARRLSTLDHLLT	GRVGWNIVT	GYPD	SAARNL	GLDRQIA	HDDNRYD
Micrococcus yunnanensis_WP_135040276.1:19-468	GVTAGTAY	HPYPFARRLATLDHLLT	GRVGWNIVT	GYPD	SAARNL	QDDQDME	HDDNRYE
Acinetobacter calcoaceticus_WP_004642549.1:7-452	GTTVNL	HPYQFARRFASLDHLLT	GRIGWNIVT	GYPD	SAARNL	GQKGLKD	HDDNRYE
Penicillium brasilianum_CEO59775.1:15-472	GVTVTTT	QPYHLARRLSTVDHLLT	GRVGWNIVT	GYPD	SAARNL	GKAEQPH	HDDNRYA
Aspergillus cristatus_ODM22551.1:12-469	GVTVTTT	QPYHLARRLSTVDHLLT	GRVGWNIVT	GYPD	SAARNL	GYAHQPN	HDDNRYA
Pseudomonas taiwanensis_WP_027907363.1:1-446	GVTFSLT	PPYPFARRMSTLDHLLT	GRVGWNIVT	GYPD	SAARNL	GLARQLG	HDDNRYD
Acidovorax avenae	GVTVNL	QPYLLARRFSTLDHLLT	GRVGWNIVT	GYPD	SAARNL	GVAQQMP	HDDNRYD
Staphylococcus pseudintermedius_WP_101431388.1:4-450	APTGSTT	QPYKFLARRLSTLDHLLT	GRVGWNIVT	GYPD	SAARNL	GLKERLP	HDDNRYD
Rhodococcus triatoma_WP_081607437.1:2-451	GVTANLT	PPYQFARRFASLDHLLT	GRIGWNIVT	GYPD	SAARNL	GLEQQVA	HDDNRYA
Alcaligenes_sp_RS4_230_WP_128393375.1:4-450	GVTANIHT	TPYSFARRVSSLDHLLT	GRVGWNIVT	GYPD	SAARNL	GRDGLDE	HDDNRYD
Gibbsiella quercinecans_WP_121552947.1:7-454	GLTANVS	SPYLFARRFSTLDHLLT	GRVGWNIVT	GYPD	SAARNL	GQQQLVA	HDDNRYD
Acinetobacter ursingii_WP_044435211.1:5-452	GITVNL	PPYQFARRFASLDHLLT	GRIGWNIVT	GYPD	SAARNL	GHSGLKD	HDDNRYE
Erwinia typographi_WP_034887712.1:4-447	GVTANLT	APYPFARRLSTLDHLLT	GRIGWNIVT	GYPD	SAARNL	QQRQLLA	HDDNRYD
Trichoderma harzianum_KKP01913.1:14-470	GVTIAT	QPYHLARRLSTVDHLLT	GRVGWNIVT	GYPD	SAARNL	GLTEQPP	HDDNRYA
Fusarium graminearum_235_CEF79766.1:12-466	GVTVST	QPYHLARRLSTLDHLLT	GRVGWNIVT	GYPD	SAARNL	GREEQLS	HDDNRYA
Gordonia alkanivorans_WP_006357654.1:10-461	GVTATG	HPYPFARRMSTLDHLLT	GRVGWNIVT	GYPD	SAARNL	GDDDLQA	HDDNRYD
Acinetobacter radioresistens_WP_111281495.1:5-455	GITVNL	TPYQFARRFASLDHLLT	GRIGWNIVT	GYPD	SAARNL	GQKGLKQ	HDDNRYA
Mesorhizobium plurifarium_WP_073985566.1:5-458	APTGSTT	QPYALARRLSTLDHLLT	GRIGWNIVT	GYPD	SAARNL	GHNTQIP	HDDNRYA
Oceanobacillus halophilus_WP_121203049.1:1-454	APITISAT	QPYSLARRLSTLDHLLT	GRIGWNIVT	GYPD	SAARNL	GLSGRLP	HDDNRYD
Acinetobacter tandiis_240_WP_100241535.1:7-457	GTTVNL	NPYQFARRFASLDHLLT	GRIGWNIVT	GYPD	SAARNL	QQGLKE	HDDNRYA
Burkholderia plantarii_WP_042624083.1:1-457	GLTTSV	APYLLARRFSTLDHLLT	GRIGWNIVT	GYPD	SAARNL	GDDALLA	HDDNRYE
Alcaligenes faecalis_WP_094195208.1:6-457	GLTASV	HPYTFARRVSTLDHLLT	GRIGWNIVT	GYPD	SAARNL	QDGLDA	HDDNRYD
Bradyrhizobium arachidis_WP_092214516.1:1-453	GVTAPVS	PPFTLARRFSTLDHLLT	GRIGWNIVT	GYPD	SAARNL	GRDSIMA	HDDNRYD
Cupriavidus plantarum_WP_109583068.1:1-458	GVTLSV	HPYPLARRLSTLDHLLT	GRIGWNIVT	GYPD	SAARNL	GLDALVE	HDDNRYD
Variovorax_sp_770b2_245_WP_093443018.1:5-461	GTTATIS	SPHTFARRMSTLDHLLT	GRIGWNIVT	GYPD	SAARNL	QSAPLS	HDDNRYD
RZJ22128.1:4-447	IATAST	NPYLLARRFASLDHLLT	GRIGWNIVT	GYPD	SAARNL	GLEQHPD	HDDNRYE
LadB_Geobacillus thermoleovorans_BAM76371.1	LFAARP	SPAIFAKQLATINCWTL	GRALPNIVT	GYPD	SAARNL	AEGDFLD	HDDNRYE
LadAbeta_Geobacillus thermoleovorans_BAM76372.1	AGTAST	EPFHIARRFSSLDHLLT	GRIGWNIVT	GYPD	SAARNL	SQTAHLE	HDDNRYE
Af1_AFLA_024140_XP_002373925.1	GVTVTTT	QPYHLARRLSTIDHLLT	GRIGWNIVT	GYPD	SAARNL	GHTQQPQ	HDDNRYA
Af3_AFLA_58870_XP_002378631.1	GVTAST	APYALARRFSTVDHLLT	GRVGWNIVT	GYPD	SAARNL	GLNTQVE	HDDNRYR
Af4_AFLA_049780_XP_002383105.1	GITAST	PPFLLAKRFSTLDHLLT	GRIGWNIVT	GYPD	SAARNL	GLDTPIE	HDDNRYR
Af5_AFLA_126060_XP_002381799.1	GITAST	TPYALARRFSTLDHLLT	GRVGWNIVT	GYPD	SAARNL	GMDEQIP	HDDNRYA
Af2_QMW32876.1:9-463	GVTASV	KPYALARRLSTVDHLLT	GRIGWNIVT	GYPD	SAARNL	GLKEQIP	HDDNRYA
Yarrowia lipolytica_CLIB122_YALI0C07546p_XP_50156	GITVST	PPFTLARRFSTLDHLLT	GRIGWNIVT	GYPD	SAARNL	GLEHQVE	HDDNRYK
Rhizobium_sp_CF122_WP007794079.1	VATASV	EPYHIARRFASLDHLLT	GRAGWNIVT	GYPD	SAARNL	GREEHYA	HDDNRYE
Acinetobacter_sp_NIPH_2100_LLM	IATAST	EPYLLARRFASLDHLLT	GRAGWNIVT	GYPD	SAARNL	GYEQIIP	HDDNRYE
Nostoc_sp_PCC_7107_WP_015115963.1	IATAST	EPYTLARRFASLDHLLT	GRAGWNIVT	GYPD	SAARNL	GLEHHPH	HDDNRYE
Aspergillus flavus_NRRL3357_uncharacterized	AATASV	EPYHIARRFASLDHLLT	GRAGWNIVT	GYPD	SAARNL	GLDAHVE	HDDNRYK
Paenibacillus curdlanolyticus_WP006037998.1	AGTVST	EPFHVARRFASLDHLLT	GRAGWNIVT	GYPD	SAARNL	NLEKHVQ	HDDNRYE
LadAbeta_Geobacillus thermoleovorans_FMN-dependent	AGTAST	EPFHIARRFSSLDHLLT	GRAGWNIVT	GYPD	SAARNL	SQTAHLE	HDDNRYE
SsuD_1M41	LVALRP	SPTVAARQAATLDRLS	GRALPNIVT	GYPD	SAARNL	GDGVFLD	HDDNRYE
Paenibacillus curdlanolyticus_WP006037998.1	AGTVST	EPFHVARRFASLDHLLT	GRAGWNIVT	GYPD	SAARNL	NLEKHVQ	HDDNRYE
Bacillus	LVAVRP	APSVAAARMSTLDRLS	GRLLINIVT	GYPD	SAARNL	GDGLFLS	HDDNRYE
Pseudomonas	LVAIRP	SPTVSARMAATLDRLS	GRLLINIVT	GYPD	SAARNL	GDGIHLG	HDDNRYE
LadB_Geobacillus thermoleovorans_FMN-dependent	LFAARP	SPAIFAKQLATINCWTL	GRALPNIVT	GYPD	SAARNL	AEGDFLD	HDDNRYE
Pseudomonas aeruginosa_PAO1_NP_251290.1	LLAYRPG	VIAPLAARQLATLDQFS	GRLLINIVT	GYPD	SAARNL	RDGDYLD	HDDNRYA
Alkanesulfonate	VIALRP	NTLYPTVAAKALATLDQLS	GRVVVHF	IAGGS	DAEQA	REGDFLT	KDERRYA
Alkanesulfonate	IIALRP	NTLYPTVAAKALATLDQLS	GRVVVHF	IAGGS	DAEQA	KEGDFLT	KDERRYA
Aspergillus niger_ATCC13496_RDH19503.1	IIALRP	NTLYPTVAAKALATLDQLS	GRVVVHF	IAGGS	DAEQA	KEGDFLT	KDERRYG
Penicillium digitatum_Pd1_XP014534980.1	IIALRP	NTLYPTVAAKALATLDQLS	GRVVVHF	IAGGS	DAEQA	KEGDFLT	KDERRYG
Acinetobacter rudis_WP_016657872.1	LVAIRP	GIISETVSAARQAATLDRLS	GRLLINIVT	GYPD	SAARNL	GDGLFLD	HDDNRYE

160 170 180 190 200 210

LADA_Geobacillus_thermodenitrificans_WP_01188513
Geobacillus_sp._LEMMY01_WP_079935807.1:1-440
Geobacillus_stearothermophilus_ABV66256.1:1-440
Geobacillus_sp._B4113_201601_WP_061912600.1:1-440
Geobacillus_sp._B4113_201601_5WP_061912600.1:1-44
Bacillus_thuringiensis_6WP_029441578.1:1-435
Lysinibacillus_sphaericus_WP_103976887.1:2-422
Lysinibacillus_sphaericus_WP_069508309.1:2-422
Rummeliibacillus_sp._SL167_10_WP_146551437.1:2-42
Paenibacillus_sp._DXL2_WP_110843609.1:1-459
Paenibacillus_naphthalenovorans_WP_074730028.1:1-
Cohnella_sp._HS21_WP_130606586.1:1-453
Streptosporangium_subroseum_15_WP_089205784.1:1-4
Arthrobacter_sp._Hz2_WP_120147654.1:1-455
Nonomuraea_solani_WP_103963668.1:1-453
Arthrobacter_ruber_WP_105030338.1:1-455
Bacillus_aciditolerans_20_WP_121446947.1:1-456
WP_137163763.1:1-458
Aeribacillus_pallidus_WP_130157503.1:4-457
Bacillus_megaterium_24WP_098602848.1:4-460
Streptomyces_sp._150FB_WP_078877664.1:5-455
Arthrobacter_sp._DWC3_WP_104051071.1:1-454
Cohnella_thermotolerans_WP_027093898.1:1-456
Paenibacillus_bovis_28WP_144921429.1:1-452
Bacillus_aciditolerans_WP_121447760.1:1-452
Leifsonia_sp._ALI-44-B_30_WP_077053645.1:1-455
Parageobacillus_thermoglucoasidius_WP_064552269.
Geobacillus_sp._Y4_1MC1_WP_013399886.1:1-459
Bacillus_methanolicus_35WP_004434428.1:1-462
Terribacillus_halophilus_WP_077309754.1:1-448
Paraburkholderia_kururiensis_WP_01777532.1:1-453
Gracilibacillus_massiliensis_WP_058308419.1:1-456
Streptomyces_yanglinensis_WP_103888551.1:5-452
Trinickia_sp._7GSK02_40_WP_136896361.1:1-452
Cryobacterium_sp._NEAU-85_WP_123045138.1:1-448
Alicyclobacillus_acidoterrestres_WP_021298468.1:4
Oceanobacillus_senegalensis_WP_085994229.1:1-452
Bacillus_sinesaloumensis_WP_077620983.1:1-449
Halopenitium_persicus_WP_021074147.1:6-457
Microbacteriaceae_bacterium
Lysinibacillus_sinduriensis_WP_036201100.1:1-458
Bacillus_endophyticus_WP_113749053.1:5-457
Pseudomonas_monteilii_WP_119371117.1:1-455
Bacillus_endophyticus_50_WP_061801645.1:5-457
Planococcus_maitriensis_WP_112233285.1:1-457
Oceanobacillus_profundus_WP_118889880.1:1-447
Burkholderia_pseudomallei_WP_141404579.1:1-452
Terribacillus_saccharophilus_WP_095261886.1:1-455
Sediminibacillus_albus_WP_093212831.1:4-453
Sciscionella_marina_WP_020496929.1:1-448
Mycetocolla_saprophilus_WP_043321267.1:1-452
Lysinibacillus_macroides_WP_053993569.1:4-460
Pseudomonas_putida_WP_086978777.1:1-458
Sediminibacillus_halophilus_60_WP_074598704.1:4-4
Rhizobium_oryzae_WP_085420425.1:1-450
Pseudomonas_extremorientalis_WP_071491956.1:1-455
Pseudomonas_fluorescens_WP_016977452.1:1-454
Neorhizobium_sp._T25_27_WP_105419890.1:1-450
Pseudomonas_extremaustralis_WP_078833627.1:1-457
Fictibacillus_aquaticus_WP_094253544.1:1-455
Pseudomonas_extremaustralis_KAA8559760.1:1-456
Mycobacterium_sp._ACS1612_WP_067812332.1:1-454
Bacillus_megaterium_WP_116075167.1:1-455
Pseudomonas_frederiksborgensis_70_WP_123409596.1:
Pseudomonas_citronellolis_SF6C1163.1:1-452
Herbaspirillum_chlorophenolicum_WP_050468599.1:4-
Arthrobacter_crystallopoietes_WP_074700854.1:1-45
Terribacillus_goriensis_WP_038558686.1:1-438
Bacillus_megaterium_WP_025749753.1:1-455
Neorhizobium_sp._T7_12_WP_105403044.1:1-451
Rummeliibacillus_sp._SL167_WP_146553619.1:4-459
Burkholderia_sp._PAMC
Pseudomonas_korensis_WP_064585463.1:4-449
Pseudomonas_fluorescens_80_WP_064116961.1:6-451
Pseudomonas_rhodesiae_WP_040265276.1:4-450
Collimonas_sp._OK412_WP_092393355.1:4-454
Pseudomonas_marginalis_WP_058415544.1:1-456
Pseudomonas_antarctica_WP_064452947.1:1-458
Pseudomonas_protegens_WP_041115159.1:9-454
Pseudomonas_synxantha_WP_057024776.1:4-449
Rhizobium_leguminosarum_WP_128409501.1:2-451
Pseudomonas_chlororaphis_WP_038359779.1:6-451
Pseudomonas_syringae_90_WP_024642725.1:1-456
Collimonas_fungivorans_WP_061540754.1:4-453
Rhizobium_leguminosarum_WP_116409027.1:2-451
Microvirga_ossetica_WP_099511173.1:1-454
Pseudomonas_caspiana_WP_087268376.1:4-451
Pseudomonas_lundensis_WP_048375063.1:4-451
Caballeronia_mineralivorans_WP_047894899.1:4-456
Pseudomonas_paralactis_WP_057702387.1:4-450
Pseudomonas_taetrolens_WP_048381143.1:4-453
Pseudomonas_psychrophila_WP_123750761.1:4-450
Collimonas_arenae_100_WP_061532973.1:4-454
Pseudomonas_viridiflava_WP_122210720.1:4-451
Kocuria_varians_WP_068470402.1:1-454
Pseudomonas_wadsworthensis_WP_115084816.1:4-455
Pseudomonas_syringae_WP_011266344.1:4-452
Pseudomonas_sp._286_105WP_122415793.1:4-453
Geobacillus_vulcani_WP_031406843.1:1-461
Geobacillus_igicianus_WP_033018365.1:1-461
Pseudomonas_fluoridensis_WP_083182568.1:4-453
Pseudomonas_asturiensis_WP_073167523.1:4-451
Geobacillus_vulcani_110_WP_031406843.1:1-461

L A D E Y L E V C Y K L W E G S W E D N A V I R D I E N . . . N I Y T D P S K V H E I N H S G K Y F E V P G . P H L C E P
L A D E Y L E V C Y K L W E G S W E D N A V I R D I E N . . . N I Y T D P R K V H E I N H S G K Y F E V P G . P H L C E P
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M A D E Y L E V C Y K L W E G S W E D N A V I R D I D N . . . N I Y T V P S K V H K I N H S G K Y F E V P G . P H L C E P
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L A D E F F L E V C Y K L W E I S W E D D A V I R D R E N . . . K I Y T D P N K V H Q I N H I G K Y F N V P G . P H L S E P
L A D E Y L D V C Y K L W E E S W E D D A V S I E K N M . . . Y Y A D P T K V H K I N H K G K Y F D V I G . P H L C E P
L A D E Y L N V C Y K L W E E S W E D D A V S I E K N M . . . Y Y A D P T K V H K I N H K G K Y F D V I G . P H L C E P
L A E E F F L E V C Y K L W E L S W D N D A V S L E N D . . . C Y A S P S K V H K I N H K G K Y F N V P G . P H I C E P
I A D E Y L E V C Y K L W E S S W E D D A V V R D V E T . . . Q T Y T D P D K V H T I D H E G R Y F R V P G . P H L S E P
I A E E Y M D V C Y K L W E S S W E D D A V I R D V Q K . . . Q I Y T D P D K V H F I H H E G K Y F K V P G . P H L S Q P
V A D E Y L D V C Y K L W E A S W E D D A V I R D A A R . . . G I Y T D P S K V H E I N H G K Y F N I P G . P H L S E P
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L A E E Y L Q V C Y K L W E K S W D D D A V L L E R D S . . . G R Y I E P A R V H P I N H V G K H F Q V P G . M H L C Q P
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V A E E F F L E V C Y K L W E T S W E P D A V E R N A E T . . . G R Y T D P S K V H E I H E G R E F F R V N G . P H L S E P
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I A E E Y L E V C Y K L W E E S W E D D A V K L D K E N . . . R V F T D P S K V H D I N H O G K Y F R V P G . A H L C E P
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I A D E C L E V C Y K L W E G S W E E G A F L E D R E T . . . G V L I D P A K I H P I N H H G A F F S V E G . P H L C E P

Pseudomonas syringae WP_024682626.1:4-452
LadAalpha_Geobacillus thermoleovorans BAM76377.1
Tsukamurella pseudosporumae WP_068746786.1:1-457
Kocuria sp. *Marseille*-P3598 WP_085529073.1:5-456
Microvirga aerophila WP_114188789.1:1-456
Burkholderia ubonensis WP_071760483.1:5-455
Achromobacter marplatensis WP_006226823.1:4-450
Acinetobacter baumannii WP_070165746.1:1-443
Labeledella phragmitis WP_128496094.1:1-453
Nocardia cyriacigeorgica 120 WP_130918184.1:1-453
Nocardia cyriacigeorgica WP_130918184.1:1-453
Mycobacterium sp. 1164985.4 WP_067298521.1:1-453
Rhodococcus sp. 1R11 WP_135042739.1:1-449
Erwinia amylovora WP_004157587.1:5-459
Ralstonia mannitolilytica WP_102079134.1:4-451
Leifsonia flava WP_135120808.1:15-465
Cryobacterium roopkundense WP_084141147.1:1-453
Cupriavidus pauculus WP_101681197.1:1-455
Rhizobium sp. BK333_130 WP_133704837.1:2-454
Caballeronia mineralivorans WP_047846789.1:1-454
Nocardia altamirensis WP_069163049.1:1-454
Cupriavidus sp. P-10 WP_116322758.1:1-452
Serratia sp. S1B WP_116726564.1:1-452
Pseudomonas putida WP_043864435.1:1-452
Pseudomonas aeruginosa WP_023084248.1:4-453
Pseudomonas mucidolens WP_084381795.1:9-455
Pseudomonas poae WP_060549803.1:4-450
Pseudomonas chlororaphis WP_123573412.1:9-454
Janthinobacterium lividum 140 WP_072454679.1:1-44
Haladaptatus cibarius WP_049970513.1:4-446
Arthrobacter luteolus WP_066298473.1:1-443
Geobacillus sp. ZGt-1 WP_047758532.1:1-436
Lysinibacillus composti WP_124766485.1:4-458
Microcella putealis WP_130486201.1:20-474
Pseudomonas nitroreducens WP_037016976.1:1-453
Acinetobacter wuhouensis WP_130168784.1:1-453
Bradyrhizobium sp. YR681 WP_008144663.1:1-454
Schumannella sp. 10F1D-1 WP_141164655.1:10-460
Pseudomonas coronafaciens 150 WP_122355187.1:4-45
Pseudomonas syringae WP_003420328.1:4-452
unclassified Rhodococcus WP_094682261.1:1-449
Hafnia alvei WP_046449330.1:6-449
AS9A_3890_Hoyosella subflava WP_013808677.1:1-453
Acinetobacter baumannii WP_000995600.1:1-443
Agrobacterium sp. B133/95 WP_065696417.1:2-454
Microbacterium sp. KROC2 WP_024289149.1:1-453
Variovorax paradoxus WP_012747040.1:6-452
Methylobacterium radiotolerans WP_076730229.1:5-4
Streptomyces sp. BK215 WP_132915265.1:7-452
Geobacillus thermodenitrificans 160 WP_008880416.
Pseudomonas aeruginosa WP_132556951.1:356-785
Penicillium solitum OQE02104.1:14-471
Penicillium vulpinum OQE05502.1:12-469
Clavibacter michiganensis WP_045526194.1:1-454
Glutamicibacter creatinolyticus WP_054821484.1:6-
Campylobacter sp. P0078 WP_086237522.1:4-454
Pseudomonas furukawaii WP_003454569.1:1-447
Leucobacter triazinivorans WP_130111548.1:1-442
Aspergillus brasiliensis CBS_101740_OJ368286.1:12
Aspergillus udagawae 170_GAO89440.1:15-472
Aspergillus flavus RM237351.1:15-472
Aspergillus flavus RAQ54081.1:15-472
Penicillium arizonense XP_022490779.1:12-469
Salinibacterium sp. CGMCC
Aspergillus fumigatus OXN06785.1:14-471
Aspergillus lentulus GAQ0210.1:7-464
Aspergillus flavus RAQ66103.1:15-472
Aspergillus fumigatus OXN22894.1:14-471
Aspergillus nidulans
Penicillium nalgiovense OQE79848.1:14-471
Aspergillus wentii
Gordonia iterans WP_105943624.1:1-453
Azotobacter beijerinckii WP_090735436.1:4-454
Staphylococcus sp. NAM3COL9 WP_057513692.1:4-453
Acidovorax sp. 56 WP_099656603.1:11-450
Paenibacillus sp. BIH84019 WP_099518466.1:1-456
Penicillium antarcticum QOD90033.1:5-465
Aspergillus oryzae RIB40_190_XP_001823703.1:9-463
Fusarium oxysporum f. sp. *pisi*
Colletotrichum fructicola Nara_gc5_ELA35345.1:18-
Micrococcus luteus WP_041104460.1:19-468
Aspergillus awamori GCB21923.1:12-469
Aspergillus niger CBS
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Aspergillus wentii DTO_134E9_OJ340237.1:14-471
Aspergillus indologenus CBS_114_80_PYI31207.1:11-
Aspergillus fischeri NRRL_181_XP_001264002.1:14-4
Penicillium coprophilum 200_OQE46388.1:11-466
Cupriavidus taiwanensis WP_116379876.1:8-454
Penicillium digitatum
Aspergillus niger GAQ46262.1:12-469
Aspergillus nomius NRRL_13137_XP_015412385.1:15-4
Aspergillus aculeatus ATCC_16872_XP_020055010.1:1
Penicillium brasilianum OQK84969.1:19-474
Penicillium subrubescens QF15100.1:19-474
Trichoderma arundinaceum RFU80530.1:19-474
Aspergillus thermomutatus 210_XP_026614594.1:15-4
Serratia liquefaciens WP_044551273.1:4-449
Micrococcus luteus WP_065572847.1:19-468
Halolamina rubra WP_049979911.1:1-449
Acinetobacter pittii WP_075382847.1:7-452
Corynebacterium variabile WP_052302534.1:2-464
Aspergillus luchuensis GAT21254.1:12-471

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IADECLEVTKYLWEGSWEAGAFLEDRET...GVLIDPAKIHPIHHGGAFFSVEGPHLCEP
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VADEFMEVTKYLWEGSWEDDAVVDREA...RLYARDPKVHPIHGGKHYFVPPGITHVGE
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RADEFLEVAKYLWEGSWDDDAVVDREA...RVYAQPAVVRVDHEGKYFVPPGPHLSEP
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Aspergillus luchuensis
Aspergillus bombycis_XP_022386026.1:15-472
Agrobacterium vitis_WP_070163524.1:1-454
Pseudomonas psychrotolerans_220_WP_074584491.1:5-
Micrococcus yunnanensis_WP_135040276.1:19-468
Acinetobacter calcoaceticus_WP_004642549.1:7-452
Penicillium brasilianum_CEO59775.1:15-472
Aspergillus cristatus_ODM22551.1:12-469
Pseudomonas taiwanensis_WP_027907363.1:1-446
Acidovorax avenae
Staphylococcus pseudintermedius_WP_101431388.1:4-
Rhodococcus triatoniae_WP_081607437.1:2-451
Alcaligenes_sp_RS4_230_WP_128393375.1:4-450
Gibbsiella quercinecans_WP_121552947.1:7-454
Acinetobacter ursingii_WP_044435211.1:5-452
Erwinia typographi_WP_034887712.1:4-447
Trichoderma harzianum_KKP01913.1:14-470
Fusarium graminearum_235_CEF79766.1:12-466
Gordonia alkanivorans_WP_006357654.1:10-461
Acinetobacter radioresistens_WP_111281495.1:5-455
Mesorhizobium plurifarium_WP_073985566.1:5-458
Oceanobacillus halophilus_WP_121203049.1:1-454
Acinetobacter tandoii_240_WP_100241535.1:7-457
Burkholderia plantarii_WP_042624083.1:1-457
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Variovorax_sp_770b2_245_WP_093443018.1:5-461
RZJ22128.1:4-447
LadB_Geobacillus thermoleovorans_BAM76371.1
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Af2_QMW32876.1:9-463
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SsuD_1M41
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Bacillus
Pseudomonas
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Pseudomonas aeruginosa_PAO1_NP_251290.1
Alkanesulfonate
Alkanesulfonate
Aspergillus niger_ATCC13496_RDH19503.1
Penicillium digitatum_Pd1_XP014534980.1
Acinetobacter rudis_WP_016657872.1

QAE EYIKV TYKLWES SWRS DAVVLD RTR... GIY TDP TRVRE INHT GK YF VPG . PHICQP
IAEEYIKV TYKLWES SWRS DAVVLD RER... GY TDP SRVRE INHV GK YF VPG . PHICQP
IANEYLEV TYKLLEG SWE GAIIRD PKG... RVFT DPA KVHE IG HK GK HF D VPG . YGLTEP
QADEYLEV TYKLLEG SWADD AVVRDRVQ... RIYARPERVRKVAH HGEFFD VEG . YHLCEP
HADEYLDV TYKLLEG SWEDD AVVYDKES... GV FADPA KVHD IAHE GTWF KVP G . HAVTEP
QAEFFLEL CYKYWEG SWEND AVKKDRVQ... RVFT DP SKVHT IHHG KYQSEG . VFQVSP
LAE EYVKV TYKLWES SWRQ DAVVLD RER... GIY TDP ARV RQ INHV GK YF VPG . PHICQP
VAEEYIKV AYKLWES SWRS DAVILDRQR... GIY AEP SRIRE INHV GK YF VPG . PHICQP
LAE EYLEV TYKLWES SWEDD AVVLERET... GRV VEP SKVHA IGH GEHF QVPG . MHLSP
RADEFMDV AYQLWEG SWDD DAVLDRAR... RIYADPA RVRP VRHR GTYF QVEG . YHLCEP
RADEF LQV SYQLWED SWEDD AVVKTRER... DTYADP SKVHA IHHG KTFDIPG . PHLVEP
IADEFMEV TYKLWEG SWEDD AVVRDAER... GY TDP TKVHA AAKG TYF VPD . PFLCEP
RADD FLQL CYKLWEG SWEDG AIIRD RRG... RIY TDP NKVHA IAHNG PYRAHG . YHSSEP
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IADEF LQV SYQLWED SWEDD AVIMDRTA... GY FADPA KVHP IRRHGRYF VPD . AFLVEP
RADEFLEV TYKLWEG SWEDD AVVYNRK... DIFANPE KVHA IDEHEGFFRVPG . VHLTEP
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RADEFMEV CYRLWEG SWEDGARLDRER... RIYADPARHA IRHEGAHFREGE . VFQCEP
RAEDFLQL AYKLWEG SWEDG ALIADKQR... RYHALPE KVHTVHHG GPFYRSNA . IHMSAP
LADEF LQV SYQLWEG SWDD EAVVDPFR... GVIADPS RIRK VHHG GAHF KIDA . IHLVHP
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RTREYIHLK QLETLPS VTYEGRFYRLN . ASLF . P
RAREFVDV VNGLWE . SWDEEALIRDQSS... GIYFHA EKWRP LNHHGTHFSVRG . PLNSSR
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RADEYMEV TYKLWEG TWRD GAVKDPKT... GYVSDPNQVRA IEHNG KYF KSTA . ASQLPA
IAHEYMEV TYKLWEG SFRDD AVVDREQ... GYV IASDAVRQ IHHG GK YF VPG . PHFCEP
KADEYMDV TYKLWES SWAED AVIKGLKT... DAF . DTSKINY IDEHG KHF KVG . PAVALP
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RAREFVDV VNGLWE . SWDEEALIRDQSS... GIYFHA EKWRP LNHHGTHFSVRG . PLNSSR
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RAEEFVDV VTKLWD . SWDDALL YDKDS... ARFADKD KVRA IDHK GK FFSVRG . PLNVAR
AADEF LQV WKGLLAGDT VNYE GK HIHVEN . SELLYP
VTDEF LRV WRRV LQ EA VDFH GK HIHVENAKALYP
RTREYIHLK QLETLPS VTYEGRFYRLN . ASLF . P
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Bacillus_methanolicus_35WP_004434428.1:1-462 SL QRTTPVLYQAGVSERKGEFAAKHAEVFFVGGTTPERIRYFTEDIKRRAEKYGRNPEN.I
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Oceanobacillus_profundus_WP_118889880.1:1-447 SP QRTTPVLYQAGASSRGRKFAAKHAEVFFVGAAPSKVILKKTVDADIRRAAAYGRDPK.V
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Pseudomonas_putida_WP_086978777.1:1-458 SP QRTTPVLYQAGASSRGRKFAAKHAEVFFVGAAPSKVILKKTVDADIRRAAAYGRDPK.V
Sediminibacillus_halophilus_60_WP_074598704.1:4-4 Rhizobium_oryzae_WP_085420425.1:1-450 SP QRTTPVLYQAGASSRGRKFAAKHAEVFFVGAAPSKVILKKTVDADIRRAAAYGRDPK.V
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Pseudomonas_fluorescens_WP_016977452.1:1-454 SP QRTTPVLYQAGASSRGRKFAAKHAEVFFVGAAPSKVILKKTVDADIRRAAAYGRDPK.V
Neorhizobium_sp_T25_27_WP_105419890.1:1-450 SP QRTTPVLYQAGASSRGRKFAAKHAEVFFVGAAPSKVILKKTVDADIRRAAAYGRDPK.V
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Pseudomonas_frederiksbergensis_70_WP_123409596.1: SP QRTTPVLYQAGASSRGRKFAAKHAEVFFVGAAPSKVILKKTVDADIRRAAAYGRDPK.V
Pseudomonas_citronellolis_SF6C1163.1:1-452 SR QRTTPVLFQAGTSAPGREFAAGHAEVFFVGGTTPAAVRNIAHMRERAAHGRDPAG.I
Herbaspirillum_chlorophenolicum_WP_050468599.1:4- SP QRTTPVLYQAGSSRGRQFAAGHAEVFFVSSQTRDAARQVLQVIREGAAREGRNPDD.V
Arthrobacter_crystallopoietes_WP_074700854.1:1-45 SL QRTTPVLYQAGTSERGRDFAAKHAEVFFVSSRTVQVAAVDRLKRAEAAAGRGRDA.V
Terribacillus_goriensis_WP_038558686.1:1-438 SP QRTTPVLYQAGTSERGRDFAAKHAEVFFVGGTTPKIKNYIEDIKRAEAYGRSRDE.I
Bacillus_megaterium_WP_025749753.1:1-455 SP QRTTPVLFQAGASSAPGREFAAKHAEVFI SFTTKKVADYVKKMRAQIAAEGRDPQS.V
Neorhizobium_sp_T7_12_WP_105403044.1:1-451 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFVGGTTPKIKNYIEDIKRAEAYGRSRDE.I
Rummeliibacillus_sp_SL167_WP_146553619.1:4-459 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFVGGTTPKIKNYIEDIKRAEAYGRSRDE.I
Burkholderia_sp_PAMC SP QRTTPVLFQAGSSRGRQFAAKHAEVFFVGGTTPKIKNYIEDIKRAEAYGRSRDE.I
Pseudomonas_korensis_WP_064585463.1:4-449 SP QRTTPVLFQAGSSDRGLLFAGRHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_fluorescens_80_WP_064116961.1:6-451 SP QRTTPVLFQAGSSDRGLLFAGRHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_rhodesiae_WP_040265276.1:4-450 SP QRTTPVLFQAGSSDRGLLFAGRHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Collimonas_sp_OK412_WP_092393355.1:4-454 SP QRTTPVLYQAGASSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_marginalis_WP_058415544.1:1-456 SP QRTTPVLYQAGASSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_antarctica_WP_064452947.1:1-458 SP QRTTPVLYQAGASSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_protegens_WP_041115159.1:9-454 SP QRTTPVLYQAGSSDRGLLFAGRHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_synxantha_WP_057024776.1:4-449 SP QRTTPVLYQAGSSDRGLLFAGRHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Rhizobium_leguminosarum_WP_128409501.1:2-451 SP QRTPLLYQAGASSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_chlororaphis_WP_038359779.1:6-451 SP QRTTPVLYQAGSSDRGLLFAGRHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_syringae_90_WP_024642725.1:1-456 SP QRTTPVLYQAGASSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Collimonas_fungivorans_WP_061540754.1:4-453 SP QRTTPVLYQAGASSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Rhizobium_leguminosarum_WP_116409027.1:2-451 SP QRTPLLYQAGASSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Microvirga_ossetica_WP_099511173.1:1-454 SP QRTTPVLYQAGSSTRGREFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_caspiana_WP_087268376.1:4-451 SA QRTTPVLFQAGSSDRGLLFAGRHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_lundensis_WP_048375063.1:4-451 SP QRTTPVLYQAGSSDRGLLFAGRHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Caballeronia_mineralivorans_WP_047894899.1:4-456 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_paralactis_WP_057702387.1:4-450 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_tsetrolensis_WP_048381143.1:4-453 SP QRTTPVLYQAGSSDRGLLFAGRHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_psychrophila_WP_123750761.1:4-450 SP QRTTPVLYQAGSSDRGLLFAGRHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Collimonas_arenae_100_WP_061532973.1:4-454 SP QRTPLLYQAGASSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_viridiflava_WP_122210720.1:4-451 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Kocuria_varians_WP_068470402.1:1-454 SP QRTPLIFQAGASSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_wadsworthensis_WP_115084816.1:4-455 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_syringae_WP_011266344.1:4-452 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_sp_286_105WP_122415793.1:4-453 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Geobacillus_vulcani_WP_031406843.1:1-461 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Geobacillus_icitianus_WP_033018365.1:1-461 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_fluoridensis_WP_083182568.1:4-453 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Pseudomonas_asturiensis_WP_073167523.1:4-451 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I
Geobacillus_vulcani_110_WP_031406843.1:1-461 SP QRTTPVLYQAGSSRGRQFAAKHAEVFFISGONKPKSTKVQDKVRASAVEAGRNPED.I

Pseudomonas_syringae_WP_024682626.1:1-4-452 SP QRTPVLFQAGS ERGLQFAGQNAECVFISGQNKAAATREQVDKVRASAVQA GRNPED
 LadaAlpha_Geobacillus_thermoleovorans_BAM76377.1 SP QRTPVLYQAGS ERGRAFAAKHAEVFVGA SPERLSFYIQDIRQRAERY GRDPQQ
 Tsukamurella_pseudosporumae_WP_068746786.1:1-457 SP QRSVPVYQAGS PRGLKFAATENAEIFVAAPTKAILKDVVTRVREGLVAN GRDPYS
 Kocuria_sp._Marcelliae-P3598_WP_085529073.1:5-456 SP QRTPVIFQAGAS SRGQAFAGRHAEAVFVGGGLRPDLTRMTDRIDKEAEA GRNRND
 Microvirga_aerophila_WP_114188789.1:1-456 SP QRTPVLYQAGAS ARGKDFAAHAEAVFVLYGNKEQTKTAKVEDVRRQAACL GRDPNG
 Burkholderia_ubonensis_WP_071760483.1:5-455 SP QRTPVLYQAGAS ARGVEFAGRHAEAVFVNGQSKAAARAAVLDIRAAARQ GRDPAS
 Achromobacter_marplatensis_WP_066226823.1:4-450 SP QRTPVLYQAGS GRGQFAFAAHAEAVFVSSQTKEGLRKLVAEVRESVARE GRSPRD
 Acinetobacter_baumannii_WP_070165746.1:1-443 SP QRTPVLYQAGAS SRGQKFAAQNAECVFIAASP SKIATKKVVGIRQKLVQE GRDPYS
 Labedella_phragmitis_WP_128496094.1:1-453 SI QRSVPVYQAGAS PRGIRFAASNAEAIFVASS TKAGLAATVGRIRDALAEA GRDRYA
 Nocardia_cyriaciageorgica_120_WP_130918184.1:1-453 SP QRTPVLYQAGS PRGVRFAAENAEIFVITAGP SKRVLAQTVSRVRDIALEAA GRDRYA
 Nocardia_cyriaciageorgica_WP_130918184.1:1-453 SP QRTPVLYQAGAS PRGVRFAAENAEIFVITAGP SKRVLAQTVSRVRDIALEAA GRDRYA
 Mycobacterium_sp._1164985.4_WP_067298521.1:1-453 SP QRTPVLYQAGS PRGVRFAAENAEIFVITAGP SKRVLAQTVSRVRDIALEAA GRDPYS
 Rhodococcus_sp._1R11_WP_135042739.1:1-449 SP QRTPVIFQAGAS PRGVRFAAQNAEAIFVGA TPKEILAQTVSNIRRALQDA GRDPHS
 Erwinia_amylovora_WP_004157587.1:5-459 SP QRTPVLYQAGS SRGKRFAAEHAEAVFVAA SPKVLKKTADVIRRAALET GRDPRS
 Ralstonia_mannitolilytica_WP_102079134.1:1-451 SP QRTPVLFQAGS GRGQRFAARHAEAVFISPPNKAAARTQVAAALREQLAA GRRPDD
 Leifsonia_flava_WP_135120808.1:15-465 SP QRSVPVYQAGS PRGIFFAAENAEIFVAAST KEVLLKSTVERIRDALAEA GRDRYS
 Cryobacterium_roopkundense_WP_084141147.1:1-453 ST QRSVPVYQAGS PRGITFAAENAEIFVAASTKPOLATVKKIRDALAEA GRDRYA
 Cupriavidus_pauculus_WP_101681197.1:1-455 SP QRTPVLYQAGS TRGRCFAATHAEAVFVNGQKKGEVKIEVDDIRAQAVQL GRQADD
 Rhizobium_sp._BK333_130_WP_133704837.1:2-454 SP QRTPLLFQAGAS ARGQDFAARHAEAVFVIASTPQOAKPMTDALRQAVDF GRRADD
 Caballeronia_mineralivorans_WP_047846789.1:1-454 SP QRTPVLYQAGAS ARGKAFAAHAEAVFVAASTPKEVLLKSVADVRHQAAEA GRNAAG
 Nocardia_altamirensis_WP_069163049.1:1-454 SP QRTPVLYQAGS TRGVRFAAENAEIFVIASTP SKRLLAQTVSRIRDALVAA GRDRYS
 Cupriavidus_sp._P-10_WP_116322758.1:1-452 SP QRTPVLYQAGS PKGQAFAGRHAEAVFVSGP TKHHVLTNTVMTKRAAAVQQ GRCPED
 Serratia_sp._S1B_WP_116726564.1:1-452 SP QRTPVLYQAGAS SRGQQFASQNAECVFIASTP SKAAKKVQVQIRAKLVEQ GRDPYS
 Pseudomonas_putida_WP_043864435.1:1-452 SP QRTPVLYQAGS TRGRAFAAENAEIFVIASTP SKATVLKNVQVQIRAAVAA GRAPGD
 Pseudomonas_aeruginosa_WP_023084248.1:4-453 SP QRTPVLFQAGS ERGLAFAARHAEAVFVSGQTREATRQLVQIRAAVVGAA GRRAED
 Pseudomonas_mucidolens_WP_084381795.1:9-455 SP QRTPVLFQAGS ERGLLFAGRHAEAVFISGQNKAAATLQVDKVRASAVQD GRNADD
 Pseudomonas_poae_WP_060549803.1:4-450 SP QRTPVLFQAGS DRGLLFAGRHAEAVFISGQTRAAATKAQVDKVRASAVQA GRNAQD
 Pseudomonas_chlororaphis_WP_123573416.1:9-454 SP QRTPVLFQAGS DRGLLFAGRHAEAVFISGQNKASTRAQVDKVRASAVAA GRNPED
 Janthinobacterium_lividum_140_WP_072454679.1:1-44 SP QRTPLLYQAGTSPRGTTRFAARHAEAVFVSGP SKTIVKRYADDLRAAVRQS GRDGDG
 Haladaptatus_cibarius_WP_049970513.1:4-446 SP QRTPVLYQAGS ERGRNFAAENAEIFVQSPTTEATKSVSVEDVREARTEV GRNGDE
 Arthrobacter_luteolus_WP_066298473.1:1-443 SP QRTPAIFQAGAS ARGRRGFAARHAEAVFISNIRPDLTRRTTDTATDEFEAA GRPRDA
 Geobacillus_sp._ZGT-1_WP_047758532.1:1-436 SP QRTPVLYQAGS ERGRAFAAKHAEAVFVGA SPERLSFYIQDIRQRAERY GRDPQQ
 Lysinibacillus_composti_WP_124766485.1:4-458 SP QRTPVLYQAGS TKGRAFAARNAEIFVIGAPNIAAAKETVRKIREDIQKT GRSDQE
 Microcella_putealis_WP_130486201.1:20-474 SP QRTPVLYQAGS PRGVAFAAGNAEAIFVAASTPKEVLRGTVTRIRDALAEA GRDRYA
 Pseudomonas_nitroreducens_WP_037016976.1:1-453 SP QRTPVLYQAGAS SRGKFAAGNAEAIFVIASTPKNILRDQVADLRKLAVEA GRDPDD
 Acinetobacter_wuhouensis_WP_130168784.1:1-453 SP QRTPVLYQAGAS SRGQFASQNAECVFIASTP SKIAAKKVQSIQKRLREE GRDPYS
 Bradyrhizobium_sp._YR681_WP_008144663.1:1-454 SP QRTPVLYQAGTSPRGQFAAKHAEAVFMSGP SAKIITAPVAAIEBEAAKF GRNPAE
 Schumannella_sp._10F1D-1_WP_141164655.1:10-460 SP QRTPVLYQAGAS SRGIGFAAGNAEAIFVIASTPKEVLRSTVSKIRDALAEA GRDRYS
 Pseudomonas_coronafaciens_150_WP_123255187.1:4-45 SP QRTPVLFQAGS ERGLQFAGQNAECVFISGQNKATATREQNVKVRASAVQA GRNPED
 Pseudomonas_syringae_WP_003430238.1:4-452 SP QRTPVLFQAGS ERGLQFAGQNAECVFISGQNKAAATREQVDKVRASAVQA GRNPED
 unclassified_Rhodococcus_WP_094682261.1:1-449 SP QRTPVIFQAGS PRGVRFAAQNAEAIFVGA TPKEILAQTVSNVRRALDA GRDPYS
 Hafnia_alvei_WP_046449330.1:6-449 SI QRTPLLYQAGS SKRGIFAAHAEAVFVNGATPQMAKAVVNTLRQAQAA GRRAAS
 AS9A_3890_Hoyosella_subflava_WP_013808677.1:1-453 SP QRTPVLYQAGS PRGVRFAAENAEIFVIASTP SKRVLKETVRRIRSGLVAA GRAPYS
 Acinetobacter_baumannii_WP_000995600.1:1-443 SP QRTPVLYQAGAS SRGQKFAAQNAECVFIASTP SKIATKKVVGIRQKLVQE GRDPYS
 Agrobacterium_sp._B133/95_WP_065696417.1:2-454 SP QRTPLLFQAGAS ARGQDFAARHAEAVFIASTPVPQAGKPMTDALRQAVDF GRRADD
 Microbacterium_sp._KROCZY2_WP_024289149.1:1-453 SP QRTPLIFQAGS SRGQAFAGRHAEAVFIALRPDLTRMTDRIDKVEAE GRDRND
 Variovorax_paradoxus_WP_012747040.1:6-452 SP QRTPVLFQAGS GRGQRFAARHAEAVFISPPSKEAARTQVQALREQLVQA GRRPDD
 Methylobacterium_radiotolerans_WP_076730229.1:5-4 SP QRTPVLYQAGS GRGRAFAGRHAEAVFISARDPATRESVRAIRAEAAVAA GRNPDD
 Streptomyces_sp._BK215_WP_132915265.1:7-452 SP LRTPVLFQAGS EAGRSFAARHAEAVFILA NPLAARTIDDVRAATATA GRRPED
 Geobacillus_thermodenitrificans_160_WP_008880416. SP QRTPLLYQAGTSPDRGRAFAAKHAEAVFVGA SPERIRSYIQDIRQRAERY GRDPQQ
 Pseudomonas_aeruginosa_WP_132556951.1:356-785 SP QRTPVLFQAGS ERGLAFAAKHAEAVFVSGQTREATRQLVQIRAAVVGAA GRRAED
 Penicillium_solitum_OQE02104.1:14-471 SP QRTPVILQAGT SKAGKTFAAQHAEAVFVAGHSPAVAKNVKEIRELAQSEY GRDPQS
 Penicillium_vulpinum_OQE05502.1:12-469 SP QRTPVILQAGT SKAGKTFAAQHAEAVFVAGHSPAVAKNVKEIRELAQSEY GRDPQS
 Clavibacter_michiganensis_WP_045526194.1:1-454 SP QRTPVVIFQAGS PRGREFAAKHAEAVFVINGLTPELTPRPVTDIDRAERI GRPDRS
 Glutamicibacter_creatinolyticus_WP_054821484.1:6- ST QRTPVLYQAGS SRGVKFAAENAEIFVIASTPTEMLKATVTKIRDIAEAA GRDRYD
 Campylobacter_sp._P0078_WP_086237522.1:4-454 SI QRTPVLFQAGNPRGLEFAAKHAEAVFIAPIAKAYTKDAVKQVQRQALIKA GRNPYS
 Pseudomonas_furukawii_WP_003454569.1:1-447 SP QRTPLVFQAGS ARGGLKFAAGHAEAVFISGQNKAAATREQVDKVRASAVAA GRPADA
 Leucobacter_triadinivorans_WP_130111548.1:1-442 SP QRTPLVFQAGS PRGIRFAARHAEAVFISGQNTNAVARKSVDAIRSGLVAA GRSPDA
 Aspergillus_brasiliensis_CBS_101740_OJG68286.1:12 SP QRTPVILQAGT SKAGKFAAQHAEAVFVAGHSPSVAKNIAIRETAKTQF GRDPKS
 Aspergillus_udagawae_170_GAO89440.1:15-472 SP QRTPVILQAGT SKAGKTFAAQHAEAVFVAGHSPAVAKNIAIRAMAQADF GRDPKS
 Aspergillus_flavus_RM373751.1:15-472 SP QRTPVILQAGT SKSGKFAAQHAEAVFVAGHSPVVAKNVIAIRELAKTQF GRDPQS
 Aspergillus_flavus_RAQ54081.1:15-472 SP QRTPVILQAGT SKSGKFAAQHAEAVFVAGHSPVVAKNVIAIRELAKTQF GRDPQS
 Penicillium_arizonense_XP_022490779.1:12-469 SP QRTPVILQAGT SKAGKTFAAQHAEAVFVAGHSPSVAKNVKEIRELAKTQF GRDPKS
 Salinibacterium_sp._CGMCC SP QRTPVIFQAGS

Aspergillus luchuensis SP QRTPVILQAGTS KAGKFAAQHAEAFVAGHSPSVVAKNIAEIRETAKTQFGRDPAG.I
 Aspergillus bombycis XP_022386026.1:15-472 SP QRTPVILQAGTS KSGKFAAQHAEAFVAGHSPVVVAKNVAEIRELAKTQFGRDPQS.I
 Agrobacterium vitis WP_070163524.1:1-454 SP QRTPVLYQAGS GPKKKFAAQHAEAFVVAAPTCKSVLKAYVAEIRQOQAAAA.GRDPNA.L
 Pseudomonas psychrotolerans_220_WP_074584491.1:5- SR QRTPVLYQAGS DRGLFAFAGRHAEAFVIFSGQDQAATRAQVVRVGRGAAAA.GRRADD.I
 Micrococcus yunnanensis WP_135040276.1:19-468 SV QRTPVLYQAGS TRGRAFGAGHAEAFVIFNSPTKELAAATVKKIRQALVDA.GRDPYD.V
 Acinetobacter calcoaceticus WP_004642549.1:7-452 SV QRTPTLLFQAGS SPKGMQFATRHAEAFVIFGGDKPEKIREQVKKIRALAEQQ.GRAGDD.I
 Penicillium brasilianum CEO59775.1:15-472 SP QRTPVILQAGTS KAGKTFAAQHAEAFVAGHSPSVVAKNVAEIRQAKTQFGRDPQS.I
 Aspergillus cristatus ODM22551.1:12-469 SP QRTPTLLQAGTS KAGKTFAAQHAEAFVFGHSPSVVKNIAEIREMKAQTFGRDPAS.I
 Pseudomonas taiwanensis WP_027907363.1:1-446 SP QRTPVLFQAGS ARGLQFAARHAEAFVIFSGPTPTVLRRAEAGIRQASDAQ.GRRGRDE.V
 Acidovorax avenae SP QRTPVLFQAGS GRGLRFAARHAEAFVIFSTQDKDSTRELVRALRAEVVRA.GRHDPDV.V
 Staphylococcus pseudintermedius WP_101431388.1:4- SP QRTPVLFQAGS EKGKTFAAKHAEAFVFKHTSIESLRAVTDIRTRAQQF.GRNGED.I
 Rhodococcus triatmae WP_081607437.1:2-451 SR QRTPALFQAGS SAGREFAAKHAEAFVLDTSVNSLRSSVATTTELARTL.GRSRSD.L
 Alcaligenes sp. RS4_230_WP_128393375.1:4-450 SP QRTPVLYQAGS GRGRQFASRHAEAFVIFADSPATAAKAASKTLRQDFVNA.GRQADD.V
 Gibbsiella quercinecans WP_121552917.1:7-454 SP QRTPLLFQAGS ARGIRFAARHAEAFVFNAGTSPMAAKQVDKLRAAVEA.GRAEAD.I
 Acinetobacter ursingii WP_044435211.1:5-452 SI QRTPVLFQAGS PRGLFAFTHAEAFVIFGGDQPKKIRQQVDKIRELAVQQ.GRQADD.I
 Erwinia typographi WP_034887712.1:4-447 SP QRTPLLFQAGS SARGIQFAARHAEAFVFNASPPAAMRQOTQLRQQAALDA.GRRADD.I
 Trichoderma harzianum KKP01913.1:14-470 SP QRTPVIMQAGTS KAGKFAAKHAEAFVAGHSPSVIAKNITADIRAAARDEYNRDPST.I
 Fusarium graminearum_235_CEF79766.1:12-466 SP QRTPLLLQAGS KAGKLFQAAQHAEAFVIFSAHAPAVAKKNIAEIRQTAKTDTNRRPN.N
 Gordonia alkanivorans WP_006357654.1:10-461 SP QGSPVLYQAGS PRGRFPAADNAEAFVFAAPTAKAILRQVSKIRELVL.A.GRDPYD.A
 Acinetobacter radioresistens WP_111281495.1:5-455 SP QRTPVLYQAGS PRGLTFATQHAEAFVIFGGDKPEKIKQQVEKIRSLATQ.GREEAA.I
 Mesorhizobium plurifarum WP_073985566.1:5-458 SP QRTPVLYQAGS VGVGRFAARHAEAFVIFAVHRPDLARKIVDDVRRAERL.GRDPQS.L
 Oceanobacillus halophilus WP_121203049.1:1-454 SP QRTPVLYQAGS PRGRDFAAKHAEAFVIFKGHLEALKSYTKDKLNRNTIQQ.GRKGED.I
 Acinetobacter tandoii_240_WP_100241535.1:7-457 SP QRTPVLYQAGS PRGLTFATQHAEAFVIFGGDQPEKIKQQVDKIRALAVSQ.GRDANS.V
 Burkholderia plantarii WP_042624083.1:1-457 SP QRTPLLFQAGS ARGTRFAARHAEAFVIFGAPTRNGLRSSARIRQALVDA.GRAPDS.A
 Alcaligenes faecalis WP_094195208.1:6-457 SA QRTPLLFQAGS SARGLOFAGQHAEAFVIFGAGTPEARESSRKLQQAALVDA.GRAQD.L
 Bradyrhizobium arachidis WP_092214516.1:1-453 SL QRTPLLFQAGS NRGKDFAAHAEAFVIFGESHKAPATAANVAETRARARAF.GRDGRD.G
 Cupriavidus plantarum WP_109583068.1:1-458 SP QRTPLLFQAGS GRGTRFAARHAEAFVIFGAPTAPGLRVTDRDLRALREA.GRDPAS.V
 Variovorax sp._770b2_245_WP_093443018.1:5-461 SP QRTPLLFQAGS PRGTAFAARHAEAFVIFPNQGLKATAQVIRKLEAALVTA.GRTRDS.V
 RZJ22128.1:4-447 V QGYPVIVQAGS SEDGRELAKGYAEVIFMTAQNLADAEFYRDVKSRLLKY.GRHADD.L
 LadB_Geobacillus_thermoleovorans_BAM76371.1 K AQRPPIYFGAS DIAKEVAKEADVYMMWGETFERMKERIQEMKQAAHY.GRT...V
 LadBETA_Geobacillus_thermoleovorans_BAM76372.1 PP QGKPVILQAGS QDGIRFAAHVAEVVFATAQSLTLDARQFYQTVKQEARA.GRNPDH.I
 Af1_AFLA_024140_XP_002373925.1 SP QRTPVILQAGTS KSGKFAAQHAEAFVAGHSPSVVAKNVAEIRELAKTQFGRDPQS.I
 Af3_AFLA_58870_XP_002378631.1 SP QRTFLLQAGTS TAGKSAFAAKHAEAFVIFLHGQKPELVRPVSVDNVRQQAQAG.GRDPAS.I
 Af4_AFLA_049780_XP_002383105.1 SP QRTPLLFQAGTS AAGSAFAATHAEAFVIFSSHSPAVLRPKVIEDIRKLAEEQ.GRDPERS.I
 Af5_AFLA_126060_XP_002381799.1 SK QRTPLLFQAGTS SAGKRFAAKHSEVFMFLGLEPEKTPAKVDNMRHLAEI.GRPTDS.I
 Af2_QMW32876.1:9-463 SP QRTPLLFQAGTS AAGNGFGKGHAEAFVIFGGQTPEGRVRTVDNIRKVAEEE.GRDNAN.H
 Yarrowia lipolytica_CLIB122_YALI0C07546p_XP_50156 SV QRTPVLYQAGS SAGRAFGAGHAEAFVIFATGSPQGLRQTVNLRNLSAGDR...K
 Rhizobium sp._CF122_WP007794079.1 AP QGQPVLYQAGS SGPGEKLAARTAEVVFATAHQTIEDARGFVSDKGLRLAKY.GRREEE.L
 Acinetobacter sp._NIPH_2100_ILM TP QGYPVIVQAGS GPGRDLAARTAEVIFATANQLEDAQEFYRDVKSRLLAKY.GRGADE.L
 Nostoc sp._PCC_7107_WP_015115963.1 PP QGYPVIVQAGS EVGRDLAARTAEVIFATANQTLADAEFYADVKGLRLAKY.GRSPDD.L
 Aspergillus flavus_NRR13357_uncharacterized PV QGWPVIVQAGS SEP GKQLAAETAEAFVFCSPRDLSSAKALYADIKGRAVAA.GRDRNH.L
 Paenibacillus_curdanolyticus_WP006037998.1 PI QGHPVIVQAGS SEP GKELAARTAEVIFATAQGLEAAQRFYSDVKGLRLAKY.GRSPDD.L
 LadBETA_Geobacillus_thermoleovorans_FMN-dependen PP QGKPVILQAGS QDGIRFAAHVAEVVFATAQSLTLDARQFYQTVKQEARA.GRNPDH.I
 SsuD_1M41 AIQ QGYPVLYFGSS QDVAQELAAEQVDLYLTWGEPPLEVEKEIEQVRAKAAAH.GRK...I
 Paenibacillus_curdanolyticus_WP006037998.1 PI QGHPVIVQAGS SEP GKELAARTAEVIFATAQGLEAAQRFYSDVKGLRLAKY.GRSPDD.L
 Bacillus PV QKFPPIYFGSS SPAGQKVAAKHSVDYLTWGEPPLEQVREKIAA VRKQAAEA.GRT...V
 Pseudomonas LQ RPYQPVLYFGSS EAAHELAGEQVDVYLTWGEPLPAVAAKIDAVRQRAARH.GRT...L
 LadB_Geobacillus_thermoleovorans_FMN-dependent KP AQRPPIYFGAS DIAKEVAKEADVYMMWGETFERMKERIQEMKQAAHY.GRT...L
 Pseudomonas_aeruginosa_PA01_NP_251290.1 RQ SHPIPIYFGSS DAAIEVAARHADTYMLWGEPLAAVDGHIRRVRAAKAQ.GRD...L
 Alkanesulfonate L NGTIPVSVGSS DEAYRIGGSLADIFGLWGEPLKETKEQIDRIYAAEAKA.GRAENDRP
 Alkanesulfonate TK ETIPVSVGSS DDAYRIGGSLADIFGLWGEPLKETKEQIEKIYAAEAKA.GRTRDP.L
 Aspergillus_niger_ATCC13496_RDH19503.1 ANP NGTIPVSVGSS DEAYRIGGSLADIFGLWGEPLKETKEQIDRIYAAEAKA.GRAPNDRP
 Penicillium_digitatum_Pdl_XP014534980.1 TG DSIPVSVGSS DEAYRIGGSLADIFGLWGEPLKETKEQIERIYAAEAKA.GRPSDRP
 Acinetobacter_rudis_WP_016657472.1 VQ KPYQPVLYFGSS TPAQDLAAEQVDVYLTWGEPPAAVEKIAA IRKAAQQ.GRE...L

	280	290	300	310	320						
LADA Geobacillus_thermodenitrificans_WP_011888513	KMFAGIC	ICVIVGK	THDEAME	KLNSF	QKYWS	LEGH	LAHYGGG	GYDLSKYS	..SNDY	I	
Geobacillus_sp._LEMMY01_WP_079935807.1:1-440	KMFAGIC	ICVIVGK	THDEAME	KLNSF	QKYWS	LEGH	LAHYGGG	GYDLSKYS	..SNDY	I	
Geobacillus_stearothermophilus_ABV66256.1:1-440	KMFAGIC	ICVIVGK	THDEAME	KLNSF	QKYWS	LEGH	LAHYGGG	GYDLSKYS	..SNDY	I	
Geobacillus_sp._B4113_201601_WP_061912600.1:1-440	KMFAGIC	ICVIVGK	THDEAME	KLNSF	QKYWS	LEGH	LAHYGGG	GYDLSKYS	..SNDY	I	
Geobacillus_sp._B4113_201601_5WP_061912600.1:1-44	KMFAGIC	ICVIVGK	THDEAME	KLNSF	QKYWS	LEGH	LAHYGGG	GYDLSKYS	..SNDY	I	
Bacillus_thuringiensis_6WP_029441578.1:1-435	KLIFAG	ICVIVGK	THEEAME	KLNSF	QKYWS	LEGN	LAHYAGG	GYDLSQYN	..INDY	I	
Lysinibacillus_sphaericus_WP_103976887.1:2-422	KMFMG	LCITVGL	TDEEINK	SVFDS	QKYWS	LEGN	MAHYCGG	GIDLSKYS	..QDDN	I	
Lysinibacillus_sphaericus_WP_069508309.1:2-422	KMFMG	LCITVGL	TDEEINK	SVFDS	QKYWS	LEGN	MAHYCGG	GIDLSKYS	..QDDN	I	
Rummeliibacillus_sp._SL167_10_WP_146551437.1:2-42	KFFMG	LCITVGL	TDDAIRK	IEKLY	KAFWS	VEGN	LAHYCGG	NIDLSKYE	..KEDI	L	
Paenibacillus_sp._DXL2_WP_110843609.1:1-459	KLFAGV	SVIVGR	TKEEAER	KYEDY	KRLYS	VEGV	LAHYGGG	GYDLSAYD	..PDDY	L	
Paenibacillus_naphtthalenovorans_WP_074730028.1:1-4	KLVFAG	VATIVGR	TKEEAQR	KYERY	EYARLY	VEGV	LAHYGGG	GYDLSAYD	..PEDD	L	
Cohnella_sp._HS21_WP_130606586.1:1-453	KVFMA	INSIVGR	TTRAEAE	KKLEY	TAIRS	DEAP	VLYGGFS	GIDLSKYD	..RSDY	L	
Streptoporangium_subroseum_15_WP_089205784.1:1-4	KVFPAS	AVIVAE	TQREAAK	VADLR	HRIRAA	GAAG	LAQRGS	GIDLAAYR	..PADS	ITDI	
Arthrobacter_sp._Hz2_WP_120147654.1:1-455	KAFAS	AVIVGR	TRHKEA	QKADY	RRLRS	SAEGY	LAHAGGG	GIDLAAYR	..PDEV	ITDI	
Nonomuraea_solani_WP_103963668.1:1-453	TFFPS	ASVIVAR	TQFEVDA	KLADL	QRHIRP	EGFL	LAQRGS	GIDLAAYR	..PDEL	I	
Arthrobacter_ruber_WP_105030338.1:1-455	KAFAS	AVIVGR	TRSKGA	QKADY	RRLRS	SAEGY	LAHAGGG	GIDLAAYR	..PDEV	ITDI	
Bacillus_aciditolerans_20_WP_121446947.1:1-456	KAFFT	LNIVGE	TSEAEQ	KYQLARY	SW	EAARK	AQYGGGS	GYDLSQYT	..DLSP	F	
Bacillus_sp._137163763.1:1-458	LTYAQA	ALLIVAP	TREEEAAR	FAERY	RRYVD	LDAA	LALLSGWT	GIDFAGLD	..PDAP	I	
Aeribacillus_pallidus_WP_130157503.1:4-457	KVFAFL	FTVIVGR	TTEEA	WAKYEL	SYI	VEG	ALLSGWS	GVDFSKYD	..PDQE	I	
Bacillus_megaterium_24WP_098602848.1:4-460	KVFAFL	FTVIVGR	TTEEA	WAKYEL	SYI	VEG	ALLSGWS	GVDFSKYD	..PDQE	I	
Streptomyces_sp._150FB_WP_078877664.1:5-455	KFMAG	ASVIVGR	SKDEE	VARKVE	FTALRS	VDGY	LAHSGA	GIDWTRY	..PETR	IGDI	
Arthrobacter_sp._DWC3_WP_104051071.1:1-454	KAFAS	AVIVGR	TAKDA	QKADY	RRLRS	SAEGY	LAHAGGG	GIDLAAYR	..PDEV	I	
Cohnella_thermotolerans_WP_027093898.1:1-456	KAFFT	LNIVVAE	TTEEAER	KFAEY	SRRLS	VEG	AARKYGGGS	GYDLSQYK	..DLDA	IFEY	
Paenibacillus_bovis_28WP_144921429.1:1-452	KILTM	FTVIVGR	TTEEA	QKNEY	KHHS	VEG	ALLFGGW	GVDLSGYD	..PSTI	V	
Bacillus_aciditolerans_WP_121447760.1:1-452	KILAC	ITVIVGR	TTEEA	QKNEY	QKHVS	VEG	ALLFGGW	GIDFSEYD	..PDEN	L	
Leifsonia_sp._ALI-44-B_30_WP_077053645.1:1-455	KTFAS	AVIVDR	DRDRA	ALAKA	EYKRYS	DEGY	THSGGG	GIDLAAYP	..KDAL	ITDI	
Parageobacillus_thermoglucoasidarius_WP_064552269	KVFAFL	FTVIVGR	TTEEA	QKFAE	LNHLWS	PD	ASKAQFSGAS	GYDLAEY	ENKDLNAP	F	
Geobacillus_sp._Y4_1MCL1_WP_013399886.1:1-459	KVFAFL	FTVIVGR	TTEEA	QKFAE	LNHLWS	PD	ASKAQFSGAS	GYDLAEY	ENKDLNAP	F	
Bacillus_methanolicus_35WP_004434428.1:1-462	KVFSFL	TVIVGE	TTEEA	QKQYEL	NRLWS	PD	AARKAQFSGAS	GYDLSQYK	..DLDA	IFEY	
Terribacillus_halophilus_WP_077309754.1:1-448	KVMSFL	FTVIVAE	TTEEA	QKLNK	YRSYAS	VEG	VLGGWT	GIDFSEYD	..PEEE	L	
Paraburkholderia_kururiensis_WP_01777532.1:1-453	LIFNL	HTVITGR	TTEEA	AKH	HADYR	RYAS	DEG	SALLMSGWT	GIDLSKYD	..LDEP	L
Gracilibacillus_massiliensis_WP_058308419.1:1-456	KIISFL	SVVVAE	TTEEA	AKFEY	EYNKWS	VD	AARKAQY	GYDLAEY	EDADP	DEP	
Streptomyces_yanglinensis_WP_103888511.5:452	KFMAG	AVIVGR	TERD	VARKVE	FTALRS	VD	GHLAHSAG	GIDWTRY	..PSTR	IGDI	
Trinickia_sp._7GSK02_40_WP_136896361.1:1-452	LIFNL	HTVITGR	TTEEA	AKH	HADYR	RYAS	DEG	SALLMSGWT	GIDLSKYD	..LDEP</	

Pseudomonas syringae WP_024682626.1:4-452
LadAlpha Geobacillus thermoleovorans BAM76377.1
Tsukamurella pseudospumae WP_068746786.1:1-457
Kocuria sp. *Marseille*-P3598 WP_085529073.1:5-456
Microvirga aerophila WP_114188789.1:1-456
Burkholderia ubonensis WP_071760483.1:5-455
Achromobacter marplatensis WP_006226823.1:4-450
Acinetobacter baumannii WP_070165746.1:1-443
Labedella phragmitis WP_128496094.1:1-453
Nocardia cyriacigeorgica 120 WP_130918184.1:1-453
Nocardia cyriacigeorgica WP_130918184.1:1-453
Mycobacterium sp. 1164985.4 WP_067298521.1:1-453
Rhodococcus sp. 1R11 WP_135042739.1:1-449
Erwinia amylovora WP_004157587.1:5-459
Ralstonia mannitolilytica WP_102079134.1:4-451
Leifsonia flava WP_135120808.1:15-465
Cryobacterium roopkundense WP_084141147.1:1-453
Cupriavidus pauculus WP_101681197.1:1-455
Rhizobium sp. BK333 130 WP_133704837.1:2-454
Caballeronia mineralivorans WP_047846789.1:1-454
Nocardia altamirensis WP_069163049.1:1-454
Cupriavidus sp. P-10 WP_116322758.1:1-452
Serratia sp. S1B WP_116726564.1:1-452
Pseudomonas putida WP_043864435.1:1-452
Pseudomonas aeruginosa WP_023084248.1:4-453
Pseudomonas mucidolens WP_084381795.1:9-455
Pseudomonas poae WP_060549803.1:4-450
Pseudomonas chlororaphis WP_123573412.1:9-454
Janthinobacterium lividum 140 WP_072454679.1:1-44
Haladaptatus cibarius WP_049970513.1:4-446
Arthrobacter luteolus WP_066298473.1:1-443
Geobacillus sp. ZGT-1 WP_047758532.1:1-436
Lysinibacillus composti WP_124766485.1:4-458
Microcella putealis WP_130486201.1:20-474
Pseudomonas nitroreducens WP_037016976.1:1-453
Acinetobacter wuhouensis WP_130168784.1:1-453
Bradyrhizobium sp. YR681 WP_008144663.1:1-454
Schumannella sp. 10F1D-1 WP_141164655.1:10-460
Pseudomonas coronafaciens 150 WP_122355187.1:4-45
Pseudomonas syringae WP_003430238.1:4-452
unclassified Rhodococcus WP_094682261.1:1-449
Hafnia alvei WP_046449330.1:6-449
AS9A_3890 Hoyosella subflava WP_013808677.1:1-453
Acinetobacter baumannii WP_000995600.1:1-443
Agrobacterium sp. B133/95 WP_065696417.1:2-454
Microbacterium sp. KROCZY2 WP_024289149.1:1-453
Variovorax paradoxus WP_012747040.1:6-452
Methylobacterium radiotolerans WP_076730229.1:5-4
Streptomyces sp. BK215 WP_132915265.1:7-452
Geobacillus thermodenitrificans 160 WP_008880416.
Pseudomonas aeruginosa WP_132556951.1:356-785
Penicillium solitum OQE02104.1:14-471
Penicillium vulpinum OQE05502.1:12-469
Clavibacter michiganensis WP_045526194.1:1-454
Glutamicibacter creatinolyticus WP_054821484.1:6-
Campylobacter sp. P0078 WP_086237522.1:4-454
Pseudomonas furukawaii WP_003454569.1:1-447
Leucobacter triazinivorans WP_130111548.1:1-442
Aspergillus brasiliensis CBS_101740_OJG68286.1:12
Aspergillus udagawae 170 GA089440.1:15-472
Aspergillus flavus RMZ37351.1:15-472
Aspergillus flavus RAQ54081.1:15-472
Penicillium arizonense XP_022490779.1:12-469
Salinibacterium sp. CGMCC
Aspergillus fumigatus OXN06785.1:14-471
Aspergillus lentulus RAQ01210.1:7-464
Aspergillus flavus RAQ66103.1:15-472
Aspergillus fumigatus OXN22894.1:14-471
Aspergillus nidulans
Penicillium nalgiovense OQE79848.1:14-471
Aspergillus wentii
Gordonia iterans WP_105943624.1:1-453
Azotobacter beijerinckii WP_090735436.1:4-454
Staphylococcus sp. NAM3COL9 WP_05713692.1:4-453
Acidovorax sp. 56 WP_099656603.1:11-450
Paenibacillus sp. BIHB4019 WP_099518466.1:1-456
Penicillium antarcticum OQD90033.1:5-465
Aspergillus oryzae RIB40_190 XP_001823703.1:9-463
Fusarium oxysporum f. sp. pisi
Colletotrichum fruticicola Nara_g5_ELA35345.1:18-
Micrococcus luteus WP_041104460.1:19-468
Aspergillus awamori GCB21923.1:12-469
Aspergillus niger CBS
Aspergillus lacticoffeatus CBS_101883_XP_02545389
Aspergillus wentii DTO_134E9_OJJA0237.1:14-471
Aspergillus indologenus CBS_114.80_PYI32107.1:11-
Aspergillus fischeri NRRL_181_XP_001264002.1:14-4
Penicillium coprophilum 200_OQE46388.1:11-466
Cupriavidus taiwanensis WP_116379876.1:8-454
Penicillium digitatum
Aspergillus niger GAQ46262.1:12-469
Aspergillus nomius NRRL_13137_XP_015412385.1:15-4
Aspergillus aculeatus ATCC_16872_XP_020055010.1:1
Penicillium brasilianum OQO84969.1:19-474
Penicillium subrubescens OKP15100.1:19-474
Trichoderma arundinaceum RFU80530.1:19-474
Aspergillus thermomutatus 210_XP_026614594.1:15-4
Serratia liquefaciens WP_044551273.1:4-449
Micrococcus luteus WP_065572847.1:19-468
Halolamina rubra WP_049979911.1:1-449
Acinetobacter pittii WP_075382847.1:7-452
Corynebacterium variabile WP_052302534.1:2-464
Aspergillus luchuensis GAT21254.1:12-471

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Aspergillus luchuensis
Aspergillus bombycis_XP_022386026.1:15-472
Agrobacterium vitis_WP_070163524.1:1-454
Pseudomonas psychrotolerans_220_WP_074584491.1:5-
Micrococcus yunnanensis_WP_135040276.1:19-468
Acinetobacter calcoaceticus_WP_004642549.1:7-452
Penicillium brasilianum_CEO59775.1:15-472
Aspergillus cristatus_ODM22551.1:12-469
Pseudomonas taiwanensis_WP_027907363.1:1-446
Acidovorax avenae
Staphylococcus pseudintermedius_WP_101431388.1:4-
Rhodococcus triatoniae_WP_081607437.1:2-451
Alcaligenes_sp._RS4_230_WP_128393375.1:4-450
Gibbsiella quercinecans_WP_121552947.1:7-454
Acinetobacter ursingii_WP_044435211.1:5-452
Erwinia typographi_WP_034887712.1:4-447
Trichoderma harzianum_KKP01913.1:14-470
Fusarium graminearum_235_CEF79766.1:12-466
Gordonia alkanivorans_WP_006357654.1:10-461
Acinetobacter radioresistens_WP_111281495.1:5-455
Mesorhizobium plurifarium_WP_073985566.1:5-458
Oceanobacillus halophilus_WP_121203049.1:1-454
Acinetobacter tandoii_240_WP_100241535.1:7-457
Burkholderia plantarii_WP_042624083.1:1-457
Alcaligenes faecalis_WP_094195208.1:6-457
Bradyrhizobium arachidis_WP_092214516.1:1-453
Cupriavidus plantarum_WP_109583068.1:1-458
Variovorax_sp._770b2_245_WP_093443018.1:5-461
RZJ22128.1:4-447
LadB_Geobacillus thermoleovorans_BAM76371.1
LadAbeta_Geobacillus thermoleovorans_BAM76372.1
Af1_AFLA_024140_XP_002373925.1
Af3_AFLA_58870_XP_002378631.1
Af4_AFLA_049780_XP_002383105.1
Af5_AFLA_126060_XP_002381799.1
Af2_QMW32876.1:9-463
Yarrowia lipolytica_CLIB122_YALI0C07546p_XP_50156
Rhizobium_sp._CF122_WP007794079.1
Acinetobacter_sp._NIPH_2100_ILM
Nostoc_sp._PCC_7107_WP_015115963.1
Aspergillus flavus_NRRL3357_uncharacterized
Paenibacillus curdalanolyticus_WP006037998.1
LadAbeta_Geobacillus thermoleovorans_FMN-dependen
SsuD_1M41
Paenibacillus curdalanolyticus_WP006037998.1
Bacillus
Pseudomonas
LadB_Geobacillus thermoleovorans_FMN-dependent
Pseudomonas aeruginosa_PA01_NP_251290.1
Alkanesulfonate
Alkanesulfonate
Aspergillus niger_ATCC13496_RDH19503.1
Penicillium digitatum_Pdl_XP014534980.1
Acinetobacter rudis_WP_016657872.1

LADA Geobacillus_thermophilus WP 011888513 GSI
 Geobacillus_sp. LEMMY01 WP 079935807.1:1-440 GSI
 Geobacillus_stearothermophilus ABV66256.1:1-440 GSI
 Geobacillus_sp. B4113_201601 WP 061912600.1:1-440 GSI
 Geobacillus_sp. B4113_201601_5WP 061912600.1:1-440 GSI
 Bacillus_thuringiensis_6WP 029441578.1:1-435 GSI
 Lysinibacillus_sphaericus WP 103976887.1:2-422 NGF
 Lysinibacillus_sphaericus WP 069508309.1:2-422 N
 Rummeliibacillus_sp. SL167_10 WP 146551437.1:2-42 NGS
 Paenibacillus_sp. DXL2 WP 110843609.1:1-459 D.Y.V
 Paenibacillus_naphthalenovorans WP 074730028.1:1- E.Y.V
 Cohnella_sp. HS21 WP 130606586.1:1-453 SYY
 Streptomyces_orangium_subroseus_15 WP 089205784.1:1-4 VAR
 Arthrobacter_sp. H22 WP 120147654.1:1-455 LAR
 Nonomuraea_solani WP 103963668.1:1-453 D.DIVARGGD
 Arthrobacter_ruber WP 105030338.1:1-455 LAR
 Bacillus_aciditolerans_20 WP 121446947.1:1-456 EYK
 WP 137163763.1:1-458 E.Y.V
 Aeribacillus_pallidus WP 130157503.1:4-457 E.Y.V
 Bacillus_megaterium_24WP 098602848.1:4-460 K.Y.I
 Streptomyces_sp. 150FB WP 078877664.1:5-455 IAR
 Arthrobacter_sp. DWC3 WP 104051071.1:1-454 D.DILARENR
 Cohnella_thermotolerans WP 027093898.1:1-456 K
 Paenibacillus_bovis_28WP 144921429.1:1-452 E.Y.V
 Bacillus_aciditolerans WP 121447760.1:1-452 K.Y.V
 Leifsonia_sp. ALI-44-B_30 WP 077053645.1:1-455 LAA
 Parageobacillus_thermoglucoasidarius WP 064552269. EFF
 Geobacillus_sp. Y4_1MCI WP 013399886.1:1-459 E.F.K
 Bacillus_methanolicus_35WP 00434428.1:1-462 EFF
 Terribacillus_halophilus WP 077309754.1:1-448 R.F.V
 Paraburkholderia_kururiensis WP 01777532.1:1-453 R.Y.V
 Gracilibacillus_massiliensis WP 058308419.1:1-456 E.YKK
 Streptomyces_yanglinensis WP 10388851.1:5-452 IAR
 Trinickia_sp. 7GSK02_40 WP 136896361.1:1-452 S.Y.V
 Cryobacterium_sp. NEAD-85 WP 123045138.1:1-448 EYK
 Alicyclobacillus_acidoterrestis WP 021298468.1:4 R.Y.V
 Oceanobacillus_senegalensis WP 085994229.1:1-452 R.Y.V
 Bacillus_sinesaloumensis WP 077620983.1:1-449 G.YKK
 Halopenitius_persicus WP 021074147.1:6-457 E.H.I
 Microbacteriaceae_bacterium E.Y.K
 Lysinibacillus_sinduriensis WP 036201100.1:1-458 EYQ
 Bacillus_endophyticus WP 113749053.1:5-457 E.Y.V
 Pseudomonas_monteilii WP 119371117.1:1-455 E.H.I
 Bacillus_endophyticus_50 WP 061801645.1:5-457 E.Y.V
 Planococcus_maitriensis WP 12233285.1:1-457 E.Y.V
 Oceanobacillus_profundus WP 118889880.1:1-447 S.Y.V
 Burkholderia_pseudomallei WP 141404579.1:1-452 E.H.V
 Terribacillus_saccharophilus WP 095261886.1:1-455 T.YGK
 Sediminibacillus_albus WP 093212831.1:4-453 R.Y.V
 Sciscionella_marina WP 020496929.1:1-448 GFK
 Mycetocolla_saprophilus WP 043321267.1:1-452 EYK
 Lysinibacillus_macroides WP 053993569.1:4-460 N.Y.V
 Pseudomonas_putida WP 086978777.1:1-458 E.H.V
 Sediminibacillus_halophilus_60 WP 074598704.1:4-4 R.Y.V
 Rhizobium_oryzae WP 085420425.1:1-450 ETG
 Pseudomonas_extremorientalis WP 071491956.1:1-455 R.H.V
 Pseudomonas_fluorescens WP 016977452.1:1-454 K.H.V
 Neorhizobium_sp. T25_27 WP 105419890.1:1-450 ETG
 Pseudomonas_extremaustralis WP 078833627.1:1-457 K.H.V
 Fictibacillus_aquaticus WP 094253544.1:1-455 EFF
 Pseudomonas_extremaustralis_KAA8559760.1:1-456 K.H.V
 Mycobacterium_sp. ACS1612 WP 067812332.1:1-454 A.V.V
 Bacillus_megaterium WP 116075167.1:1-455 E.F.V
 Pseudomonas_frederiksbergensis_70 WP 123409596.1: K.H.V
 Pseudomonas_citronellolis SCF61163.1:1-452 AEL
 Herbaspirillum_chlorophenolicum WP 050468599.1:4- R.A.A
 Arthrobacter_crystallopoietes WP 074700854.1:1-45 Q.Y.V
 Terribacillus_goriensis WP 038558686.1:1-438 K
 Bacillus_megaterium WP 025749753.1:1-455 E.F.V
 Neorhizobium_sp. T7_12 WP 105403044.1:1-451 E.T.G
 Rummeliibacillus_sp. SL167 WP 146553619.1:4-459 K.Y.V
 Burkholderia_sp. PAMC Q.P.P
 Pseudomonas_koreensis WP 064585463.1:4-449 Q.Y.V
 Pseudomonas_fluorescens_80 WP 064116961.1:6-451 Q.Y.V
 Pseudomonas_rhodesiae WP 040265276.1:4-450 Q.Y.V
 Collimonas_sp. OK412 WP 092393355.1:4-454 K.P.A
 Pseudomonas_marginalis WP 058415544.1:1-456 K.H.V
 Pseudomonas_antarctica WP 064452947.1:1-458 K.H.V
 Pseudomonas_protegens WP 041115159.1:9-454 Q.Y.V
 Pseudomonas_synxantha WP 057024776.1:4-449 Q.Y.V
 Rhizobium_leguminosarum WP 128409501.1:2-451 DQS
 Pseudomonas_chlororaphis WP 038359779.1:6-451 Q.Y.V
 Pseudomonas_syringae_90 WP 024642725.1:1-456 R.H.V
 Collimonas_fungivorans WP 061540754.1:4-453 K.P.A
 Rhizobium_leguminosarum WP 116409027.1:2-451 D.Q.S
 Microvirga_ossetica WP 099511173.1:1-454 Q.Y.V
 Pseudomonas_caspiana WP 087268376.1:4-451 Q.Y.V
 Pseudomonas_lundensis WP 048375063.1:4-451 Q.Y.V
 Caballeronia_mineralivorans WP 047894899.1:4-456 E.P.P
 Pseudomonas_paralactis WP 057702387.1:4-450 Q.Y.V
 Pseudomonas_tetrolens WP 048381143.1:4-453 Q.Y.V
 Pseudomonas_psychrophila WP 123750761.1:4-450 Q.Y.V
 Collimonas_arenae_100 WP 061532973.1:4-454 K.P.A
 Pseudomonas_viridiflava WP 122210720.1:4-451 Q.Y.V
 Kocuria_varians WP 068470402.1:1-454 N.Y.V
 Pseudomonas_wadsworthiensis WP 115084816.1:4-455 Q.Y.V
 Pseudomonas_syringae WP 011266344.1:4-452 Q.Y.V
 Pseudomonas_sp. 286_105WP 122415793.1:4-453 Q.Y.V
 Geobacillus_vulcani WP 031406843.1:1-461 LFR
 Geobacillus_igicianus WP 033018365.1:1-461 LFR
 Pseudomonas_floridensis WP 083182568.1:4-453 Q.Y.V
 Pseudomonas_asturiensis WP 073167523.1:4-451 Q.Y.V
 Geobacillus_vulcani_110 WP 031406843.1:1-461 LFR

Pseudomonas syringae WP_024682626.1:4-452
LadAalpha_Geobacillus thermoleovorans BAM76377.1
Tsukamurella pseudosporumae WP_068746786.1:1-457
Kocuria sp. *Marseille*-P3598 WP_085529073.1:5-456
Microvirga aerophila WP_114188789.1:1-456
Burkholderia ubonensis WP_01760483.1:5-455
Achromobacter marplatensis WP_006226823.1:4-450
Acinetobacter baumannii WP_070165746.1:1-443
Labeledella phragmitis WP_128496094.1:1-453
Nocardia cyriacigeorgica 120 WP_130918184.1:1-453
Nocardia cyriacigeorgica WP_130918184.1:1-453
Mycobacterium sp. 1164985.4 WP_067298521.1:1-453
Rhodococcus sp. 1R11 WP_135042739.1:1-449
Erwinia amylovora WP_004157587.1:5-459
Ralstonia mannitolilytica WP_102079134.1:4-451
Leifsonia flava WP_135120808.1:15-465
Cryobacterium roopkundense WP_084141147.1:1-453
Cupriavidus pauculus WP_101681197.1:1-455
Rhizobium sp. BK333_130 WP_133704837.1:2-454
Caballeronia mineralivorans WP_047846789.1:1-454
Nocardia altamirensis WP_069163049.1:1-454
Cupriavidus sp. P-10 WP_116322758.1:1-452
Serratia sp. S1B WP_116726564.1:1-452
Pseudomonas putida WP_043864435.1:1-452
Pseudomonas aeruginosa WP_023084248.1:4-453
Pseudomonas mucidolens WP_084381795.1:9-455
Pseudomonas poae WP_060549803.1:4-450
Pseudomonas chlororaphis WP_123573412.1:9-454
Janthinobacterium lividum 140 WP_072454679.1:1-44
Haladaptatus cibarius WP_049970513.1:4-446
Arthrobacter luteolus WP_066298473.1:1-443
Geobacillus sp. ZGt-1 WP_047758532.1:1-436
Lysinibacillus compositi WP_124766485.1:4-458
Microcella putealis WP_130486201.1:20-474
Pseudomonas nitroreducens WP_037016976.1:1-453
Acinetobacter wuhouensis WP_130168784.1:1-453
Bradyrhizobium sp. YR681 WP_008144663.1:1-454
Schumannella sp. 10F1D-1 WP_141164655.1:10-460
Pseudomonas coronafaciens 150 WP_122355187.1:4-45
Pseudomonas syringae WP_003420328.1:4-452
unclassified Rhodococcus WP_094682261.1:1-449
Hafnia alvei WP_046449330.1:6-449
AS9A_3890_Hoyosella subflava WP_013808677.1:1-453
Acinetobacter baumannii WP_000995600.1:1-443
Agrobacterium sp. B133/95 WP_065696417.1:2-454
Microbacterium sp. KROC2 WP_024289149.1:1-453
Variovorax paradoxus WP_012747040.1:6-452
Methylobacterium radiotolerans WP_076730229.1:5-4
Streptomyces sp. BK215 WP_132915265.1:7-452
Geobacillus thermodenitrificans 160 WP_008880416
Pseudomonas aeruginosa WP_132556951.1:356-785
Penicillium solitum OQE02104.1:14-471
Penicillium vulpinum OQE05502.1:12-469
Clavibacter michiganensis WP_045526194.1:1-454
Glutamicibacter creatinolyticus WP_054821484.1:6-
Campylobacter sp. P0078 WP_086237522.1:4-454
Pseudomonas furukawaii WP_003454569.1:1-447
Leucobacter triazinivorans WP_130111548.1:1-442
Aspergillus brasiliensis CBS_101740 OJ368286.1:12
Aspergillus udagawae 170 GAO89440.1:15-472
Aspergillus flavus RM237351.1:15-472
Aspergillus flavus RAQ54081.1:15-472
Penicillium arizonense XP_022490779.1:12-469
Salinibacterium sp. CGMCC
Aspergillus fumigatus OXN06785.1:14-471
Aspergillus lentulus GAQ0210.1:7-464
Aspergillus flavus RAQ66103.1:15-472
Aspergillus fumigatus OXN22894.1:14-471
Aspergillus nidulans
Penicillium nalgiovense OQE79848.1:14-471
Aspergillus wentii
Gordonia iterans WP_105943624.1:1-453
Azotobacter beijerinckii WP_090735436.1:4-454
Staphylococcus sp. NAM3COL9 WP_057513692.1:4-453
Acidovorax sp. 56 WP_099656603.1:11-450
Paenibacillus sp. BIH4019 WP_099518466.1:1-456
Penicillium antarcticum OQD90033.1:5-465
Aspergillus oryzae RIB40_190 XP_001823703.1:9-463
Fusarium oxysporum f. sp. *pisi*
Colletotrichum fructicola Nara_gc5 ELA35345.1:18-
Micrococcus luteus WP_041104460.1:19-468
Aspergillus awamori GCB21923.1:12-469
Aspergillus niger CBS
Aspergillus lacticoferatus CBS_101883 XP_02545389
Aspergillus wentii DTO_134E9 OJ340237.1:14-471
Aspergillus indologenus CBS_114 XP_PYI31207.1:11-
Aspergillus fischeri NRRL_181 XP_001264002.1:14-4
Penicillium coprophilum 200 OQE46388.1:11-466
Cupriavidus taiwanensis WP_116379876.1:8-454
Penicillium digitatum
Aspergillus niger GAQ46262.1:12-469
Aspergillus nomius NRRL_13137 XP_015412385.1:15-4
Aspergillus aculeatus ATCC_16872 XP_020055010.1:1
Penicillium brasilianum OQO84969.1:19-474
Penicillium subrubescens OKP1500.1:19-474
Trichoderma arundinaceum RFU80530.1:19-474
Aspergillus thermomutatus 210 XP_026614594.1:15-4
Serratia liquefaciens WP_044551273.1:4-449
Micrococcus luteus WP_065572847.1:19-468
Halolamina rubra WP_049979911.1:1-449
Acinetobacter pittii WP_075382847.1:7-452
Corynebacterium variabile WP_052302534.1:2-464
Aspergillus luchuensis GAT21254.1:12-471

Q.Y.V...KNN...AIQSATKNLKNND...W.TRQKLLD.QHALGGRYI.TLIGSP
LFR...ATD...HGHYKAASLTKD ATK...PL.TIGBALQ.KAGTLTRES.VIIGNP
G.D.V...KSN...AIQSANFNQADPS.GK.DW.TVEDIGK.WGRIGGMGP.VIVGSG
N.Y.V...KTD...STQSFLTPTFLQSKD...K.EW.TREBIAK.HCAIGGMGD.VIVGSG
QYQ...KTD...AMASMLEAFTRDSSQ...VW.TLRKIFD...KGLGARNP.PIVGSG
S.Y.V...KTD...STQSAVDAISKKSTS.GA...W.TVRRLMD.QMSLGGRYQ.PIVGSG
R.Y.V...KNN...AIESAVKNLTVSRTD...R.TVTDLLA.DMALGGRYP.ALVGSA
E.Y.I...QTN...AIQSLDSYVNADPE.RV...W.TIEEIAN.WNSLGGNGP.VLVGSA
G.N.V...ESN...AIQSAVANFQEANDD.GG.EF.RVRDIA.R.MGAIGGLGP.RIVGSG
G.D.V...ESN...AIQSAVAAFQEFDDDD.GR.EW.TVRDIA.R.MGAIGGLGP.RIVGSG
G.D.V...ESN...AIQSAVAAFQEFDDDD.GR.EW.TVRDIA.R.MGAIGGLGP.RIVGSG
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G.N.V...ESN...AIQSFVASFOSIGAD.GK.EW.TVRDIAE.WGKIGGMGP.RFVGS
K.H.L...HTN...AIQSAVETFTSTADPD.RQ...W.TVQALAD.WVGIGGFPG.LLVGSA
D.Y.G...GGN...AIESATT...TAARHG...W.TRRKLLD.LFELGGRYP.AIVGDP
G.N.V...QSN...AIRSVIANYESAKN.GE.VF.TVRDIA.R.GGAIGGLGP.TIVGSG
G.N.V...KSN...AIQSAVSNVQAGGAG.GK.EW.TVRDIA.R.QGAIGGLGP.TIVGSG
QTG...KSQ...AIQSVNVEAMTRSAGP...QW.TRRKLLD.QMVLGSRQK.PMVGSG
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G.Q.V...ESN...AIQSAVAEFQEFDDDDGR.EW.TVRDIA.R.MGAIGGLGP.RIVGSG
K.H.I...RND...SMHTAIDRFTIADPN...RVW.TVGEVAE.HLAVGGSGP.VIVGSG
E.Y.I...QTN...AIQSLDSYVNADPN.RV...W.TIEEIAN.WNSVGGNGP.VLVGSA
R.E.V...QSD...AIQSAVEAFTRADPS.RT...W.TTAEIAD.YCAIGGGDP.VLVGSA
R.Y.E...KNN...AIESVKNLTVARTD...S.TVRKLLD.QLALGGRYV.TLVGDP
Q.Y.V...KSN...AIQSATKTLQEND...W.TRRKLLD.QHALGGRYI.TLVGSG
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Q.Y.V...KSN...AIQSATKTLQNNND...W.TRRKLLD.QHALGGRYI.TLVGSG
D.Y.I...DSP...AGRSALASFSQADPD.RT...W.TVREAAE.YIGLGGRG.PVLGDA
E.H.I...ETE...AIOGVANLTKHAPE...RDW.TVRDIAE.FCGLGSTSP.VIVGSG
K.Y.L...DTN...AARSALSIFTADPD...R.SW.TPNAID.YLIGGGIP.VLVGSA
LFR...ATD...HGHYKAASLTKD ATK...PL.TIGBALQ.KAGTLTRES.VIIGNP
S.Y.I...END...SIRSTLENFTKINLDRPS...W.TVQDVID.AVGIGGMAA.IVIGSG
G.N.V...PSN...AIQSVSNFNAFAAAEH.GQ.EF.TVGDIA.R.HSAIGGLGP.LIVGSG
R.H.V...QSD...AIQSAVDAFSAADPD.RQ...W.TAAEIAE.YCALGGDP.LIVGSG
E.Y.I...KTN...AIQSMALDAYVNADPN.RV...W.TIEEIAN.WNSVGGNGP.VLVGSA
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Q.Y.V...KNN...AIQSATKTLQNNND...W.TRQKLLD.QHALGGRYI.TLIGSP
G.N.V...ESN...AIQSFVASFOSIGAD.GK.EW.TVRDIAE.WGKIGGMGP.RIVGSG
VAG...KVE...AIESVTKAFSG...W.TRRKLLD.QHALGGRYV.PIVGSG
G.N.V...ESN...AIRSAVAAFQESGDD.GR.EW.LVRDIAE.WASIGGLGP.RFVGS
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D.Y.G...KTN...AIESATR...TAEQGG...W.THRKLLD.LFELGGRYP.AIVGDA
P.Y.A...PGN...AIQSAVAAAARRGL...W.TKRDLA.LFELGSRYA.VITGDA
...HEL...RTE...VAHGATVRLAESAPDKTM...W.TFADLARLMVTT...RAVGTGP
LFH...TDT...HGHYKAASLTKD AAR...PM.TIGAALE.KAGTLTRDA.VIIGNP
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R.H.V...ESN...AIRSAVEGWSKATPDVAK...W.TKATVGR.HITVGGGGA.TPVGTA
K.Y.I...DTD...AARSALAIFFRYDPD...R.DW.TPRDVAG.YVIGGGIP.VISGSA
GSN.V...KSN...AIQSSVETFTQKASGD.EGSPW.TIRQIAE.WVGIGGFPG.IVVGSG
S.N.I...KSN...AIEGLKVEEYANSKTDNGK.QW.TSRELIAK.VAGIGALGQ.KIVGSG
VER...KTN...AIESVVKGFSG...W.TRRKLLD.QHALGGRYP.QAVGSP
G.N.V...ESN...AIQSTVAAFQADNPD.GR.AW.TVRDMVE.RNGTAGLGA.TVVGSA
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R.H.V...ESN...AIRSAVEGWSKATPGVDK...W.TKSTVGO.HITVGGGGA.TPVGTP
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R.H.V...ESN...AIRSAVEGWSKATPEVAK...W.TKATVGR.HITVGGGGA.TPVGTA
G.N.V...KSN...AIQSAVSNFQQANAE.GG.EW.TVGDIA.R.HSAIGGLGP.TIVGSG
R.H.V...ESN...AIRSAVEGWSKSTPEVAK...W.TKSTVGO.HITVGGGGA.TPVGTP
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G.D.V...ESN...AIRSAVSAFAQASG.GK.PW.SVGLDIAE.WGKIGGMGP.VFVGS
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LMT...DSP...AIRSIIVRRWSATVPGTENLQW.TKRRIVE.YLSVGGGGA.KIVGSG
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E.H.I...ETQ...AIOGTMNAFTQADPD...REW.TVREVAE.FSGLGSTSP.IVVGTP
P.Y.Q...KSN...AITSITKEFKEQQ...I.TKNDLKA.QHVLGGRYP.LIVGSG
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R.H.V...ESN...AIRSAVEGWSKATPEVEK...W.TKATVGO.HITVGGGGA.TPVGTP

Aspergillus luchuensis
Aspergillus bombycis_XP_022386026.1:15-472
Agrobacterium vitis_WP_070163524.1:1-454
Pseudomonas psychrotolerans_220_WP_074584491.1:5-
Micrococcus yunnanensis_WP_135040276.1:19-468
Acinetobacter calcoaceticus_WP_004642549.1:7-452
Penicillium brasilianum_CEO59775.1:15-472
Aspergillus cristatus_ODM22551.1:12-469
Pseudomonas taiwanensis_WP_027907363.1:1-446
Acidovorax avenae
Staphylococcus pseudintermedius_WP_101431388.1:4-
Rhodococcus triatoniae_WP_081607437.1:2-451
Alcaligenes_sp_RS4_230_WP_128393375.1:4-450
Gibbsiella quercinecans_WP_121552947.1:7-454
Acinetobacter ursingii_WP_044435211.1:5-452
Erwinia typographi_WP_034887712.1:4-447
Trichoderma harzianum_KKP01913.1:14-470
Fusarium graminearum_235_CEF79766.1:12-466
Gordonia alkanivorans_WP_006357654.1:10-461
Acinetobacter radioresistens_WP_111281495.1:5-455
Mesorhizobium plurifarium_WP_073985566.1:5-458
Oceanobacillus halophilus_WP_121203049.1:1-454
Acinetobacter tandoii_240_WP_100241535.1:7-457
Burkholderia plantarii_WP_042624083.1:1-457
Alcaligenes faecalis_WP_094195208.1:6-457
Bradyrhizobium arachidis_WP_092214516.1:1-453
Cupriavidus plantarum_WP_109583068.1:1-458
Variovorax_sp_770b2_245_WP_093443018.1:5-461
RZJ22128.1:4-447
LadB_Geobacillus thermoleovorans_BAM76371.1
LadAbeta_Geobacillus thermoleovorans_BAM76372.1
Af1_AFLA_024140_XP_002373925.1
Af3_AFLA_58870_XP_002378631.1
Af4_AFLA_049780_XP_002383105.1
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Af2_QMW32876.1:9-463
Yarrowia lipolytica_CLIB122_YALI0C07546p_XP_50156
Rhizobium_sp_CF122_WP007794079.1
Acinetobacter_sp_NIPH_2100_LLM
Nostoc_sp_PCC_7107_WP_015115963.1
Aspergillus flavus_NRRL3357_uncharacterized
Paenibacillus curdianolyticus_WP006037998.1
LadAbeta_Geobacillus thermoleovorans_FMN-dependen
SsuD_1M41
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Bacillus
Pseudomonas
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Pseudomonas aeruginosa_PAO1_NP_251290.1
Alkanesulfonate
Alkanesulfonate
Aspergillus niger_ATCC13496_RDH19503.1
Penicillium digitatum_Pd1_XP014534980.1
Acinetobacter rudis_WP_016657872.1
R.H.V...ESN...AIRSAVEGWSKATPEVEK..W.TKATVGO.HITVGG LGA.TPVGT
R.H.V...ESN...AIRSAVEGWSKATPGVDK..W.TKSTVGO.HITVGG LGA.TPVGT
Q.K.V...ETN...AIHSFVEHIAGGD...KS..W.TIEELAK.FGGTGG LGP.VFVGAP
RPQ...RTE...AIESALKRLVAKDAG...W.TRRKLLQ.QHALGG RYT.ALVGDP
G.D.V...KSN...AIQSAVETFKASGT.DE.EW.TVRKLAQ.WVGTGG FGP.VIVGGG
P.Y.Q...KSN...SIVSITEKFKQQ...I.TKNDLKA.QHVLGG RYP.LIVGSG
R.H.V...ESN...AIRSAVEGWSKATPEVAK..W.TKTTVGO.HITVGG LGA.TPVGTA
R.T.V...ESN...AIRSAVEGWSKATPEVP..KW.TKKTVGE.HITVGG LGA.TAVGTP
E.Y.V...END...AGRAALAAFTAADPN.RR..W.TVREAAE.FIGLGG RGP.VLIGSP
G.Q.H...RSN...GIENSLRRLANGRAH...Y.TLGD LLE.ELALGG RYA.TVVGSP
E.N.I...ETE...AMQGNLNLYTKDPHR...KW.TLREAVK.NHGLNG TV.KF IGTP
E.Y.V...ETD...GIRSFLEFRTIADPD.RT..W.TPROVAE..QMARS LGAITVVGSP
S.Y.G...QSN...AMQSAASQTA..SQQG...W.TRRDLLN.QHKLGS RYP.TLVGDA
A.G.G...PTR...AIESVSNTYS...G.W.TKRRLLQ.QHALGG RYP.LIVGDP
P.Y.Q...KSN...SIASVNEKFKTQQ...I.TKNDLKN.QHVLGG RYP.LIVGSG
V.S.G...DTR...AIESVSKAF...SS..W.TRRRLLQ.QHAMGS RYP.LIVGNP
R.H.V...ESN...AIRSAVEAWSKASPSVAK..W.TKRAVAK.HIVVGG LGA.TVIGTP
R.Q.V...ESN...AVKSTVEGYARFSPVNS..KW.TKHTVAE.HVSLGG NGP.LIVGTP
G.N.V...ESN...AIQSAVAAFQQAES.GE.EW.RVRDIAA.WGGTGG MGP.VLIGSG
P.Y.Q...QTN...SIASVNNKFKEQK...I.TVAD LKD.QHVLGG RYP.LIVGSG
E.Y.V...ETQ...GIRSVLDIYTRLDPN...RRW.TPRAIGE.FLGAAG GA.EIVGGP
EDM...ETE...AVQGNLDMYTKDPNK...KW.TLREAVQ.NHGLNG TV.KF IGTP
P.Y.Q...KTN...SIASVNVQKFKEQS...I.TRNDLLA.QHVLGG RYP.LIVGSG
A.Y.V...DTD...AGQSALASFSKLDPD.KV..W.TVRDATE.FAATGG RGA.VVVGDA
S.F.G...PSN...AIQSAASAAA..QKQG...W.TTRRRLLQ.QFTLGS RYK.TIVGDP
P.T.VK...KDN...AVTSMIDSFSE..RP..W.TIREIIE.HNGIGGR GP.VIVGSP
A.Y.V...DTN...AGQSALASFSKLDPS...RTW.TVRDAVE.FVGTGG RGG.VAVGDP
S.G.G...SAD...AIQSSVSSL.AGQGG.KP.SP.TVRQLLA.QMPLGG RHT.PVVGSP
P.K.LE...DADINFSSRQMMIDIAARKHNF...SIRQLYEYIASARGHW..TLIGTA
.....GAK...RLHELMKTSAERRFQIGPNLWAGLTQVLS...GNSI.ALVGTP
PDD.IPETNGNQ...SRRQLIIDLARRERL...TIROLYQ..RIAGARGHFTIIGTP
R.H.V...ESN...AIRSAVEGWSKATPGVDK..W.TKSTVGO.HITVGG LGA.TPVGTS
R.F.V...EQP...AIRSMVNHWASTVPGTGKKW.DKKTISE.YLIMGG NGA.KVIGSA
DSL...EAH...KVTSMLDATTTTSEDVPO..W.TPRVVAQ.KAAIGG LGP.VGIGSP
SFT...AVG...GIQSLISSWSKTVPNSNGLKW.TKRRVLQ.ELALGG AHP.RAIGSP
R.F.S...ESP...RVQSIIVRRWSATVPGTENLPW.TKRRIVE.YLSVGG LGA.KVVGSP
R.E.T...DNP...NLVKAIVSMWASQTDKDE.VW.DVDKVAN.EYKLAGRG G.VAVGDA
P.D.VP...ETN.ASKSRQKLLLDLARRENL...TIRELYLRVAGARGHW..QIVGTP
P.....ELG...EGQGMVSRPALIADIAKNNF.SIROLYE.WVA.GARGHWQ LIGTP
P.E.LP..SDTN.NNKSRLKLVKDLATRGTL...TLRQLYLALATARGHR..TIIGTP
PTD.IPETNASK...TGRAGVLKLAEDEKL...TVRQLAQRHGGYSGL..AFVGTP
P.E.LPELSQIN.GGKSRLFQLLKDLADREQL...TIROLYQ..RIAGARGHREIVGTP
PDD.IPETNGNQ...SRRQLIIDLARRERL...TIROLYQ..RIAGARGHFTIIGTP
GQQ.....RMA...ALHNGKRDNLEISPN...LW.AGVGLVR...GGAGT.ALVGDG
P.....ELS...QINGGKSRFQLLKDLADREQL.TIROLYQ..RIAGARGHREIVGTP
.....RMA...ALHGGRRDRLEIQPN...LW.AGVGLVR...GGAGT.ALVGDP
.....GAK...RLHELMKTSAERRFQIGPNLWAGLTQVLS...GNSI.ALVGTP
.....GSQ...RLLAEEQGEVLDSR...LWTGVARLTG...ARWNSTALVGTP
.....QNV...GSQRLLDIAARGEVO.DRALW.YPTVVA...NARGAST.ALVGSSY
.....GSQRLLDIAARGEIQDRALWYPTV...ATNARGAST.ALVGSP
P.....PON...VGSRRLLDIAATRGEVQDRALWYPTVATN...AQGAST.ALVGSP
K.....RMA...ALHGGKRDHLEVSPN...LW.AGVGLVR...GGAGT.ALVGDP

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 Geobacillus_sp._LEMMY01_WP_079935807.1:1-440
 Geobacillus_stearothermophilus_ABV66256.1:1-440
 Geobacillus_sp._B4113_201601_WP_061912600.1:1-440
 Geobacillus_sp._B4113_201601_5WP_061912600.1:1-44
 Bacillus_thuringiensis_6WP_029441578.1:1-435
 Lysinibacillus_sphaericus_WP_103976887.1:2-422
 Lysinibacillus_sphaericus_WP_069508309.1:2-422
 Rummeliibacillus_sp._SL167_10_WP_146551437.1:2-42
 Paenibacillus_sp._DXL2_WP_110843609.1:1-459
 Paenibacillus_naphthalenovorans_WP_074730028.1:1-
 Cohnella_sp._HS21_WP_130606586.1:1-453
 Streptoporangium_subroseum_15_WP_089205784.1:1-4
 Arthrobacter_sp._H22_WP_120147654.1:1-455
 Nonomuraea_solani_WP_103963668.1:1-453
 Arthrobacter_ruber_WP_105030338.1:1-455
 Bacillus_aciditolerans_20_WP_121446947.1:1-456
 WP_137163763.1:1-458
 Aeribacillus_pallidus_WP_130157503.1:4-457
 Bacillus_megaterium_24WP_098602848.1:4-460
 Streptomyces_sp._150FB_WP_078877664.1:5-455
 Arthrobacter_sp._DWC3_WP_104051071.1:1-454
 Cohnella_thermotolerans_WP_027093898.1:1-456
 Paenibacillus_bovis_28WP_144921429.1:1-452
 Bacillus_aciditolerans_WP_121447760.1:1-452
 Leifsonia_sp._ALI-44-B_30_WP_077053645.1:1-455
 Parageobacillus_thermoglucoasidarius_WP_064552269.
 Geobacillus_sp._Y4_1MC1_WP_013399886.1:1-459
 Bacillus_methanolicus_35WP_004434428.1:1-462
 Terribacillus_halophilus_WP_077309754.1:1-448
 Paraburkholderia_kururiensis_WP_01777532.1:1-453
 Gracilibacillus_massiliensis_WP_058308419.1:1-456
 Streptomyces_yanglinensis_WP_103888551.1:5-452
 Trinickia_sp._7GSK02_40_WP_136896361.1:1-452
 Cryobacterium_sp._NEAU-85_WP_123045138.1:1-448
 Alicyclobacillus_acidoterrestis_WP_021298468.1:4
 Oceanobacillus_senegalensis_WP_085994229.1:1-452
 Bacillus_sinesaloumensis_WP_077620983.1:1-449
 Halopenitus_persicus_WP_021074147.1:6-457
 Microbacteriaceae_bacterium
 Lysinibacillus_sinduriensis_WP_036201100.1:1-458
 Bacillus_endophyticus_WP_113749053.1:5-457
 Pseudomonas_monteilii_WP_119371117.1:1-455
 Bacillus_endophyticus_50_WP_061801645.1:5-457
 Planococcus_maitriensis_WP_112233285.1:1-457
 Oceanobacillus_profundus_WP_118889880.1:1-447
 Burkholderia_pseudomallei_WP_141404579.1:1-452
 Terribacillus_saccharophilus_WP_095261886.1:1-455
 Sediminibacillus_albus_WP_093212831.1:4-453
 Scidionella_marina_WP_020496929.1:1-448
 Mycetocola_saprophilus_WP_043321267.1:1-452
 Lysinibacillus_macroides_WP_053993569.1:4-460
 Pseudomonas_putida_WP_086978777.1:1-458
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 Rhizobium_oryzae_WP_085420425.1:1-450
 Pseudomonas_extremorientalis_WP_071491956.1:1-455
 Pseudomonas_fluorescens_WP_016977452.1:1-454
 Neorhizobium_sp._T25_27_WP_105419890.1:1-450
 Pseudomonas_extremaustralis_WP_078833627.1:1-457
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 Mycobacterium_sp._ACS1612_WP_067812332.1:1-454
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 Pseudomonas_frederiksbergensis_70_WP_123409596.1:
 Pseudomonas_citronellolis_SF6C1163.1:1-452
 Herbaspirillum_chlorophenolicum_WP_050468599.1:4-
 Arthrobacter_crystallophilus_WP_074700854.1:1-45
 Terribacillus_goriensis_WP_038558686.1:1-438
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 Rummeliibacillus_sp._SL167_WP_146553619.1:4-459
 Burkholderia_sp._PAMC
 Pseudomonas_koreensis_WP_064585463.1:4-449
 Pseudomonas_fluorescens_80_WP_064116961.1:6-451
 Pseudomonas_rhodesiae_WP_040265276.1:4-450
 Collimonas_sp._OK412_WP_092393355.1:4-454
 Pseudomonas_marginalis_WP_058415544.1:1-456
 Pseudomonas_antarctica_WP_064452947.1:1-458
 Pseudomonas_protegens_WP_041115159.1:9-454
 Pseudomonas_synxantha_WP_057024776.1:4-449
 Rhizobium_leguminosarum_WP_128409501.1:2-451
 Pseudomonas_chlororaphis_WP_038359779.1:6-451
 Pseudomonas_syringae_90_WP_024642725.1:1-456
 Collimonas_fungivorans_WP_061540754.1:4-453
 Rhizobium_leguminosarum_WP_116409027.1:2-451
 Microvirga_ossetica_WP_099511173.1:1-454
 Pseudomonas_caspiana_WP_087268376.1:4-451
 Pseudomonas_lundensis_WP_048375063.1:4-451
 Caballeronia_mineralivorans_WP_047894899.1:4-456
 Pseudomonas_paralactis_WP_057702387.1:4-450
 Pseudomonas_tetrolens_WP_048381143.1:4-453
 Pseudomonas_psychrophila_WP_123750761.1:4-450
 Collimonas_arenae_100_WP_061532973.1:4-454
 Pseudomonas_viridiflava_WP_122210720.1:4-451
 Kocuria_varians_WP_068470402.1:1-454
 Pseudomonas_wadsworthiensis_WP_115084816.1:4-455
 Pseudomonas_syringae_WP_011266344.1:4-452
 Pseudomonas_sp._286_105WP_122415793.1:4-453
 Geobacillus_vulcani_WP_031406843.1:1-461
 Geobacillus_igigianus_WP_033018365.1:1-461
 Pseudomonas_floridensis_WP_083182568.1:4-453
 Pseudomonas_asturiensis_WP_073167523.1:4-451
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Pseudomonas syringae WP_024682626.1:4-452
LadAalpha_Geobacillus thermoleovorans BAM76377.1
Tsukamurella pseudosporumae WP_068746786.1:1-457
Kocuria sp. *Marcellae* WP_085529073.1:5-456
Microvirga aerophila WP_114188789.1:1-456
Burkholderia ubonensis WP_07160483.1:5-455
Achromobacter marplatensis WP_006226823.1:4-450
Acinetobacter baumannii WP_070165746.1:1-443
Labedella phragmitis WP_128496094.1:1-453
Nocardia cyriacigeorgica 120 WP_130918184.1:1-453
Nocardia cyriacigeorgica WP_130918184.1:1-453
Mycobacterium sp. 1164985.4 WP_067298521.1:1-453
Rhodococcus sp. 1R11 WP_135042739.1:1-449
Erwinia amylovora WP_004157587.1:5-459
Ralstonia mannitolilytica WP_102079134.1:4-451
Leifsonia flava WP_135120808.1:15-465
Cryobacterium roopkundense WP_084141147.1:1-453
Cupriavidus pauculus WP_101681197.1:1-455
Rhizobium sp. BK333_130 WP_133704837.1:2-454
Caballeronia mineralivorans WP_047846789.1:1-454
Nocardia altamirensis WP_069163049.1:1-454
Cupriavidus sp. P-10 WP_116322758.1:1-452
Serratia sp. S1B WP_116726564.1:1-452
Pseudomonas putida WP_043864435.1:1-452
Pseudomonas aeruginosa WP_023084248.1:4-453
Pseudomonas mucidolens WP_084381795.1:9-455
Pseudomonas poae WP_060549803.1:4-450
Pseudomonas chlororaphis WP_123573412.1:9-454
Janthinobacterium lividum 140 WP_072454679.1:1-44
Haladaptatus cibarius WP_049970513.1:4-446
Arthrobacter luteolus WP_066298473.1:1-443
Geobacillus sp. ZGt-1 WP_047758532.1:1-436
Lysinibacillus composti WP_124766485.1:4-458
Microcella putealis WP_130486201.1:20-474
Pseudomonas nitroreducens WP_037016976.1:1-453
Acinetobacter wuhouensis WP_130168784.1:1-453
Bradyrhizobium sp. YR681 WP_008144663.1:1-454
Schumannella sp. 10F1D-1 WP_141164655.1:10-460
Pseudomonas coronafaciens 150 WP_122355187.1:4-45
Pseudomonas syringae WP_003430238.1:4-452
unclassified Rhodococcus WP_094682261.1:1-449
Hafnia alvei WP_046449330.1:6-449
AS9A_3890_Hoyosella subflava WP_013808677.1:1-453
Acinetobacter baumannii WP_000995600.1:1-443
Agrobacterium sp. B133/95 WP_065696417.1:2-454
Microbacterium sp. KROC2 WP_024289149.1:1-453
Variovorax paradoxus WP_012747040.1:6-452
Methylobacterium radiotolerans WP_076730229.1:5-4
Streptomyces sp. BK215 WP_132915265.1:7-452
Geobacillus thermodenitrificans 160 WP_008880416
Pseudomonas aeruginosa WP_132556951.1:356-785
Penicillium solitum OQE02104.1:14-471
Penicillium vulpinum OQE05502.1:12-469
Clavibacter michiganensis WP_045526194.1:1-454
Glutamicibacter creatinolyticus WP_054821484.1:6-
Campylobacter sp. P0078 WP_086237522.1:4-454
Pseudomonas furukawii WP_003454569.1:1-447
Leucobacter triazinivorans WP_130111548.1:1-442
Aspergillus brasiliensis CBS_101740 OJ368286.1:12
Aspergillus udagawae 170 GAO894400.1:15-472
Aspergillus flavus RM237351.1:15-472
Aspergillus flavus RAQ504081.1:15-472
Penicillium arizonense XP_022490779.1:12-469
Salinibacterium sp. CGMCC
Aspergillus fumigatus OXN06785.1:14-471
Aspergillus lentulus GAU012010.1:7-464
Aspergillus flavus RAQ66103.1:15-472
Aspergillus fumigatus OXN22894.1:14-471
Aspergillus nidulans
Penicillium nalgiovense OQE79848.1:14-471
Aspergillus wentii
Gordonia iterans WP_105943624.1:1-453
Azotobacter beijerinckii WP_090735436.1:4-454
Staphylococcus sp. NAM3COL9 WP_057513692.1:4-453
Acidovorax sp. 56 WP_099656603.1:11-450
Paenibacillus sp. BIH84019 WP_099518466.1:1-456
Penicillium antarcticum QOD90033.1:5-465
Aspergillus oryzae RIB40_190 XP_001823703.1:9-463
Fusarium oxysporum f. sp. *pisi*
Colletotrichum fructicola Nara_gc5 ELA35345.1:18-
Micrococcus luteus WP_041104460.1:19-468
Aspergillus awamori GCB21923.1:12-469
Aspergillus niger CBS
Aspergillus lactiofeatus CBS_101883 XP_02545389
Aspergillus wentii DTO_134E9 OJ340237.1:14-471
Aspergillus indologenus CBS_114_XP_PY131207.1:11-
Aspergillus fischeri NRRL_181 XP_001264002.1:14-4
Penicillium coprophilum 200 OQE46388.1:11-466
Cupriavidus taiwanensis WP_116379876.1:8-454
Penicillium digitatum
Aspergillus niger GAQ46262.1:12-469
Aspergillus nomius NRRL_13137 XP_015412385.1:15-4
Aspergillus aculeatus ATCC_16872 XP_020055010.1:1
Penicillium brasilianum OQO84969.1:19-474
Penicillium subrubescens OKP15100.1:19-474
Trichoderma arundinaceum RFU80530.1:19-474
Aspergillus thermomutatus 210 XP_0266614594.1:15-4
Serratia liquefaciens WP_044551273.1:4-449
Micrococcus luteus WP_065572847.1:19-468
Halolamina rubra WP_049979911.1:1-449
Acinetobacter pittii WP_075382847.1:7-452
Corynebacterium variabile WP_052302534.1:2-464
Aspergillus luchuensis GAT21254.1:12-471
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QRVADLQENGETDVGDFNL . . . *AYAITPGTFEDIVEFIVPELRRRGVYP* . . . *SEYTPG* . . . *TL*
EKVADLERWIDEGGLDGNL . . . *AYHYVPGSFFDFVEFVPELQRRGRYR* . . . *TEYEGS* . . . *TF*
EEIADLQNWIEETGVDGFNL . . . *SRVVTPELLEDFVDLVVPLQERGVYK* . . . *RDYAEQ* . . . *TL*
SOVADLQAVIEDTGIDGFNL . . . *TRIVMPESEDFVDVWVPELQRRGVYK* . . . *EDYDPA* . . . *TL*
AOVADLESWVAETDIDGFNL . . . *ARTVTPCEYGFIDLVIPELQSRGSYK* . . . *TAYADG* . . . *PL*
ETVSDALQQWVEDTDIDGFNL . . . *AYILAHQTFADVVEFIVPELQKRGVYQ* . . . *TSYAQG* . . . *TL*
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GEVADLQENVEDTDVGDFNL . . . *AYAITPGTFEDVVDVQVVPPELQRRGVYR* . . . *TEYTPG* . . . *TL*
QTVADLQSWVEDTDVGDFNL . . . *AYALTHETFSDVVEHLIPELQKRGVYK* . . . *QAYQPG* . . . *TL*
GQVADTLIENWIDETGIDGFNL . . . *SRVTVPESEYDFVDLVVPLQERGRYK* . . . *TAYEGG* . . . *TL*
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AEVADHLQWVADTDVGDFNL . . . *AYAITPGTFEDVIEFVPELQRRGRYK* . . . *EAYAEQ* . . . *SL*
EHVADLLMAWSEETGVDGFNL . . . *SRVTVPECFEDVVDLVVPLQERGVYK* . . . *TAYQPG* . . . *TY*
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ATVADLQENVD DTDLDGFNL . . . *AYAVTPGSFEDIVRHVVPVLAARGAYA* . . . *TEYVPG* . . . *TL*
KRVADLQQWMEETDIDGFNL . . . *AYTVAPESINDFVELVPELQARGVYK* . . . *TEYTPG* . . . *TL*
ETVADLQENWVEDTDVGDFNL . . . *AYILAHQTFSDVVEFIVPELQKRGVYQ* . . . *TEYAQG* . . . *TL*
QTVADLQENWVEDTDVGDFNL . . . *ASVVAPETFEAVVDLVPELQARGLFK* . . . *RDYAEQ* . . . *TL*
RQVADLLEGWID DTDLDGFNL . . . *TRTVPESEYADFIDLVPPELQARGVYK* . . . *TAYAPG* . . . *TL*
EQVADLESWINEETGLDGFNL . . . *TRMVTPESYVDFIDWVPELQRRGSYK* . . . *TAYEGG* . . . *TL*
EQVADLELWISIEETGLDGFNL . . . *TRIVTPESYVDFIDLVPPELQRRGSYK* . . . *TEYTPG* . . . *TL*
QQVADLESWIAETGLDGFNL . . . *TRIVTPESYADFIDLVPPELQRRGSYK* . . . *TAYDNG* . . . *TL*
RQVADLQENWIDETGIDGFNL . . . *AFVAHDSMADVVEHIVPELQRRGRYH* . . . *THYEEG* . . . *SL*
EQVADLEAWNIDETGVTGFNL . . . *KELVRPGLTWDFVDLVPELEKRLVLR* . . . *EEYEGE* . . . *TL*
ETVADEVERWVEDEAGLDGNL . . . *AYAVTPGSFEDFVDLVPELQRRGRVW* . . . *DGYTPG* . . . *TL*
IQVADAEERARRSGVDGFNL . . . *THLITPKDLDDFIEYVVPILQRRGLYK* . . . *TAYTPG* . . . *TM*
EQTADTMEQVNEAGVDGFNL . . . *AYAITPGTFKDFGLVFPVILRERGLVP* . . . *EEYEGN* . . . *TF*
VEIADLQENVD DTDVGDFNL . . . *AYAVTPGTFADVVEHVPVLTERRGLVP* . . . *DAYDEG* . . . *TL*
QTVADQLQWVVEDTDVGDFNL . . . *SSIVAPETTFVDIDLVPPELQARGLFK* . . . *REYEQG* . . . *TL*
STVADLQHWVVD DTDVGDFNL . . . *AYILAHQSFIDVVEHIVPELQRRGVYQ* . . . *TAYAREG* . . . *TL*
ESVADKIEDWFEKTDVGLNV . . . *AFAISPGDFEADMLVPELTKRRGRYK* . . . *PEYAKG* . . . *TL*
EQTADLQSWVDETDVGDFNL . . . *AYAITPGTFEDIVEFVVPILRERGVYP* . . . *TEYQPG* . . . *TL*
EQVADLESWIEETGLDGFNL . . . *TRIVTPESYEDFIDLVIPELQRRGSYK* . . . *TAYQDG* . . . *SL*
EQVADLESWIEETGLDGFNL . . . *TRIVTPESYEDFIDLVIPELQRRGSYK* . . . *TAYQDG* . . . *SL*
GEVADLQENWVEDTDVGDFNL . . . *AYAITPGTFEDVVRVPELQRRGVYR* . . . *TEYTPG* . . . *TL*
SQVADALQWVIDEADVDGFNL . . . *TRIVNPGSYRDFIDLVPPELQRRGVYK* . . . *TEYAEQ* . . . *AL*
NTVADHIQNVVETDVGDFNL . . . *AYAITPGSFDVITHVVPVLTERRGVYA* . . . *ATYSQG* . . . *SL*
ETVSDALQQWVEDTDVGDFNL . . . *AYILAHQTFADVVEFIVPELQKRGVYQ* . . . *TSYAQG* . . . *TL*
EQTADRLQWMEEGGLDGFNL . . . *ARTVAPESLRDFVDLVVPLQERGLFK* . . . *ADYAEQ* . . . *TL*
QTVADLQETWIDEGGLDGNL . . . *AYHVSPGSFEDFVEHVPPELQRRGRYR* . . . *TDYDGP* . . . *TL*
SQVADLQSWIDETGADGFNL . . . *SRVTVPESEYDFVDLVPELQRRGRYK* . . . *TAYAEQ* . . . *SL*
VTIADLQAWTIEAGEVDGFNL . . . *SRVTVPESEYDFIDLVIPELQRRGLYK* . . . *TAYAEQ* . . . *SL*
EQTADLERWV GKAGVDGFNL . . . *TRVYTPGTFEDFV IGHVVPVLTERRGLMR* . . . *REYTPG* . . . *TL*
IEVADAEERARRSGVDGFNL . . . *VHLITPKDLDDFIEYVVPILQRRGLYK* . . . *TAYPPG* . . . *TM*
RQVADLLEGWID DTDLDGFNL . . . *TRTVPESEYADFIDLVPPELQRRGSYK* . . . *TAYAPG* . . . *TL*
AQVADNMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVPKGY* . . . *TY*
AQVADSMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVPKGY* . . . *TY*
TVADLERWVEVGGTVDGFNL . . . *AYVYTPGTFEAVVDLVPELQRRGRVW* . . . *DEYEPG* . . . *TL*
AEVAEKLEIDWVDYTDVGDFNL . . . *AYAITPGTFEDIVEYVVPPELQARGAYK* . . . *TEYAEQ* . . . *SL*
KEVCELEKLEHSDADGFNL . . . *AYATTPGTFEDVVEFIVPELQRRGSYQ* . . . *LEYQSG* . . . *SL*
SQVADQLLAWIDETGLDGFNL . . . *TRIVTPESYIDFIDLVIPELQRRGRYK* . . . *TAYADG* . . . *AL*
ATVADMERITAEAGVDGFNL . . . *AYAVTPGTFEDVVEHVPPELQRRGVYP* . . . *TEYAPG* . . . *TL*
AQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVPKGY* . . . *TY*
AQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *EDYAVRGTY* . . . *TY*
EQVADMERWVEADVDGFNL . . . *AYAVKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVNKGTY* . . . *TY*
EQVADMERWVEADVDGFNL . . . *AYAVKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVNKGTY* . . . *TY*
AQVADNMERWVEADVDGFNL . . . *AYVVKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVPKGY* . . . *TY*
EEIADLQENVDYTDVGDFNL . . . *AYAVTPGTFEDIVEHVPVLTERRGVYP* . . . *TEYAKG* . . . *TL*
AQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *EDYAVRGTY* . . . *TY*
AQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *EDYAVRGTY* . . . *TY*
EQVADMERWVEADVDGFNL . . . *AYAVKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVNKGTY* . . . *TY*
AQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVNKGTY* . . . *TY*
EQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *EDYAVPRGY* . . . *TY*
AQVADSMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVPKGY* . . . *TY*
TVADLERWVEVSGVDGFNL . . . *AHITNPGTFEDVIEYLLPELRRGRIFR* . . . *SEVEKEGATA* . . . *TA*
DEIADQTFADWVEDTDVGDFNL . . . *AYAVTPGSFEDIVDHVPLSLVRGAYP* . . . *SEYRPG* . . . *TL*
QVADALANWIEQTDLDGFNL . . . *TRTVTPESYADFIDLVPPELQRRGLYK* . . . *TAYAGG* . . . *SL*
EQVADKFEAWALEGGADGFNL . . . *AQSYSPGTFEFVDHVPELQRRGLYR* . . . *TEYEGT* . . . *TL*
DQVADALQSWVD DTDVGDFNL . . . *TRTVVPESEDFIDIVVPELQRRGLHK* . . . *SSYTPG* . . . *SL*
EDVADQIERWTEETDVGDFNL . . . *EPYVLPGSYDFVDLVPELQRRGLFK* . . . *TDYEGG* . . . *TL*
KTVADLERWVSVGDVGDFNL . . . *SYASLPDFTDDVQLLPELQRRGLFW* . . . *SDYAVKGGT* . . . *TA*
TVADLERWVEVAGVDGFNL . . . *AHITNPGTFEDVIEYLLPELRRGRFRSVVKEGA* . . . *TA*
ERIADMERWVEADVDGFNL . . . *AYALMPASFEVDISLLVPLRERGLFW* . . . *EDYAVDGGTY* . . . *TA*
TAADELERWVQADVDGFNL . . . *AHVTNPGTFEDVIEHLLPELRRGRIFR* . . . *SEVEKEGATA* . . . *TA*
ESAARQLVEWAD DTDVGDFNL . . . *AYHITPGTFEDVVEFVVPPELQKLRGYK* . . . *TAYTDG* . . . *TL*
EQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVKGGTY* . . . *TY*
EQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVKGGTY* . . . *TY*
EQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *DDYTVKGGTY* . . . *TY*
AQVADYMERWVEADVDGFNL . . . *AYAVKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVNKGTY* . . . *TY*
AQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *EDYAVPRGY* . . . *TY*
AQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *EDYAVRGTY* . . . *TY*
KTVADLERWVEISDVGDFNL . . . *AHIVNPGTFEDVIEFLLPELRRRGVFR* . . . *EGIEKEGATA* . . . *TA*
SQVADLAGWVEDTDIDGFNL . . . *SRVTVPESEYDFVDLVVPLQERGRYK* . . . *TAYADG* . . . *TL*
KTVADLERWVTVGDVGDFNL . . . *SYASLPDFTDDVIRLLPELQRRGLFW* . . . *SDYAVKGGT* . . . *TF*
EQVADQMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *DDYTVKGGTY* . . . *TY*
QVADMERWVEADVDGFNL . . . *AYAVKPGSFKDIDLLELPELRRGLFW* . . . *DDYAVNKGTY* . . . *TY*
AQVADMERWVEADVDGFNL . . . *AYAIKPGSFKDIDLLELPELRRGLFW* . . . *EDYAVPRGY* . . . *TY*
TVADLERWVEVSGVDGFNL . . . *AHIANPGTFEDVIEFLLPELRRRGFRSEVEHEGA* . . . *TA*
TVADLERWVEVSGVDGFNL . . . *AHIANPGTFEDVIEFLLPELRRRGFRSEVEHEGA* . . . *TA*
TVADLERWVEVSGVDGFNL . . . *AHVTNPGSFDVIEHLLPELRRRGVFR* . . . *NGIEKEGATA* . . . *TA*
AQVADMERWVEADVDGFNL . . . *AYAVKPGSFKDIDLLELPELRRGLFW* . . . *EDYAVRGTY* . . . *TY*
QVADALLQWIDQADIDGFNL . . . *TRIVNPGSYRDFIDLVPPELQRRGRYK* . . . *TAYRAG* . . . *SL*
ESAARQLVEWAD DTDVGDFNL . . . *AYHITPGTFEDIVEFVVPPELQKLRGYK* . . . *TAYTDG* . . . *TL*
EQVADLEVYWHESVGVVDGFNL . . . *KEAVRTGSLDFEVDVVPPELQRRGLFR* . . . *TEYEGD* . . . *TL*
EVVAEYLHILL DTDIDGFNL . . . *TRTVAPESHHDFIRLVPELQRRGRYK* . . . *TATYKTG* . . . *SL*
ESVADQLENWVEATGVDGFNL . . . *AYAVTPGTFTRFDVVDHVVPVLTERRGVYA* . . . *TEYAPG* . . . *TL*
QVADQMERWVEADVDGFNL . . . *IQAYAIKPGSFKDIDLLELPELRRGLFW* . . . *DDYTVKGGTY* . . . *TY*

Aspergillus luchuensis	QVADQMERWVNEDVDGFNL	AYAIKPGSFKDIDLLIPELKRGLFW	DDYTVKKGT
Aspergillus bombycis_XP_022386026.1:15-472	QVADQMERWVEEADVDFGNL	AYAIKPGSFKDIELLELIPELRRGLFW	DEYAVNKGTY
Agrobacterium vitis_WP_070163524.1:1-454	DQVADILQEWWTEADVDGFNI	AYAVTPGSFEDDVITYIVPELKRGRYP	TAYKPG.TL
Pseudomonas psychrotolerans_220_WP_074584491.1:5-	GQVADALLGWIDEITGLDGFNL	ARTVTPEGCYGDFIDLVPELOSGRGYK	TAYAEG.SF
Micrococcus yunnanensis_WP_135040276.1:19-468	E SAARQLVEWADETVDVGFNLI	AYHTIPTGCTEDIVEFVVPVELOKLRGYK	TAYTDG.TL
Acinetobacter calcoaceticus_WP_004642549.1:7-452	EEVAEYLHLLDETIDGDFNL	TRTVAEPESHHDIFIRLVIPLEQQRGRYK	TAYKTG.SL
Penicillium brasilianum_CEO59775.1:15-472	AQVADSLERWVQEADVDFGNL	AYAIKPGSFKDIELLELIPELRRGLFW	DDYAVPKGT
Aspergillus cristatus_ODM22551.1:12-469	QVADQLMEKWVEDADVDFGNI	AYAVKPSTGFDVIDLLIPELRRRGLFH	EDYAVPKGTYY
Pseudomonas taiwanensis_WP_027907363.1:1-446	GEVADQLTWLDQTIDGDFNL	TYAVQPDDLNTNVVLVPELOHGRGVY	TAYTEG.TL
Acidovorax avenae	QDIADMQSWLDEAGVDGFNL	ARTVVPESYTFDIDLVPVELONRGLHK	TAYAEG.TL
Staphylococcus pseudintermedius_WP_101431388.1:4-	TQIANQLLELANEGGADGFNI	AQAYSPTGTFEFVDFIPELOKKGIVR	TEYEGETL
Rhodococcus triatoma_WP_081607437.1:2-451	TTVADRLEELADEAGLDGFNV	YDNLPLRLTFDIDLVPVELORGRVP	TAYEAD.TL
Alcaligenes_sp._RS4_230_WP_128393375.1:4-450	REVADQLERWIDEGIDGDFNL	SRIVVPEPTFEDFVDLVPELOARGRYK	TAYEPG.TL
Gibbsiella quercinecans_WP_121552947.1:7-454	QQVADNLLQWVDQAGIDGDFNL	TRTNVPQSYTFDIDLVPVELOARGRYK	TAYAAG.SF
Acinetobacter ursingii_WP_044435211.1:5-452	SHVAEQILIRLLDTIDGDFNL	TRTVAPESHQDFIRFVPELOHGRGYK	TEYQAG.SL
Erwinia typographi_WP_034887712.1:4-447	SQVADALINWIDEGIDGDFNL	TRI LNPPSYRDFIDLVPVELOQRGRYK	TAYQPG.SL
Trichoderma harzianum_KKP01913.1:14-470	EKVADMERWVREADVDFGNI	AYALMPQTFQDVIDLLPVLEKRGFW	DGYAVDGGTY
Fusarium graminearum_235_CEF79766.1:12-466	TQVADSLERWVEEADVDFGNF	GYVLPQSFQDISDLLIPELRSGLFW	DDYAVPVGTY
Gordonia alkanivorans_WP_006357654.1:10-461	DEVAEQLQDWVAETVDVGfNV	AYAVTPGSFEDIVTHVIPALERGVYD	RGYVPG.TL
Acinetobacter radiorensistens_WP_111281495.1:5-455	ATVAEQLIHLIDETGIDGDFNL	TRTVAPESHQDFIRWVPELOQRGRYK	TAYSEG.TL
Mesorhizobium plurifarum_WP_073985566.1:5-458	VKAADQLAAWFDEAGIDGfNI	TDPMPLKSFQDFNNRHVPELRRGRVR	ERYEGA.TY
Oceanobacillus halophilus_WP_121203049.1:1-454	EQVIADKLKLTWAIEGADGfNI	AQSYSLETREFVDHVPELOKKGIVR	TEYKGG.TL
Acinetobacter tandoii_240_WP_100241535.1:7-457	AAVAEQLIQWIDETGIDGfNL	TRTVAPESHQDFIRYVIPPELOQRGRYK	TSYSAG.SL
Burkholderia plantarii_WP_042624083.1:1-457	AQVADQLQAIWIDTGIDGfNL	AWVESPRTFEDVVRVLPPELORGAYK	TRYETG.TL
Alcaligenes faecalis_WP_094195208.1:6-457	EQVQDALTLTWIDEGIDGfNL	TRIVVPETWEDFANLVPELONRGRYK	TAYEGG.TL
Bradyrhizobium arachidis_WP_092214516.1:1-453	TEVADQLQAWVAETIDGfNL	SYAVTPGGYQDFDAELVPELORGVYK	TGYAKG.TL
Cupriavidus plantarum_WP_109583068.1:1-458	RQVADTLEAAMDETVDGfNL	ASVEMPTGTFEDIAHVPELORGVYK	TEYADG.TL
Variovorax_sp._770b2_245_WP_093443018.1:5-461	AQVADTEA WVDEAGVDGfNL	VRTVSPEGLEHFVDLVPELORRGLHK	TAYANG.VW
RZJ22128.1:4-447	EQVQVDQLQNWFENEAADGfNI	LPPSTPAGLNDFVDFVPELORRGLFR	TEYEKG.TL
LadB_Geobacillus thermoleovorans_BAM76371.1	EQVADRLIEFIS.LGDFVYLL	RGFPHPLETEIQVGTSVIPLVRELRQT	
LadAbeta_Geobacillus thermoleovorans_BAM76372.1	EQVADQLIEWYFLQGAADGfNL	MFPYYPNGLSQSFHEVHIPLOKRGFLR	RNYEGT.TY
Af1 AFLA 024140_XP_002373925.1	EQVADMERWVREADVDFGNL	AYAVKPGSFKDIELLELIPELRRGLFW	DDYAVNHGTY
Af3 AFLA 58870_XP_002378631.1	KTVADELERWVEVGVDGfNL	SYASIPETFDDIKYLIPELOKKGIFIH	TDYAVKGGTF
Af4 AFLA 049780_XP_002383105.1	QRVADMERWIREADVLDGfNL	GYVTPGTFEEDVDLIPELRRRGLYP	ASAEADGLSA
Af5 AFLA 126060_XP_002381799.1	STVADI LQRWVDADVDFGNF	SYAVSPGTFEDIMLEYLPELRRRGVW	DDYEVKGGTA
Af2_QMW32876.1:9-463	TTVADLERWVEVAGVDGfNL	AHITNPSTGTFEDIEYLIPELRRRGFRSVG	EDYKPGA.TA
Yarrowia lipolytica_CLIB122_YALI0C07546p_XP_50156	ETVADI IEDWIEIGLDGfNL	SHATFTPGTYDIVGYLIPELOKRGFPH	KEYPNEHFT
Rhizobium.sp._CF122_WP007794079.1	SRIADEMEHWFTTGAADGfNV	MPPHSTPGGLRDFTFVPELRRRGLFR	TEYQGR.TL
Acinetobacter.sp._NIPH_2100_ILM	EQIVDQLQLEWFENEAADGfNI	LPPSTPAGLNDFVELVPELORRGLFR	TEYEGETL
Nostoc.sp._PCC_7107_WP_015115963.1	ESIADQLLEWFNNGAADGfNI	MPPILPTALD DFVN LVPELOKRGFLR	TEYEGS.TL
Aspergillus flavus_NRR13357_uncharacterized	ESIAEEMS VWLEEGADGfTV	VFPFLPGQLD DVVQ RVPELORRGLFR	QDYEGT.TL
Paenibacillus curdalanalyticus_WP006037998.1	TQIADQLQWLFENGAADGfNI	MPPYLP GGLD DFVD LVPELORRGLFR	TEYEGA.TL
LadAbeta_Geobacillus thermoleovorans_FMN-dependen	EQVADQLIEWYFLQGAADGfNL	MFPYYPNGLSQSFHEVHIPLOKRGFLR	RNYEGT.TY
SsuD_1M41	PTVAARINEYAA.LGIDSFVL	SGYPHLEEAYRVGELFFLLD	VAIPEI.PQ
Paenibacillus curdalanalyticus_WP006037998.1	TQIADQLQWLFENGAADGfNI	MPPYLP GGLD DFVD LVPELORRGLFR	TEYEGA.TL
Bacillus	.QAADRL		
Pseudomonas	RQVAERIGEYA.ELGIDSFIF	SGYPHLEEAYRF AELVFPLLPE	
LadB_Geobacillus thermoleovorans_FMN-dependent	EQVADRAL	.	
Pseudomonas aeruginosa_PAO1_NP_251290.1	EQAADALGEYYR.LGVSTFLI	RGFDPLGD VARYQG GLPAIH DH	IA
Alkanesulfonate			
Alkanesulfonate	QTI VDSILDYVD.LGAE LISI	RGYDNLND AI DYGRY ILPPVRO	AL
Aspergillus niger_ATCC13496_RDH19503.1	QTISDSILDYVD.LGAD LISI	RGYDNLND AI DYGRY VILPKV .RGELK	.A
Penicillium digitatum_Pdl_XP014534980.1	QTI VDSILDYVD.LGAD LISI	RGYDNLND AI DYGRY ILPKVRE	
Acinetobacter rudis_WP_016657872.1	ETTVABRIKEYAD.LGI ESFIF	SGYPHLEEAYRF AELVFPLLPEPYASY	.AOF GOT.N

	420	430	440
LADA_Geobacillus_thermodenitrificans_WP_011888513	REKLF	GKGNRYRLPDDHIAAR	YRNISNV
Geobacillus_sp._LEMMY01_WP_079935807.1:1-440	REKLF	GKGNRYRLPDDHIAAR	YRNISNV
Geobacillus_stearothermophilus_ABV66256.1:1-440	REKLF	GKGNRYRLPDDHIAAR	YRNISNV
Geobacillus_sp._B4113_201601_WP_061912600.1:1-440	REKLF	GKGNRYRLPDDHIAAR	YRNISNV
Geobacillus_sp._B4113_201601_5WP_061912600.1:1-44	REKLF	GKGNRYRLPDDHIAAR	YRNISNV
Bacillus_thuringiensis_6WP_029441578.1:1-435	REKLF	GKGNKLPNNHFINE	YRN
Lysinibacillus_sphaericus_WP_103976887.1:2-422	REKLF		NLKHK
Lysinibacillus_sphaericus_WP_069508309.1:2-422	REKLF		NLKHK
Rummeliibacillus_sp._SL167_10_WP_146551437.1:2-42	REKLF		YKHE
Paenibacillus_sp._DXL2_WP_110843609.1:1-459	RERLF	GGGVVRLPDDH	PGAR
Paenibacillus_naphthalenovorans_WP_074730028.1:1-4	RERLF	GKGTVOLEPGH	PGSV
Cohnella_sp._HS21_WP_130606586.1:1-453	REKLF	GPGESRLPDR	HPGAA
Streptosporangium_subroseum_15_WP_089205784.1:1-4	RERLF	GPGIHRLPET	HPGAA
Arthrobacter_sp._Hz2_WP_120147654.1:1-455	RERLF	GPGNTRLFDQ	HPGAR
Nonomuraea_solani_WP_103963668.1:1-453	RERLF	GPVHRLPAT	HPGAA
Arthrobacter_ruber_WP_105030338.1:1-455	RERLF	GPSARLPDR	HPGAR
Bacillus_aciditolerans_20_WP_121446947.1:1-456	REKLF	NQGSSLLPND	HPGSK
WP_137163763.1:1-458	RHKL	GRG.DRLPEGH	AGROVRIQ
Aeribacillus_pallidus_WP_130157503.1:4-457	REKLF	GKQSRLLPED	HIGAK
Bacillus_megaterium_24WP_098602848.1:4-460	REKLF	GKQPRLSKE	HIGST
Streptomyces_sp._150FB_WP_078877664.1:5-455	RERLF	GPSARLLDD	HPGKR
Arthrobacter_sp._DWC3_WP_104051071.1:1-454	RERLF	GAGNTRLFDQ	HPGAR
Cohnella_thermotolerans_WP_027093898.1:1-456	REKLF	GPGRLLPDPH	HPGAK
Paenibacillus_bovis_28WP_144921429.1:1-452	RGNLF	GAG.PQLPDH	HPGKS
Bacillus_aciditolerans_WP_121447760.1:1-452	RESLF	GRG.SQLPGH	HPGKQ
Leifsonia_sp._ALI-44-B_30_WP_077053645.1:1-455	RERLF	GAGNARLFPE	HPGAR
Parageobacillus_thermoglucoasidiasus_WP_064552269.	REKLF	NHGSSLLPED	HPGSA
Geobacillus_sp._Y4_1MC1_WP_013399886.1:1-459	REKLF	NYGSSLLPED	HPGSA
Bacillus_methanolicus_35WP_004434428.1:1-462	RQKLF	GHGSSNLLPED	HPGSK
Terribacillus_halophilus_WP_077309754.1:1-448	RENLF		SGNSKLPDR
Paraburkholderia_kururiensis_WP_01777532.1:1-453	REKLF	GGG.ARLAEP	HPGAR
Gracilibacillus_massiliensis_WP_058308419.1:1-456	REKLF	PDGNSRLPED	HPGSK
Streptomyces_yanglinensis_WP_103888551.1:5-452	RERLF	GAGRTRLPED	HPGTRY
Trinickia_sp._7GSK02_40_WP_136896361.1:1-452	REKLF	GRG.ARLAEP	HPGAA
Cryobacterium_sp._NEAU-85_WP_123045138.1:1-448	RERLF	DKG.PLAPDA	HPAGQ
Alicyclobacillus_acidoterrestris_WP_021298468.1:4	RDNLS	GRG.SFLDLD	HPARK
Oceanobacillus_senegalensis_WP_085994229.1:1-452	RANLT		QDQLPDH
Bacillus_sinesaloumensis_WP_077620983.1:1-449	REKLF	PQKSLIPED	HPGSK
Halopenitus_persicus_WP_021074147.1:6-457	RETMF	ETGDGFLHED	HTGSA
Microbacteriaceae_bacterium	RERLF	EGRG.PLLPER	HPAGAL
Lysinibacillus_sinduriensis_WP_036201100.1:1-458	REKLF	GTGRNLLPND	HIGAK
Bacillus_endophyticus_WP_113749053.1:5-457	REKLF	GKGRARLSEE	HVGSQ
Pseudomonas_monteilii_WP_119371117.1:1-455	REKLF	GDG.PRLPAT	HPAAG
Bacillus_endophyticus_50_WP_061801645.1:5-457	REKLF	GKGRARLSEE	HVGSQ
Planococcus_maitriensis_WP_112233285.1:1-457	REKLY	GKQQAOLKDN	HPGRT
Oceanobacillus_profundus_WP_118889880.1:1-447	RDNLF	GKG.DKLLDTH	
Burkholderia_pseudomallei_WP_141404579.1:1-452	REKLY	RAG.PRLAAP	HPAAR
Terribacillus_saccharophilus_WP_095261886.1:1-455	REKLF	DYESSRLPSG	HPASN
Sediminibacillus_albus_WP_093212831.1:4-453	RDNLF	GNG.ARLPEN	HPGRQ
Sciscionella_marina_WP_020496929.1:1-448	RERLF	GEG.PRLPAS	HPGAA
Mycetocola_saprophilus_WP_043321267.1:1-452	REKLF	PQGG.SQLPDTH	HPAAA
Lysinibacillus_macroides_WP_053993569.1:4-460	REKLF	GKGAAYLAQE	HIGAN
Pseudomonas_putida_WP_086978777.1:1-458	REKLF	GDG.PRLPAS	HPAAG
Sediminibacillus_halophilus_60_WP_074598704.1:4-4	RDNLF	GAG.PRLSEN	HPGKK
Rhizobium_oryzae_WP_085420425.1:1-450	REKLF	GSPRLPDR	HVAAG
Pseudomonas_extremorientalis_WP_071491956.1:1-455	REKLF	GDG.ARLASN	HPGAG
Pseudomonas_fluorescens_WP_016977452.1:1-454	REKLF	GEG.ARLPEV	HPGSG
Neorhizobium_sp._T25_27_WP_105419890.1:1-450	REKLF	GAPRLPDR	HIAAR
Pseudomonas_extremaustralis_WP_078833627.1:1-457	REKLF	GEG.PRLPSN	HPGAG
Fictibacillus_aquaticus_WP_094253544.1:1-455	REKLF	SHGRSVLPND	HPGRK
Pseudomonas_extremaustralis_KAA8559760.1:1-456	REKLF	GDG.ARLSAN	HPGAG
Mycobacterium_sp._ACS1612_WP_067812332.1:1-454	RDKLF	GRG.PRLPET	HRAAA
Bacillus_megaterium_WP_116075167.1:1-455	REKLF	KKSHFLPDE	HYGAV
Pseudomonas_frederiksborgensis_70_WP_123409596.1:	REKLF	GEG.PRLPDH	HPGAG
Pseudomonas_citronellolis_SF6C1163.1:1-452	RERLF	GAGHARLPAD	HGAGY
Herbaspirillum_chlorophenolicum_WP_050468599.1:4-	REKLF	GGASVLPQN	HAAA
Arthrobacter_crystallopietes_WP_074700854.1:1-45	RERLF	PGNG.PLLPAT	HPGAA
Terribacillus_goriensis_WP_038558686.1:1-438	REKLY		G
Bacillus_megaterium_WP_025749753.1:1-455	REKLF	KKSHFLPDE	HYGAV
Neorhizobium_sp._T7_12_WP_105403044.1:1-451	REKLF	GTQRLPSRH	HIAAR
Rummeliibacillus_sp._SL167_WP_146553619.1:4-459	REKLF	GES.SYLRPD	HIGHK
Burkholderia_sp._PAMC	REKLF	GGA.AHLPEQ	HAGAS
Pseudomonas_koreensis_WP_064585463.1:4-449	REKLF	HGEAQLPEQ	HTGAS
Pseudomonas_fluorescens_80_WP_064116961.1:6-451	REKLF	HGEAQLPEQ	HTGSS
Pseudomonas_rhodesiae_WP_040265276.1:4-450	REKVF	HASARLPDQ	HTGSS
Collimonas_sp._OK412_WP_092393355.1:4-454	REKLF	EAGOPTLPGR	HPAGY
Pseudomonas_marginalis_WP_058415544.1:1-456	REKLF	GDG.ARLAPN	HPGAS
Pseudomonas_antarctica_WP_064452947.1:1-458	REKLF	GEG.ARLASN	HPGAG
Pseudomonas_protegens_WP_041115159.1:9-454	REKLF	RQG.RKLPEQ	HTGAA
Pseudomonas_synxantha_WP_057024776.1:4-449	REKVF	HGAARLPDQ	HTGAT
Rhizobium_leguminosarum_WP_128409501.1:2-451	RQKLF	GGGNRLLPAA	HPAAQ
Pseudomonas_chlororaphis_WP_038359779.1:6-451	REKLF	HGEAQLPEQ	HTGAA
Pseudomonas_syringae_90_WP_024642725.1:1-456	REKLF	GDG.PRLAEG	HPGAG
Collimonas_fungivorans_WP_061540754.1:4-453	REKLF	EAGOPTLPAR	HPAAS
Rhizobium_leguminosarum_WP_116409027.1:2-451	RQKLF	GGGNRLLPAA	HPAAR
Microvirga_ossetica_WP_099511173.1:1-454	REKLF	GEGRNHLPAE	HWGAR
Pseudomonas_caspiana_WP_087268376.1:4-451	REKLF	PEGARLPDQ	HVGAS
Pseudomonas_lundensis_WP_048375063.1:4-451	RQKLF	TEGDAHLPRQ	HTGAS
Caballeronia_mineralivorans_WP_047894899.1:4-456	REKLF	GRG.AKLPEQ	HTGAS
Pseudomonas_paralactis_WP_057702387.1:4-450	REKVF	HGTARLPDQ	HTGSS
Pseudomonas_taetrolens_WP_048381143.1:4-453	RQKLF	TDGSAHLPRD	HTGAA
Pseudomonas_psychrophila_WP_123750761.1:4-450	RQKLF	VEGDAHLPER	HTGAS
Collimonas_arenae_100_WP_061532973.1:4-454	REKLF	DTGQATLPAR	HPAAG
Pseudomonas_viridiflava_WP_122210720.1:4-451	REKLF	PQGTDRLPDQ	HAGAG
Kocuria_varians_WP_068470402.1:1-454	RESLY	GAGQDRVKETH	HPAAA
Pseudomonas_wadsworthensis_WP_115084816.1:4-455	REKLF	ASDQPHLPAD	HPGAS
Pseudomonas_syringae_WP_011266344.1:4-452	RKLF	PQGTDRLPDQ	HAGAA
Pseudomonas_sp._286_105WP_122415793.1:4-453	RRKLF	PQGTDRLPDQ	HAGAG
Geobacillus_vulcani_WP_031406843.1:1-461	REKLF	GNG.PRLSHD	HPAAA
Geobacillus_igicianus_WP_033018365.1:1-461	REKLF	GNG.PRLAHD	HPAAA
Pseudomonas_floridensis_WP_083182568.1:4-453	RKLF	PQGTDRLPDQ	HAGAG
Pseudomonas_asturiensis_WP_073167523.1:4-451	RKLF	PQGTDRLPDQ	HAGAG
Geobacillus_vulcani_110_WP_031406843.1:1-461	REKLF	GNG.PRLSHD	HPAAA

Pseudomonas syringae WP_024682626.1:4-452
LadAalpha-Geobacillus thermoleovorans BAM76377.1
Tsukamurella pseudospumae WP_068746786.1:1-457
Kocuria sp. Marseille-P3598 WP_085529073.1:5-456
Microvirga aerophila WP_114188789.1:1-456
Burkholderia ubonensis WP_071760483.1:5-455
Achromobacter marplatensis WP_006226823.1:4-450
Acinetobacter baumannii WP_070165746.1:1-443
Labeledella phragmitis WP_128496094.1:1-453
Nocardia cyriacigeorgica 120 WP_130918184.1:1-453
Nocardia cyriacigeorgica WP_130918184.1:1-453
Mycobacterium sp. 1164985.4 WP_067298521.1:1-453
Rhodococcus sp. 1R11 WP_135042739.1:1-449
Erwinia amylovora WP_004157587.1:5-459
Ralstonia mannitolilytica WP_102079134.1:4-451
Leifsonia flava WP_135120808.1:15-465
Cryobacterium roopkundense WP_084141147.1:1-453
Cupriavidus pauculus WP_101681197.1:1-455
Rhizobium sp. BK333_130 WP_133704837.1:2-454
Caballeronia mineralivorans WP_047846789.1:1-454
Nocardia altamirensis WP_069163049.1:1-454
Cupriavidus sp. P-10 WP_116322758.1:1-452
Serratia sp. S1B WP_116726564.1:1-452
Pseudomonas putida WP_043864435.1:1-452
Pseudomonas aeruginosa WP_023084248.1:4-453
Pseudomonas mucidolens WP_084381795.1:9-455
Pseudomonas poae WP_060549803.1:4-450
Pseudomonas chlororaphis WP_123573412.1:9-454
Janthinobacterium lividum 140 WP_072454679.1:1-44
Haladaptatus cibarius WP_049970513.1:4-446
Arthrobacter luteolus WP_066298473.1:1-443
Geobacillus sp. ZGt-1 WP_047758532.1:1-436
Lysinibacillus composti WP_124766485.1:4-458
Microcella putealis WP_130486201.1:20-474
Pseudomonas nitroreducens WP_037016976.1:1-453
Acinetobacter wuhouensis WP_130168784.1:1-453
Bradyrhizobium sp. YR681 WP_008144663.1:1-454
Schumannella sp. 10F1D-1 WP_141164655.1:10-460
Pseudomonas coronafaciens 150 WP_122355187.1:4-45
Pseudomonas syringae WP_003430238.1:4-452
unclassified Rhodococcus WP_094682261.1:1-449
Hafnia alvei WP_046449330.1:6-449
AS9A_3890_Hoyosella subflava WP_013808677.1:1-453
Acinetobacter baumannii WP_000995600.1:1-443
Agrobacterium sp. B133/95 WP_065696417.1:2-454
Microbacterium sp. KROC2 WP_024289149.1:1-453
Variovorax paradoxus WP_012747040.1:6-452
Methylobacterium radiotolerans WP_076730229.1:5-4
Streptomyces sp. BK215 WP_132915265.1:7-452
Geobacillus thermodenitrificans 160 WP_008880416
Pseudomonas aeruginosa WP_132556951.1:356-785
Penicillium solitum OQE02104.1:14-471
Penicillium vulpinum OQE05502.1:12-469
Clavibacter michiganensis WP_045526194.1:1-454
Glutamicibacter creatinolyticus WP_054821484.1:6-
Campylobacter sp. P0078 WP_086237522.1:4-454
Pseudomonas furukawaii WP_003454569.1:1-447
Leucobacter triazinivorans WP_130111548.1:1-442
Aspergillus brasiliensis CBS_101740 OJG68286.1:12
Aspergillus udagawae 170 GAO89440.1:15-472
Aspergillus flavus RMZ37351.1:15-472
Aspergillus flavus RAQ54081.1:15-472
Penicillium arizonense XP_022490779.1:12-469
Salinibacterium sp. CGMCC
Aspergillus fumigatus OXN06785.1:14-471
Aspergillus lentulus GAQ10210.1:7-464
Aspergillus flavus RAQ66103.1:15-472
Aspergillus fumigatus OXN22894.1:14-471
Aspergillus nidulans
Penicillium nalgiovense OQE79848.1:14-471
Aspergillus wentii
Gordonia iterans WP_105943624.1:1-453
Azotobacter beijerinckii WP_090735436.1:4-454
Staphylococcus sp. NAM3COL9 WP_057513692.1:4-453
Acidovorax sp. 56 WP_099656603.1:11-450
Paenibacillus sp. BIHB4019 WP_099518466.1:1-456
Penicillium antarcticum QOD90033.1:5-465
Aspergillus oryzae RIB40_190 XP_001823703.1:9-463
Fusarium oxysporum f. sp. pisi
Colletotrichum fructicola Nara_gc5 ELA35345.1:18-
Micrococcus luteus WP_041104460.1:19-468
Aspergillus awamori GCB21923.1:12-469
Aspergillus niger CBS
Aspergillus lacticooffeatus CBS_101883 XP_02545389
Aspergillus wentii DTO_134E9 OJG40237.1:14-471
Aspergillus indologenus CBS_114_80 PYI31207.1:11-
Aspergillus fischeri NRRL_181 XP_001264002.1:14-4
Penicillium coprophilum 200_OQE46388.1:11-466
Cupriavidus taiwanensis WP_116379876.1:8-454
Penicillium digitatum
Aspergillus niger GAQ46262.1:12-469
Aspergillus nomius NRRL_13137 XP_015412385.1:15-4
Aspergillus aculeatus ATCC_16872 XP_020055010.1:1
Penicillium brasilianum OQO84969.1:19-474
Penicillium subrubescens OKP15100.1:19-474
Trichoderma arundinaceum RFU80530.1:19-474
Aspergillus thermomutatus 210 XP_026614594.1:15-4
Serratia liquefaciens WP_044551273.1:4-449
Micrococcus luteus WP_065572847.1:19-468
Halolamina rubra WP_049979911.1:1-449
Acinetobacter pittii WP_075382847.1:7-452
Corynebacterium variabile WP_052302534.1:2-464
Aspergillus luchuensis GAT21254.1:12-471

RKKLF... PQGTDRLLPQRHAGAAHRRHI...
REKLF... GNG.PRLSHDHPAAA FRPIGSRT...
RHKLF... GQG.DRLPADHPARRHRYVGA...
RENLY... GAGRTSISGDHPAATYRG...
REKLF... GKQQAALPDTHPGASYRTLGQS...
REKLF... GAG.ARLPAWHAGARHR...
REKLF... GAGRAELPVEHVG...RR...
REKLF... GAG.PYLPENHRGAKYRNL...
RHKLS... GRG.DRLPEEHPGSRHR...
RNALF... GAG.DRLPEEHRGARYR...
RNALF... GAG.DRLPEEHRGARYR...
RHKLL... GNG.DRLPEDHRGSRYR...
RHKLF... GKG.DRLPGEHRA...
REKLF... NQG.ARLAAPHPAAGYRRTAD...
RHKLF... AEG.DRLPARHAAAGFRHL...
RQKLH... GRG.DRLPAEHRGAGYR...
RNKLF... GRG.DRLPTEHRGAGYR...
RDKLF... GTARLPATHAAAQYRGTGAN...
REKLF... GRGDRLPESHPAAA FRH...
REKLF... GRG.RLLPAEHPGAR YRDIES...
RNALF... GAG.DRLPDEHRGARYR...
REKLF... KGSRLVSPHPGAEYQ...
REKLF... GQG.PYLPEDHRGAGYR...
RNKLF... GAG.DRLGAPHPAAALR...
REKLF... GCGRARLQAEHAGAAFRQ...
REKIF... TRDAHLPQQHTGATYRH...
REKVF... HASARLPKQHTGSTYRH...
REKLF... QREAQLPEQHSGSTYR...
RHKVF... GQG.PRLPADH...
RENLY... GRRYLADDH...
REYVG... GAGKPRVADTHFAAR YRG...
REKLF... GNG.PRLSHDHPAAA FRPIGSRT...
RDNLF... GKG.DRLPNHHPGKQTKVLQLN...
REKLF... GRG.DRLPAEHRGAGYRLVPA...
RNKLF... GQG.DRLGASHPAAKLR...
REKLF... GAG.AHLPEYHRGAQFRH...
REKLF... GDGRARLDAPHFAAGYR...
RQKLH... GRG.DRLPEEHPKASFR...
RHKLF... PEGTDRLLPERHAGAAHRRHI...
RKKLF... PQGTDHLPQRHAGAAHRRHI...
RHKLF... GNG.DRLPEEHRA...
RHKLF... GQG.AQLTALHPAAKRR...
REKLF... GNG.ARLPDDHRGARYR...
REKLF... GAG.PYLPENHRGAKYRNL...
RQKLH... GRGDRLPSSHPAAA FRH...
RENLY... GAGQTKVLDTHFAAKYR...
RKLFL... DAG.DRLPARHAAAOFRH...
RAKLF... GQG.DRLPARHPAEAYRG...
REKLL... PGGGPRLPERHPAAHRR...
REKLF... GGGRARLQAEHAGAAFRQ...
RENLY... GQPGQSGPHADHPASKYR...
RENLY... AQPGQSGPHADHPAYKYR...
RGRLN... GTGSPVPEWHFAHAYRG...
RNKLF... GAG.DRVKDTHRAAQYK...
RNKLF... DKG.DRLSSDHIGSKYR...
RHKLF... GQG.PRLAAPHPAAHWRO...
RDKLF... GAG.DRLPDDHRGAGYR...
RENLY... GKEGQSGPPADHPAAKYR...
RENLY... GKPQGTGPPEDHPAAKYR...
RENLY... GKPQSGPPEDHPAAKYR...
RENLY... GRPGQSGPPADHPAAKYR...
RENLY... SEPQSGPPADHPASKYR...
RNKLF... GRG.DRLPAEHPKASFR...
RENLY... GKPQGTGPPADHPASRYR...
RENLY... GKPQGTGPLEDHPASRYR...
RENLY... GKPQSGPPEDHPAAKYR...
RENLY... GKPQGTGPPADHPASRYR...
RENLY... GKPQSGPPADHPAAKYR...
RENLY... TQPGQSGPPADHPASKYR...
REAYI... GSRRLPEDHPGSKYK...
RHKLF... GNG.DRLPGAHRGAGFR...
REKLF... AAGPRLPASHPGAAWRDLS...
RENMF... GKDKKTIKENHPAKNKR...
RHKLF... GKG.NRLPDQH...
RERLF... GKEARLPEHHPGASFRTPAALV...
RENMY... GKKGQARLPDAHHPGAKY...
REVFII... GSRRLPEDHPGSKY...
RENLY... GRKGVARPPADHPAAKY...
REVFII... GSRRLPEDHPGSKYK...
RHKLF... GRG.DHLPQNHPGASFR...
RENLY... SKEGQSGPPADHPAAKYR...
RENLY... SKEGQSGPPADHPAAKYR...
RENLY... SKEGQSGPPADHPAAKYR...
RENLY... GKAGQSGPPSDHPASRYR...
RENLY... GKKQAGPPEDHPAAKYR...
RENLY... GKPQGRPPVDHPASKYR...
REVFII... GSRRLPADHPGSKYK...
RHKLF... AEG.DRLPARHAAADAFRH...
RENMY... GKQGSRLLPDTHPGAKY...
RENLY... GKEGQSGPPADHPAAKYR...
RENLY... GQPGQSGPPDHPAAKYR...
RENLY... GRRQGTGPPEDHPAAKYR...
RELF... I GSKRLPEDHPGSKYK...
REVFII... GSKRLPEDHPGSKYK...
REVFII... GSKRLPEDHPGSLYK...
RENLY... GKPQGTGPPEDHPAAKYR...
RQKLH... QQDRLPSPHPAARWR...
RHKLF... GRG.DHLPQNHPGASFR...
RERLF... GEGQRRLLPDHHPA...
RNKIF... NRG.DQLPKQHPVAQFR...
REKLFADRTGAG.PLVPHNHSAAYRFPAST...
RENLY... GKEGQSGPPADHPAAKYR...

Aspergillus luchuensis	RENLY	...GKEG	QSGPPAD	HPAAK	YR	...
Aspergillus bombycis_XP_022386026.1:15-472	RENLY	...GTP	QSGPPTD	HPAAK	YR	...
Agrobacterium vitis_WP_070163524.1:1-454	REKLF	...GQG	PYLPQN	HPADQ	YRDIEA	...
Pseudomonas psychrotolerans_220_WP_074584491.1:5-468	RHKL	...GRG	DHLDTR	HFGSR	FRQ	...
Micrococcus yunnanensis_WP_135040276.1:19-468	RHKL	...GRG	DHLPQN	HGAS	F	...
Acinetobacter calcoaceticus_WP_004642549.1:7-452	RNKIF	...NRG	DQLPKQ	HPVQA	FR	...
Penicillium brasilianum_CEO59775.1:15-472	RENLY	...STP	QAGPRAD	HPASK	YR	...
Aspergillus cristatus_ODM22551.1:12-469	RENVY	...RKG	QSGPPAD	HPASK	YR	...
Pseudomonas taiwanensis_WP_027907363.1:1-446	RHKL	...GQG	AHLPGA	H		...
Acidovorax avenae	RHKL	...GRG	DRLPAT	HHGA		...
Staphylococcus pseudintermedius_WP_101431388.1:4-451	RENMF	...GKG	HTKVKT	HPA		...
Rhodococcus triatomae_WP_081607437.1:2-451	RGNVT	...GRG	ARLDG	HVGAS	FR	...
Alcaligenes_sp_RS4_230_WP_128393375.1:4-450	RHKL	...ERG	ATLSS	HFASQ	WRH	...
Gibbsiella quercinecans_WP_121552947.1:7-454	RKKLF	...QQD	CLPAS	HPAAR	WRTPAA	...
Acinetobacter ursingii_WP_044435211.1:5-452	RHKL	...QQG	DRLAAS	HPADA	FR	...
Erwinia typographi_WP_034887712.1:4-447	RKIF	...QQD	RLPER	HPAAR	WR	...
Trichoderma harzianum_KKP01913.1:14-470	RENLY	...AKG	LARPPAD	HPASK	Y	...
Fusarium graminearum_235_CEF79766.1:12-466	RENFY	...GIP	GQKYP	LEEH	VASSH	...
Gordonia alkanivorans_WP_006357654.1:10-461	RHKL	...GRG	DHLPEN	HGST	YR	...
Acinetobacter radioresistens_WP_111281495.1:5-455	RHKL	...QQG	NLSAQ	HPVQ	FRCLT	...
Mesorhizobium plurifarium_WP_073985566.1:5-458	RERFY	...GEG	HLRLPAD	HPASA	YRRLA	...
Oceanobacillus halophilus_WP_121203049.1:1-454	RENLF	...ETG	NPHLP	DNHPARK	RKSL	...
Acinetobacter tandooi_240_WP_100241535.1:7-457	RHKL	...QQG	DHLAAQ	HPVQ	FRCLST	...
Burkholderia plantarii_WP_042624083.1:1-457	REKLL	...GGG	ARLSAP	HVGAR	FRAAGAD	...
Alcaligenes faecalis_WP_094195208.1:6-457	RQQL	...GQG	DRLSAT	HPAAQ	WRHPASG	...
Bradyrhizobium arachidis_WP_092214516.1:1-453	REKIF	...GFG	QARLP	SSHPAAR	FRH	...
Cupriavidus plantarum_WP_109583068.1:1-458	REKLT	GTGAQ	PASAT	LQAPH	HVGAAFR	...
Variovorax_sp._770b2_245_WP_093443018.1:5-461	REKIF	...GTG	QARLP	STHAGA	WRDLSQQT	...
RZJ22128.1:4-447	RENLG	...LKR	PEP	RHVLAR		...
LadB_Geobacillus thermoleovorans_BAM76371.1	...EVWI					...
LadBeta_Geobacillus thermoleovorans_BAM76372.1	RDHLG	...L	PVPK	SIRV		...
Af1_AFLA_024140_XP_002373925.1	RENLY	...GKP	QSGPPDD	HPAAK	YRWNAGVDAAEHKIPDN	...
Af3_AFLA_58870_XP_002378631.1	RENMY	...GEK	QARLP	QSHPGAK	YVWHAGEETPKYALEKNT	...
Af4_AFLA_049780_XP_002383105.1	REKVY	...GKG	QRELRAD	HPGSQ	YKYEYVQEEAAVAETEVS	...
Af5_AFLA_126060_XP_002381799.1	RENYF	...QDGL	G.SRL	REGHPGRE	YTWN	...
Af2_QMW32876.1:9-463	REVFI	...GSR	RLPED	HPGSK	Y	...
Yarrowia lipolytica_CLIB122_YALI0C07546p_XP_50156	RELLY	...DTP	GNSYL	LRSDH		...
Rhizobium_sp._CF122_WP007794079.1	RENLY	...				...
Acinetobacter_sp._NIPH_2100_LLM	RENLY	...				...
Nostoc_sp._PCC_7107_WP_015115963.1	RENLG	...				...
Aspergillus flavus_NRRL3357_uncharacterized	REHL	...				...
Paenibacillus curdlanolyticus_WP006037998.1	RENLG	...				...
LadBeta_Geobacillus thermoleovorans_FMN-dependen	RDHL	...				...
SsuD_1M41	PQPLN	...				...
Paenibacillus curdlanolyticus_WP006037998.1	RENLG	...				...
Bacillus	...					...
Pseudomonas	...					...
LadB_Geobacillus thermoleovorans_FMN-dependent	...					...
Pseudomonas aeruginosa_PAO1_NP_251290.1	RLPLL	...				...
Alkanesulfonate	...					...
Alkanesulfonate	...					...
Aspergillus niger_ATCC13496_RDH19503.1	QER	...				...
Penicillium digitatum_Pd1_XP014534980.1	RENSN	...				...
Acinetobacter rudis_WP_016657872.1	KER	...				...
	TGFFG	...				...