

Mathematical Modeling of Carbon Flux Parameters for Low-Pressure Vacuum Carburizing with Medium-High Alloy Steel

Haojie Wang ¹, Jing Liu ^{2,*}, Yong Tian ², Zhaodong Wang ^{2,*} and Xiaoxue An ²

¹ School of mechanical engineering, Shenyang University of Technology, Shenyang 110870, China; wanghaojie8219@126.com

² State Key Laboratory of Rolling and Automation, Northeastern University, Shenyang 110819, China; tianyong@ral.neu.edu.cn (Y.T.); 15140110204@163.com (X.A.)

* Correspondence: liujingxf@126.com (J.L.); zhaodongwang@263.net (Z.W.); Tel.: +86-24-8105-1555 (J.L.); +86-24-8105-1555 (Z.W.)

Table 1. Phylogenetic affiliations of the 16S rRNA gene sequences of total bacteria obtained from Bella 1 sample (145 sequences, 93 OTUs).

Representative Clone	No. of Clones	Closest match to Uncultured Clones (Accession no.)	Isolation Source	Similarity (%)	Closest Match to Isolates (Accession no.)	Similarity (%)
<i>Acidobacteria</i>						
LR760157	15	Uncultured bacterium (HM187012)	Subsurface sediments	97	<i>Luteitalea pratensis</i> (KT287072)	85
LR760158	6	Uncultured bacterium (HM187012)	Subsurface sediments	95	<i>Luteitalea pratensis</i> (KT287072)	84
LR760159	2	Uncultured bacterium (FJ152722)	Alkaline saline soil	96	<i>Vicinamibacter silvestris</i> (KP761690)	90
LR760160	1	Uncultured bacterium (HM187012)	Subsurface sediments	96	<i>Luteitalea pratensis</i> (KT287072)	84
LR760161	1	Uncultured bacterium (HM187012)	Subsurface sediments	94	<i>Luteitalea pratensis</i> (KT287072)	83
LR760162	1	Uncultured bacterium (HM187012)	Subsurface sediments	93	<i>Luteitalea pratensis</i> (KT287072)	82
LT795631	1	Uncultured <i>Acidobacteria</i> bacterium (JQ401031)	Soil biocrusts	95	<i>Luteitalea pratensis</i> (KT287072)	81
LT795632	1	Uncultured bacterium (HM187012)	Subsurface sediments	92	<i>Luteitalea pratensis</i> (KT287072)	81
LR760163	1	Uncultured bacterium (FJ152722)	Alkaline saline soils	96	<i>Vicinamibacter silvestris</i> (KP761690)	91
LR760164	1	Uncultured <i>Acidobacteria</i> bacterium (HQ598548)	Woodland soil	95	<i>Vicinamibacter silvestris</i> (KP761690)	92
LT795657	1	Uncultured bacterium (EU132183)	Soil from a prairie	92	<i>Vicinamibacter silvestris</i> (KP761690)	85
<i>Actinobacteria</i>						
LR760165	5	Uncultured bacterium (HM186891)	Subsurface sediments	94	<i>Thermoleophilum album</i> (jgi.1035965)	85
LR760166	4	Uncultured bacterium (JN615946)	Tan microbial mat from lava cave wall	96	<i>Aquihabitans daechungensis</i> (JN033775)	88
LR760167	2	Uncultured bacterium (HM186891)	Subsurface sediments	94	<i>Thermoleophilum album</i> (jgi.1035965)	84
LR760168	2	Uncultured bacterium (EU133981)	Soil from a prairie	99	<i>Thermoleophilum album</i> (jgi.1035965)	80

LR760169	2	<i>Arthrobacter</i> sp. (KT314107)	Holm-oak forest soil	99	<i>Pseudarthrobacter sulfonivorans</i> (AF235091)	99
LR760170	1	<i>Arthrobacter</i> sp. (JX010953)	Biotite mineral and soil	98	<i>Pseudarthrobacter sulfonivorans</i> (AF235091)	97
LR760171	1	Uncultured bacterium (EU134698)	Soil from a prairie	97	<i>Thermoleophilum album</i> (jgi.1035965)	82
LR760172	1	Uncultured bacterium (HM186231)	Subsurface sediments	96	<i>Thermoleophilum album</i> (jgi.1035965)	80
LR760173	1	Uncultured bacterium (JX222885)	Subsurface aquifer sediment	98	<i>Gaiella occulta</i> (JF423906)	94
LT795609	1	Uncultured bacterium (EU133028)	Soil from a prairie	91	<i>Gaiella occulta</i> (JF423906)	82
LR760174	1	Uncultured bacterium (JN615923)	Tan microbial mat from lava cave wall	99	<i>Frankia elaeagni</i> (KB893676)	94
<i>Chloroflexi</i>						
LR760175	1	Uncultured bacterium (EU132974)	Soil from a prairie	92	<i>Dehalogenimonas lykanthroporepellens</i> (CP002084)	82
LR760176	1	Uncultured bacterium (EU132974)	Soil from a prairie	92	<i>Dehalogenimonas lykanthroporepellens</i> (CP002084)	80
<i>Firmicutes</i>						
LR760177	6	Uncultured bacterium (HM186566)	Subsurface sediments	96	<i>Calditerricola yamamurae</i> (AB308475)	83
LR760178	1	Uncultured bacterium (HM186898)	Subsurface sediments	93	<i>Calditerricola yamamurae</i> (AB308475)	83
LT795612	1	Uncultured bacterium (HM186898)	Subsurface sediments	94	<i>Calditerricola satsumensis</i> (BBCF01000382)	81
LT795614	1	<i>Bacillus mycoides</i> (LN774166)	Air sample	98	<i>Bacillus mycoides</i> (ACMU01000002)	97
LR760179	1	<i>Bacillus mycoides</i> (LN774166)	Air sample	97	<i>Bacillus mycoides</i> (ACMU01000002)	97
LR760180	1	Uncultured bacterium (HM186978)	Subsurface sediments	97	<i>Thermanaeromonas toyohensis</i> (LT838272)	83
<i>Gemmatimonadetes</i>						
LR760181	18	Uncultured bacterium (JQ427306)	Alkaline saline soil	96	<i>Gemmatimonas phototrophica</i> (CP011454)	88
LR760182	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	96	<i>Gemmatimonas phototrophica</i> (CP011454)	88
LT795616	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	94	<i>Gemmatimonas phototrophica</i> (CP011454)	87
LR760183	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	93	<i>Gemmatimonas phototrophica</i> (CP011454)	86
LT795617	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	92	<i>Gemmatimonas aurantiaca</i> (AP009153)	81
LT795618	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	94	<i>Gemmatimonas aurantiaca</i> (AP009153)	83

LT795619	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	93	<i>Gemmatimonas aurantiaca</i> (AP009153)	82
LT795620	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	96	<i>Gemmatimonas phototrophica</i> (CP011454)	88
LT795621	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	93	<i>Gemmatimonas aurantiaca</i> (AP009153)	84
LT795622	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	93	<i>Gemmatimonas aurantiaca</i> (AP009153)	83
LT795623	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	93	<i>Gemmatimonas aurantiaca</i> (AP009153)	84
LR760184	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	94	<i>Roseisolibacter agri</i> (MF363155)	87
LR760185	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	93	<i>Roseisolibacter agri</i> (MF363155)	86
Alphaproteobacteria						
LT795624	1	<i>Mesorhizobium</i> sp. (CP034451)	Root nodule	99	<i>Mesorhizobium amorphae</i> (AF041442)	98
LT795625	1	<i>Mesorhizobium</i> sp. (CP034451)	Root nodule	99	<i>Mesorhizobium amorphae</i> (AF041442)	99
LR760186	1	Uncultured bacterium (GQ262853)	Soil from a simulated low-level waste site	99	<i>Methyloceanibacter superfactus</i> (LPWF01000023)	97
LT795626	1	Uncultured bacterium (GQ262853)	Soil from a simulated low-level waste site	92	<i>Methyloceanibacter superfactus</i> (LPWF01000023)	89
LR760187	1	<i>Mesorhizobium</i> sp. (CP034451)	Root nodule	98	<i>Mesorhizobium silamurunense</i> (EU399698)	99
LR760188	1	Uncultured bacterium (JN672272)	Yellow microbial mat from lava tube wall	99	<i>Methyloceanibacter marginalis</i> (LPWD01000072)	95
Betaproteobacteria						
LT795627	1	Uncultured bacterium (EU789909)	Soil from Lascaux Cave	96	<i>Advenella kashmirensis</i> subsp. <i>kashmirensis</i> (CP003555)	96
Gammaproteobacteria						
LT795628	1	<i>Lysobacter</i> sp. (KT461843)	Zn-contaminated soil rhizosphere	98	<i>Lysobacter terricola</i> (KR869779)	97
LT795644	1	Uncultured gammaproteobacterium (EU810926)	Cave of Doña Trinidad	97	<i>Serratia nematodiphila</i> (JPUX01000001)	84
LR760189	1	<i>Escherichia coli</i> (MH725721)	Soil	99	<i>Shigella sonnei</i> (FR870445)	99
Unclassified bacteria						
*						
LT795629	1	Uncultured bacterium (HM186978)	Subsurface sediments	97	-	-
LT795630	1	Uncultured bacterium (HM187247)	Subsurface sediments	96	-	-
LT795633	1	Uncultured bacterium (HM187012)	Subsurface sediments	94	-	-
LT795634	1	Uncultured bacterium (JQ428029)	Alkaline saline soil	91	-	-
LT795635	1	Uncultured bacterium (JQ428029)	Alkaline saline soil	92	-	-

LT795636	1	Uncultured bacterium (JQ428029)	Alkaline saline soil	92	-	-
LT795637	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	93	-	-
LT795638	1	Uncultured bacterium (JQ428029)	Alkaline saline soil	89	-	-
LT795639	1	Uncultured bacterium (HM186891)	Subsurface sediments	87	-	-
LT795640	1	Uncultured bacterium (KT905758)	Soil	90	-	-
LT795641	1	Uncultured bacterium (JQ428029)	Alkaline saline soil	89	-	-
LT795642	1	Uncultured bacterium (JQ428029)	Alkaline saline soil	89	-	-
LT795643	1	Uncultured bacterium (JQ428029)	Alkaline saline soil	89	-	-
LT795645	1	Uncultured bacterium (FJ152722)	Alkaline saline soil	92	-	-
LT795646	1	Uncultured bacterium (JN833536)	Aquifer	91	-	-
LT795647	1	Uncultured bacterium (JQ427306)	Alkaline saline soil	92	-	-
LT795648	1	Uncultured bacterium (KT905758)	Soil	88	-	-
LT795649	1	Uncultured <i>Acidobacteria</i> bacterium (JQ401031)	Soil biocrusts	97	-	-
LT795650	1	Uncultured <i>Acidobacteria</i> bacterium (JQ401031)	Soil biocrusts	92	-	-
LT795651	1	Uncultured bacterium (HM186898)	Subsurface sediments	95	-	-
LT795652	1	Uncultured <i>Acidobacteria</i> bacterium (JQ401031)	Soil biocrusts	93	-	-
LT795653	1	Uncultured <i>Acidobacteria</i> bacterium (JQ401031)	Soil biocrusts	93	-	-
LT795654	1	Uncultured <i>Acidobacteria</i> bacterium (JQ401031)	Soil biocrusts	94	-	-
LT795655	1	Uncultured <i>Acidobacteria</i> bacterium (JQ401031)	Soil biocrusts	94	-	-
LT795656	1	Uncultured <i>Acidobacteria</i> bacterium (JQ401031)	Soil biocrusts	95	-	-
LT795658	1	Uncultured <i>Acidobacteria</i> bacterium (JQ401031)	Soil biocrusts	93	-	-
LT795659	1	Uncultured bacterium (HM186978)	Subsurface sediments	97	-	-
LT795660	1	Uncultured bacterium (HM186978)	Subsurface sediments	93	-	-
LT795661	1	Uncultured bacterium (EU160012)	Rhizosphere soil	93	-	-
LT795662	1	Uncultured bacterium (HM186891)	Subsurface sediments	90	-	-

LT795663	1	Uncultured bacterium (JN615946)	Tan microbial mat from lava cave wall	94	-	-
LT795664	1	Uncultured bacterium (JN615946)	Tan microbial mat from lava cave wall	92	-	-
LT795665	1	Uncultured <i>Acidobacteria</i> bacterium (JQ401031)	Soil biocrusts	96	-	-
LT795666	1	Uncultured bacterium (EU160012)	Rhizosphere soil	87	-	-
LR760190	1	Uncultured bacterium (JF420704)	Glacier sediment	86	-	-
LR760191	1	Uncultured bacterium (HM187247)	Subsurface sediments	97	-	-
LR760192	1	Uncultured bacterium (JF417826)	Coalbed	94	-	-
LR760193	1	Uncultured bacterium (EU134959)	Soil from a prairie	94	-	-
LR760194	1	Uncultured bacterium (EU134959)	Soil from a prairie	97	-	-
LR760195	1	Uncultured bacterium (EU134959)	Soil from a prairie	93	-	-

* OTUs with less than 80% of similarity with their closest cultured match when compared using EzBioCloud database were not shown in Table 1.

Table 2. Phylogenetic affiliations of the 16S rRNA gene sequences of total bacteria obtained from Royal 2 sample (76 sequences, 70 OTUs).

Representative Clone	No. of Clones	Closest Match to Uncultured Clones (Accession no.)	Isolation Source	Similarity (%)	Closest Match to Isolates (Accession no.)	Similarity (%)
<i>Acidobacteria</i>						
LT795668	1	Uncultured bacterium (HE576378)	Metalworking fluids	99	<i>Luteitalea pratensis</i> (KT287072)	94
LT795672	1	Uncultured bacterium (HE576378)	Metalworking fluids	98	<i>Vicinamibacter silvestris</i> (KP761690)	93
<i>Actinobacteria</i>						
LT795673	2	Uncultured bacterium (EU132542)	Soil from a prairie	98	<i>Gaiella occulta</i> (JF423906)	93
LT795674	2	Uncultured bacterium (JN615946)	Tan microbial mat from lava cave wall	97	<i>Aciditerrimonas ferrireducens</i> (AB517669)	86
LT795675	1	Uncultured bacterium (JN417554)	Soil	94	<i>Gaiella occulta</i> (JF423906)	90
LT795676	1	Uncultured bacterium (JN417557)	Soil	92	<i>Gaiella occulta</i> (JF423906)	89
LT795677	1	Uncultured bacterium (EU132542)	Soil from a prairie	92	<i>Gaiella occulta</i> (JF423906)	87
LT795678	1	Uncultured bacterium (EU132542)	Soil from a prairie	95	<i>Gaiella occulta</i> (JF423906)	87
LT795679	1	Uncultured bacterium (EU132542)	Soil from a prairie	96	<i>Gaiella occulta</i> (JF423906)	92
LT795680	1	Uncultured <i>Aciditerrimonas</i> sp. (JX505211)	Soil	98	<i>Aciditerrimonas ferrireducens</i> (AB517669)	91
LT795681	1	Uncultured bacterium (EU133198)	Soil from a prairie	99	<i>Aciditerrimonas ferrireducens</i> (AB517669)	90

LT795682	1	Uncultured bacterium (DQ906836)	Subsurface soil	94	<i>Aciditerrimonas ferrireducens</i> (AB517669)	86
LT795683	1	Uncultured bacterium (FJ592837)	Cold-fumarole soil	94	<i>Aciditerrimonas ferrireducens</i> (AB517669)	90
LT795684	1	Uncultured bacterium (JN615946)	Tan microbial mat from lava cave wall	94	<i>Aciditerrimonas ferrireducens</i> (AB517669)	84
LT795685	1	Uncultured bacterium (JN615946)	Tan microbial mat from lava cave wall	93	<i>Aciditerrimonas ferrireducens</i> (AB517669)	83
LT795686	1	Uncultured bacterium (JN615946)	Tan microbial mat from lava cave wall	95	<i>Aciditerrimonas ferrireducens</i> (AB517669)	84
LT795687	1	Uncultured bacterium (DQ906836)	Subsurface soil	92	<i>Aciditerrimonas ferrireducens</i> (AB517669)	86
LT795688	1	Uncultured bacterium (JN592667)	Yellow microbial mat from lava tube	96	<i>Aciditerrimonas ferrireducens</i> (AB517669)	81
LT795689	1	Uncultured bacterium (JX222474)	Subsurface aquifer sediment	93	<i>Iamia majanohamensis</i> (AB360448)	84
LT795690	1	Uncultured bacterium (JX222474)	Subsurface aquifer sediment	91	<i>Aciditerrimonas ferrireducens</i> (AB517669)	82
LT795691	1	Uncultured bacterium (DQ906836)	Subsurface soil	92	<i>Aquihabitans daechungensis</i> (JN033775)	84
LT795692	1	Uncultured bacterium (KC331763)	Yellow microbial mat from lava tube walls	97	<i>Pseudonocardia alaniniphila</i> (EU722519)	93
LT795693	1	Uncultured Actinobacteria bacterium (FN297967)	Calcarene walls, underground tombs	97	<i>Pseudonocardia alaniniphila</i> (EU722519)	92
LT795694	1	Uncultured bacterium (HM445185)	White microbial mat from lava tube walls	98	<i>Pseudonocardia kunmingensis</i> (FJ817377)	94
LT795695	1	Uncultured bacterium (HM186652)	Subsurface sediments	93	<i>Streptomyces indoligenes</i> (KU195301)	83
LT795696	1	Uncultured bacterium (KC331732)	White microbial mat from lava tube wall	95	<i>Euzebya tangerina</i> (AB478418)	91
<i>Chloroflexi</i>						
LT795697	1	Uncultured Chloroflexi bacterium (JQ401554)	Soil biocrusts	86	<i>Sphaerobacter thermophilus</i> (CP001824)	80
LT795698	1	Uncultured bacterium (JX221933)	Subsurface aquifer sediment	94	<i>Caldilinea aerophila</i> (AP012337)	80
<i>Firmicutes</i>						
LT795699	2	Uncultured bacterium (AM777947)	Alkaline groundwater	98	<i>Thermosediminibacter litoriperuensis</i> (AY703479)	86

LT795700	1	Uncultured Clostridia bacterium (LT969603)	Hyperalkaline mineral waters	96	<i>Dethiobacter alkaliphilus</i> (ACJM01000032)	89
LT795701	1	<i>Paenibacillus selenitireducens</i> (NR_133807)	Seleniferous soil	95	<i>Paenibacillus selenitireducens</i> (KC815539)	95
LT795703	1	Uncultured bacterium (LT702941)	Black deposit, lava tube	97	<i>Thermodesulfitimonas autotrophica</i> (KX450231)	83
LT795707	1	<i>Ammoniphilus</i> sp. (KY039333)	Sediment from salt lake	99	<i>Ammoniphilus resinae</i> (HM193518)	98
<i>Gemmatimonadetes</i>						
LT795708	4	Uncultured bacterium (HM445227)	Yellow microbial mat from lava tube walls	96	<i>Gemmatimonas phototrophica</i> (CP011454)	84
LT795709	1	Uncultured bacterium (JN672422)	White microbial mat from lava tube wall	95	<i>Gemmatimonas aurantiaca</i> (AP009153)	85
LT795710	1	Uncultured bacterium (HM186101)	Subsurface sediments	91	<i>Roseisolibacter agri</i> (MF363155)	82
LT795711	1	Uncultured bacterium (JN701102)	White microbial mat from lava tube wall	96	<i>Gemmatimonas phototrophica</i> (CP011454)	85
LT795712	1	Uncultured bacterium (JN592653)	Yellow microbial mat from lava tube wall	90	<i>Roseisolibacter agri</i> (MF363155)	82
LT795713	1	Uncultured Gemmatimonadales bacterium (AM935162)	Hydrocarbon-contaminated soil	93	<i>Roseisolibacter agri</i> (MF363155)	84
LT795714	1	Uncultured bacterium (JN672422)	White microbial mat from lava tube wall	97	<i>Gemmatimonas phototrophica</i> (CP011454)	84
LT795715	1	Uncultured bacterium (JN701102)	White microbial mat from lava tube wall	90	<i>Gemmatimonas phototrophica</i> (CP011454)	80
LT795716	1	Uncultured bacterium (JN701102)	White microbial mat from lava tube wall	98	<i>Gemmatimonas phototrophica</i> (CP011454)	85
LT795717	1	Uncultured bacterium (JN701102)	White microbial mat from lava tube wall	96	<i>Gemmatimonas phototrophica</i> (CP011454)	84
LT795718	1	Uncultured bacterium (HM445227)	Yellow microbial mat from lava tube wall	94	<i>Gemmatimonas phototrophica</i> (CP011454)	82
LT795720	1	Uncultured bacterium (HM445227)	Yellow microbial mat from lava tube wall	95	<i>Gemmatimonas phototrophica</i> (CP011454)	83
LT795721	1	Uncultured bacterium (HM445227)	Yellow microbial mat from lava tube wall	96	<i>Gemmatimonas phototrophica</i> (CP011454)	83
<i>Nitrospirae</i>						
LT795723	1	Uncultured bacterium (KC569829)	Copper silicate organic ooze, lava tube wall	94	<i>Nitrospira moscoviensis</i> (CP011801)	88

<i>Planctomycetes</i>						
LT795724	1	Uncultured bacterium (EU135041)	Soil from a prairie	94	<i>Thermostilla marina</i> (KR872395)	83
<i>Alphaproteobacteria</i>						
LT795725	1	Uncultured bacterium (JF265953)	Yellow microbial mat from lava tube wall	99	<i>Methylocapsa palsarum</i> (jgi.1102276)	97
LT795726	1	Uncultured bacterium (JN616053)	Yellow microbial mat from lava tube wall	97	<i>Methylocapsa palsarum</i> (jgi.1102276)	95
LT795727	1	Uncultured bacterium (JN801129)	Tan microbial mat from lava tube wall	93	<i>Methylocapsa palsarum</i> (jgi.1102276)	90
LT795728	1	Uncultured bacterium (JN801129)	Tan microbial mat from lava tube wall	95	<i>Methylocapsa aurea</i> (JQKO01000009)	94
LT795729	1	Uncultured bacterium (JN616053)	Yellow microbial mat from lava tube wall	99	<i>Methylocapsa palsarum</i> (jgi.1102276)	97
LT795730	1	<i>Sinorhizobium</i> sp. (JQ316273)	Soil from a forest	95	<i>Ensifer adhaerens</i> (JNAE01000171)	95
LT795731	1	Uncultured bacterium (LR130622)	White microbial mat from lava tube	98	<i>Hyphomicrobium zavarzinii</i> (KB911255)	97
LT795732	1	Uncultured alpha proteobacterium (GU205295)	Sediment from Roraima Sur Cave	98	<i>Methylocapsa palsarum</i> (jgi.1102276)	97
LT795733	1	Uncultured bacterium (HQ114100)	Biofilms in a vermifilter	95	<i>Sphingosinicella cucumeris</i> (KM598261)	93
LT795734	1	Uncultured Caulobacterales bacterium (HM798816)	Ocean water	99	<i>Phenylobacterium haematophilum</i> (A)244650)	98
LT795735	1	Uncultured Caulobacterales bacterium (HM798816)	Deep ocean water	98	<i>Phenylobacterium haematophilum</i> (A)244650)	96
LT795736	1	Uncultured bacterium (GQ263108)	Soil from a simulated low-level waste site	99	<i>Methyloceanibacter marginalis</i> (LPWD01000072)	98
LT795737	1	Uncultured bacterium (HM445320)	White microbial mat from lava tube wall	98	<i>Filomicrobium fusiforme</i> (Y14313)	94
<i>Betaproteobacteria</i>						
LT795738	1	<i>Ralstonia</i> sp. (KU598712)	Leaf, plant grown in BPA-contaminated soil	95	<i>Ralstonia pickettii</i> (JOVL01000020)	96
<i>Gammaproteobacteria</i>						
LT795739	1	Uncultured bacterium (JN615964)	Tan microbial mat from lava cave wall	99	<i>Thiohalomonas denitrificans</i> (FMWD01000026)	91
LT795740	1	Uncultured bacterium (EU786122)	Cotton rhizosphere soil	99	<i>Povalibacter uvarum</i> (AB548216)	88

LT795741	1	Uncultured <i>Steroidobacter</i> sp. (FN297970)	Calcarene walls, underground tombs	95	<i>Steroidobacter denitrificans</i> (CP011971)	93
<i>Deltaproteobacteria</i>						
LT795742	1	Uncultured bacterium (HM444845)	Yellow microbial mat from lava tube wall	99	<i>Desulfacinum hydrothermale</i> (FWXF01000003)	87
LT795744	1	Uncultured delta proteobacterium (MG641113)	Subtropics forest soil	96	<i>Geothermobacter ehrlichii</i> (AY155599)	82
LT795745	1	Uncultured bacterium (EU134536)	Soil from a prairie	93	<i>Chondromyces pediculatus</i> (AJ233940)	84
Unclassified bacteria						
*						
LT795747	1	Uncultured bacterium (JN592669)	Yellow microbial mat from lava tube wall	92	-	-
LT795748	1	Uncultured bacterium (HM445333)	White microbial mat from lava tube wall	94	-	-

* OTUs with less than 80% of similarity with their closest cultured match when compared using EzBioCloud database were not shown in Table 2.



© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).