

Supplementary Table 1. Differential phenotypic characteristics between *A. alkaniphila* strain L81<sup>T</sup> and strain PC1 and the closest relatives within *Vallitalea* spp. and *Natranaerovirga* spp.

Strains: 1. *Abyssivirga alkaniphila* L81<sup>T</sup> (this study); 2. *Abyssivirga alkaniphila* PC1 (this study); 3. *Vallitalea guaymasensis* Ra1766G1<sup>T</sup> (this study); 4. *Vallitalea pronyensis* FatNI3<sup>T</sup> (Ben Aissa et al. 2014); 5. *Natranaerovirga pectinivora* AP3<sup>T</sup> (Sorokin et al. 2012); 6. *Natranaerovirga hydrolytica* APP2<sup>T</sup> (Sorokin et al. 2012). Positive result: +, negative result: -, Weak positive result: (+), No Data: ND

Characteristic	1	2	3	4	5	6
Gram stain	+	+	-	+	+	+
String test	+	+	+	ND	ND	ND
Optimum Temperature (°C)	37 <sup>st</sup>	37	30-35 <sup>#</sup>	30	43	45
Spores	-	-	-	+	+	+
Motility	+	+	+	+	+ <sup>st</sup>	+ <sup>st</sup>
Flagella	ND <sup>§</sup>	Peritrichous	Polar monotrichous	ND	ND	ND
Utilization of:						
Acetate	-	-	-	-	+	+
Arabinose	+	+	+	-	ND	ND
Fructose	+	-	(+)	+	ND	+
Pectin	+	-	+	ND	+	+ <sup>st</sup>
Pyruvate	-	-	+	ND	ND	ND
Rhamnose	(+)	(+)	-	+	ND	ND

<sup>§</sup>Flagella were not detected by the staining method; however, motile cells have been observed using light microscopy.

<sup>#</sup>Data from (Lakhal et al. 2013).

<sup>st</sup>Data from (Schouw et al. 2015).