Table S1. Sanger sequencing results of the PCR products for aEF-2 genes of selected positive controls.

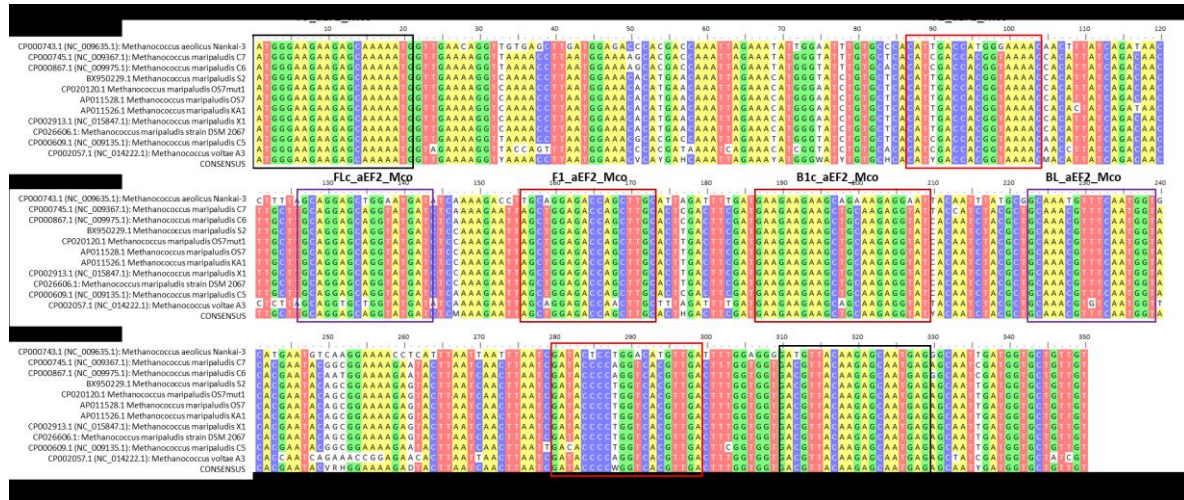| Sample ID#	Sequence 5'-3'	Primer used	BlastN results
PCR4_Mco	atGGnAcaCaTGaACaAATTAGAAACATGGGTATCTGTGCTCACATTGACCACGGTAAAACCACATTATCA GACAACTTGCTTGCAGGAGCAGGTATGATCTCCAAAGAATTAGCTGGAGACCAGCTTGCACTTGACTT CGATGAAGAAGAAGCTGCAAGAGGTATCACAATCTACGCTGCAAACGTTTCAATGGTACACGAATACA GCGGAAAAGAGTACTTAATCAACTTAATCGATACCCCTGGTCACGTTGACTTTGGTGGTGACGTTACAA GAGCAATGAGA	F3_aEF2_Mco 5'ATGGGAAGAAGAGCAAAAATG3'	*Methanococcus maripaludis*
PCR5_Mcu	gnnGTGacCCGCGCCaTGCGcnGCGGTGnGACGGCGCCGTCGTCGTGGTGGACGCGGTCGAGGGGAC CATGCCCCAGACGGAGACGGTGCTCCGGCAGGCCTTgAagGAagGCGTCCGCCCGGTTCTCTTCATCA ACAAGGTCGACCGGCTGGTCAACGAGCTGAAGGTGGACGAGCAGGAGATGCAGATCCGCCTCGCGA AGGTGATCGACAAGGTCAACAAGCTGATCAAGGGCATGAACgAaaAA	F3_aEF2_Mcu 5' TAYCTBATCAACATGATYGAT3'	*Methanoculleus marisnigri*
PCR6_Mth	ggtntaGTGgCCcaCATTGACcaCGGGAAAACaACACTTTcaGACAACCTCCTGGCTGGTGCAGGGaTGATC TCCGCCGAACTGGCCGGGGATCAGCGCTTCCTTGACTTCGACGAACAGGAACAGGCAAGGGGTATCA CCATTGACGCTGCAAACGTCTCAATGGTCCACTCCTACGAGGGAAATGAATACCTCATAAACCTCATC GACACACCAGGTCACGTTGACTTCGGGGGGGGACGTTACAAGGGCCATGAGGGCCGTGGACGGTGCA GTTGTTGTCGTATGCGCCGTTGAGGnnaTAAt	F3_aEF2_Mth 5'ATTAAGGAGCTCATGTACCA3'	*Methanothermobacter thermauthotrophicus*

- see Figure 1

Figure S1. Alignments of aEF-2 genes from selected genera of hydrogenotrophic methanogens used to design the LAMP primers. COD designated samples originate from a study published by (Tao et al. 2019). (a) *Methanoculleus* sp., (b) *Methanothermobacter* sp., (c) *Methanobrevibacter* sp., (d) *Methanococcus* sp.