

Fig. S1. Microbial and metabolic characteristics of biogas production: a) the main phases of anaerobic digestion, and b) metabolic pathways of methane synthesis in *Methanosarcina barkeri* CM1. HSCoA=coenzyme A, HSCoB=coenzyme B, HSCoM=coenzyme M, MF=methanofuran, H<sub>4</sub>MPT=tetrahydromethanopterin, CODH/ACS=carbon monoxide dehydrogenase/acetyl-CoA synthase, ack=acetate kinase, Fwd/Fmd=formyl-methanofuran dehydrogenase/formyl-methanofuran-H<sub>4</sub>MPT formyl transferase, Fd=ferredoxin, Ftr=formyltransferase, Mch=methanopterin cy-clohydrolase, Mtd=F<sub>420</sub>-dependent methenyle-H<sub>4</sub>MPT-dehydrogenase, Mer=methylene-H<sub>4</sub>MPT-reductase, Mtr=methyltransferase, Mcr=methyl-coenzyme M reductase (*3*)

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