

## Supplementary Materials

# Exploring Effective Bio-Cover Materials for Mitigating Methane Emission at a Tropical Landfill

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**Table S1.** Probes used in microbial population identification.

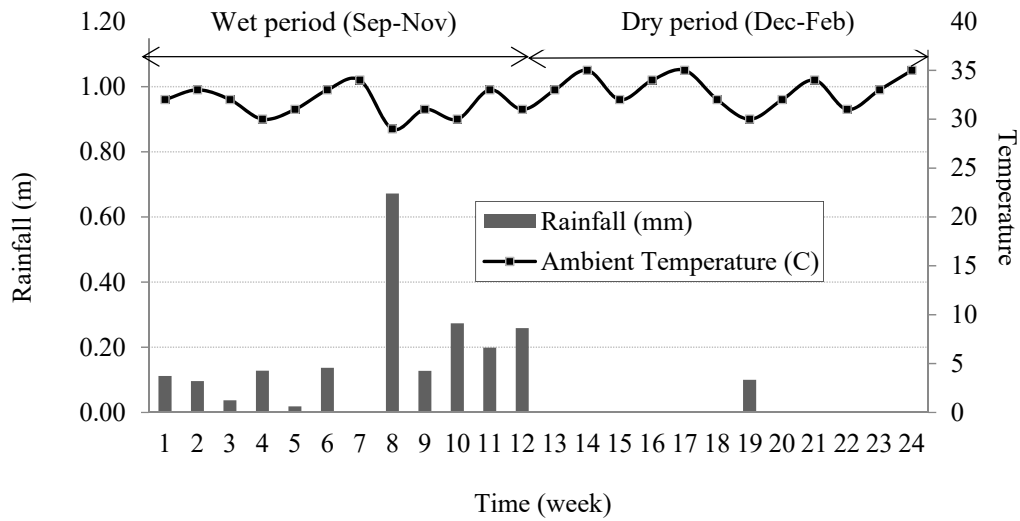
Probes	Sequence 5'-3'	Target bacteria	Tm	%FA
Mg705	CTG GTG TTC CTT CAG ATC	type I methanotrophs	54	20
Mg84	CCA CTC GTC AGC GCC CGA	type I methanotrophs	62	20
MA450	ATC CAG GTA CCG TCA TTA TC	type II methanotrophs	58	20
Mcaps-1032	CAC CTG TGT CCC TGG CTC	Methylocapsa acidiphila	60	0
Mcell-181	GTT CTC GCC ACC CGA AGT	Methylocella palustris	58	0
NIT3	CCT GTG CTC CAT GCT CCG	Nitrobacter spp.	60	40
Nsm156	TAT TAG CAC ATC TTT CGA T	Nitrosomonas spp.	50	5
Amx820	AAA ACC CCT CTA CTT AGT GCC C	Candidatus 'Brocadia anammoxidans' and Candidatus 'Kuenenia stuttgartiensis'	53	40
MSMX860	GGC TCG CTT CAC GGC TTC CCT	Methanosarcinales (all Methanosarcina and Methanosaeta)	63	45

**Table S2.** Moisture content (%) in bio-cover material.

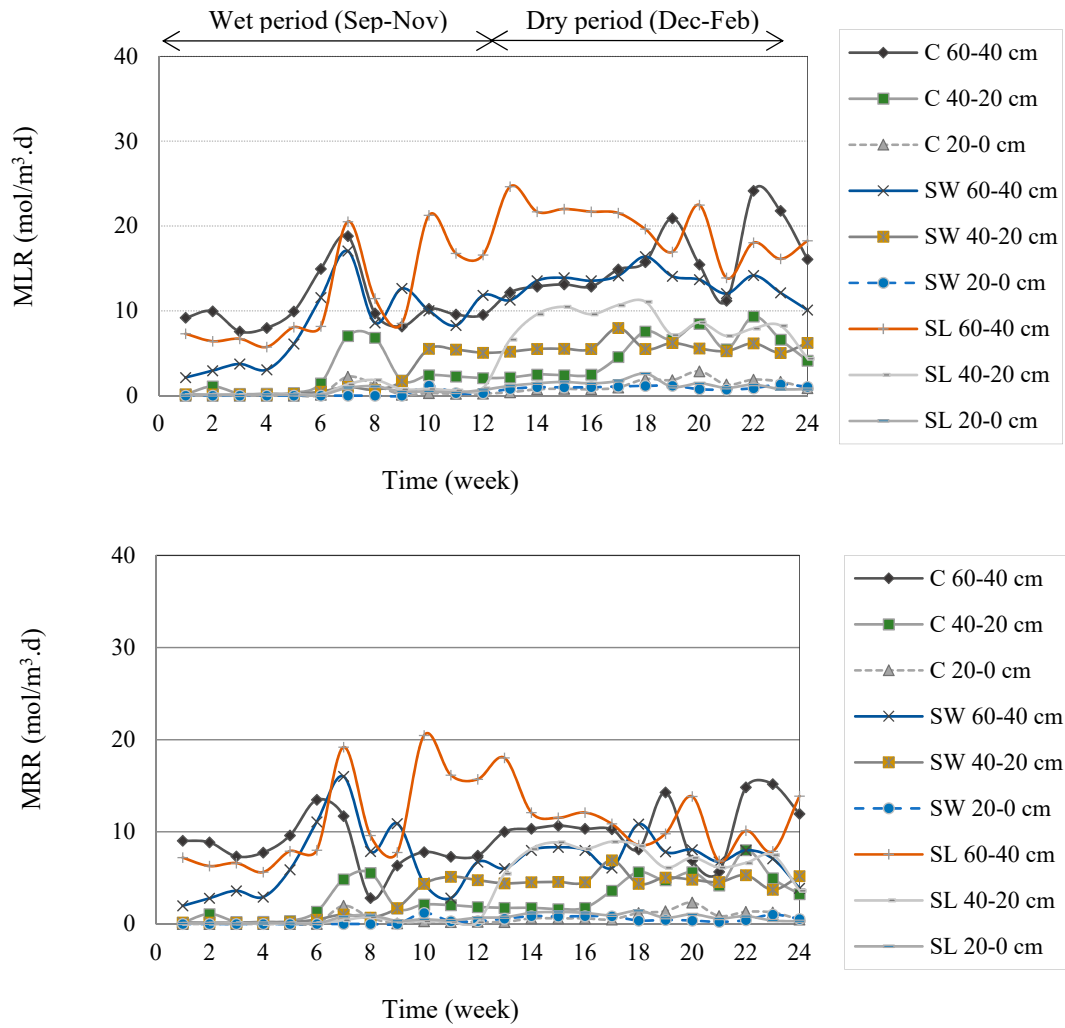
Media	Depth (m)	Sep	Oct	Nov	Dec	Jan	Feb
SL	0-0.20	56	52.1	56.2	25	20	23.4
	0.20-0.40	63	56.3	62.1	28	26	29.5
	0.40-0.60	65	60.5	68.5	35	31	35
C	0-0.20	65	58.6	60.3	55.1	57	53
	0.20-0.40	68.9	62.1	65.1	58	60	56
	0.40-0.60	69	68.3	71.2	61	65.2	60
SW	0-0.20	32	39.1	38.2	27	25	19
	0.20-0.40	40.2	45.2	43.5	33	27	21.5
	0.40-0.60	49	49.4	52.1	35	32	31.2

**Table S3.** Bio-cover material characteristics.

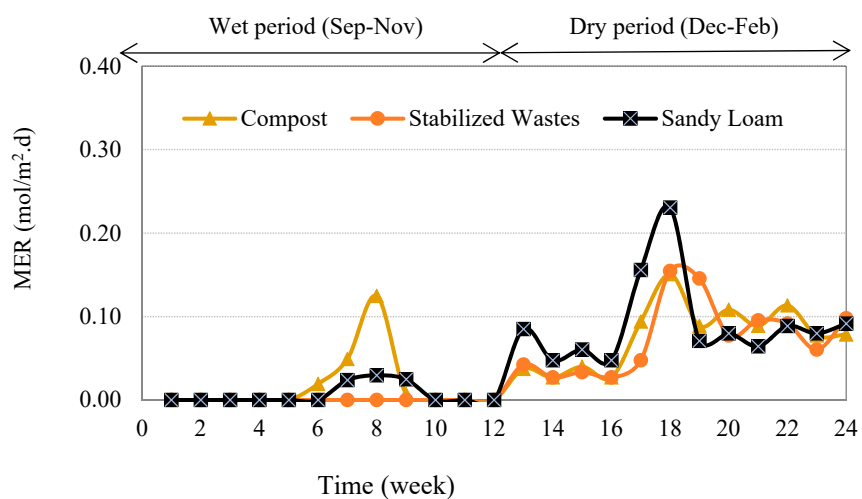
Media	Week 0	Week 24		
		0-0.20 m	0.20-0.40 m	0.40-0.60 m
Sandy loam (SL)				
Ph	7.27	6.56	6.2	6.04
EC (μs/cm)	1766	1380	157	162
NH <sub>4</sub> <sup>+</sup> (mg N/kg)	1.38	0.86	1.03	1.29
NO <sub>3</sub> <sup>-</sup> (mg N/kg)	16.35	62.52	34.91	6.53
TOC (% dry wt.)	0.6	0.56	0.45	0.5
Compost (C)				
pH	7.12	6.51	6.3	6.02
EC (μs/cm)	1206	65.4	147.6	355
NH <sub>4</sub> <sup>+</sup> (mg N/kg)	4.74	0.78	0.86	0.95
NO <sub>3</sub> <sup>-</sup> (mg N/kg)	5.54	55.9	33.96	8.78
TOC (% dry wt.)	30	15.3	17.52	16.95
Stabilized wastes (SW)				
pH	6.8	6.4	6.55	6.5
EC (μs/cm)	285	98.2	80.6	65.4
NH <sub>4</sub> <sup>+</sup> (mg N/kg)	0.6	0.43	0.78	0.79
NO <sub>3</sub> <sup>-</sup> (mg N/kg)	57.93	20.45	25.45	88.56
TOC (% dry wt.)	71.13	65.7	69.5	68.56



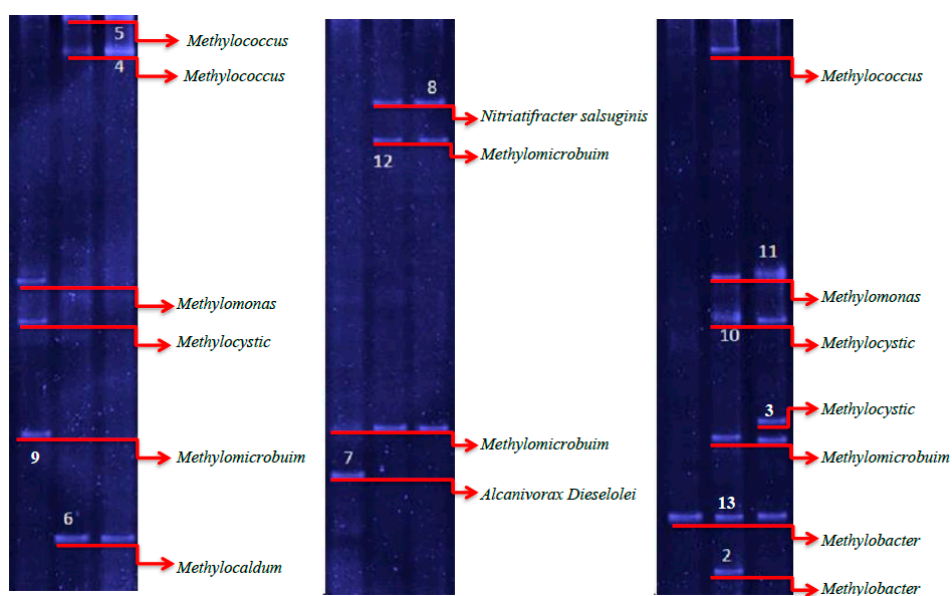
**Figure S1.** Variation of rainfall and ambient temperature.



**Figure S2.** Variation of methane loadings (MLRs) and removals (MRRs) during bio-cover operation.



**Figure S3.** Variation of methane emissions (MERs) during bio-cover operation.



**Figure S4.** PCR-DGGE profiles of methanotrophic population observed in different materials (left) C (middle) SW (right) SL media.