



**Saraswati**

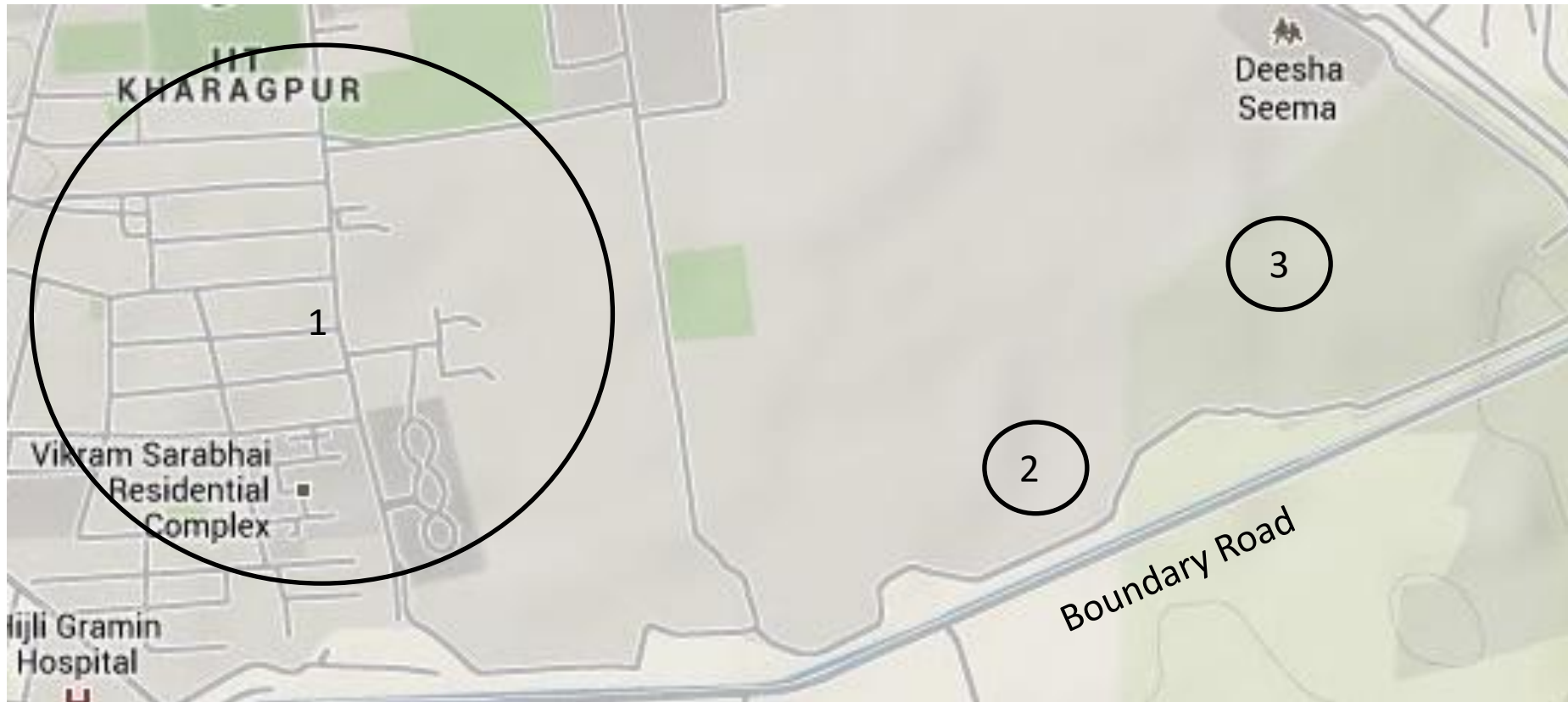


**Supporting consolidation, replication and up-scaling  
of sustainable wastewater treatment and reuse  
technologies for India**

**Pilot 6  
Anaerobic Digester**

**IIT Kharagpur, India and Simbiente, Portugal**

# SITE



**Legend:** 1-Residential area, 2-Proposed site near pumphouse 3, 3-Existing helipads

# ANAEROBIC DIGESTER



Site	Kharagpur
Type of Technology	Mobile anaerobic sludge digester
Type of Waste	Septage
Volume	2 m <sup>3</sup>
Effluent Quality	Digested Sludge
Intended Reuse	Biogas: Cook Stove, Sludge as manure
Beneficiaries	2-4 Household

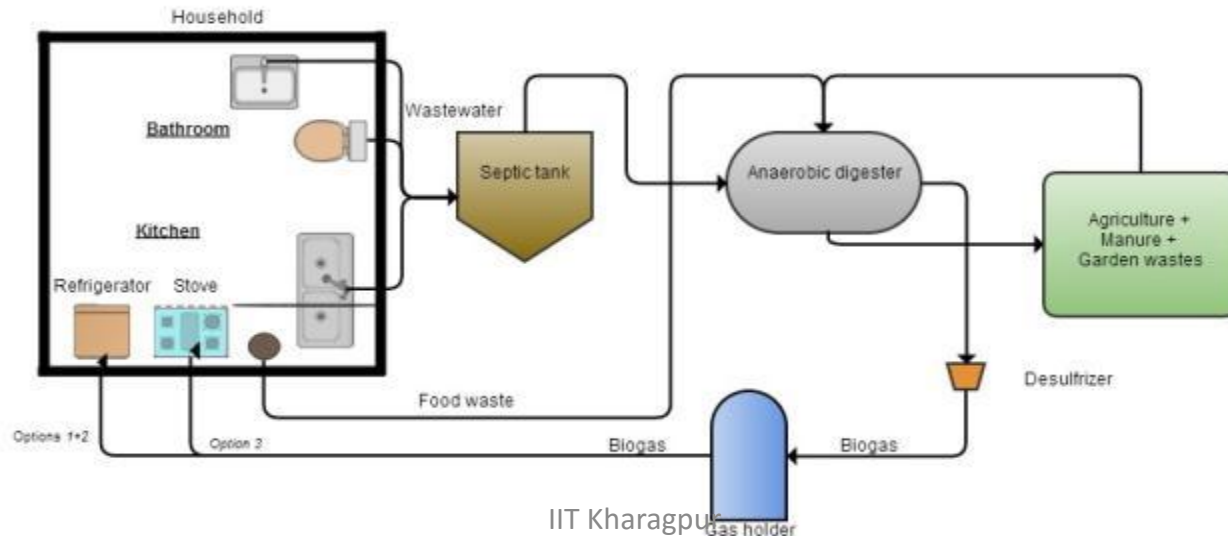
# ANAEROBIC DIGESTER



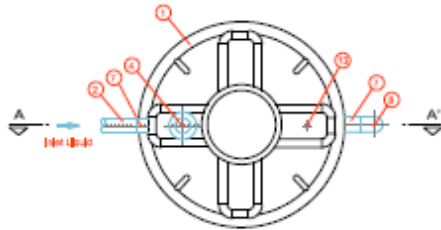
Anaerobic Digester.mp4

# FEASIBILITY STUDY

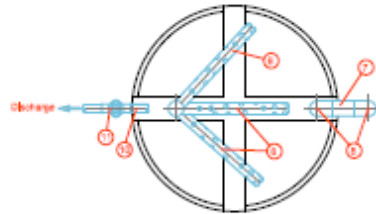
Type	Household
Regular users	People in IIT campus
Digest Influent	Sludge collected from septic tank
Digester Volume	2 m <sup>3</sup>
Gas uses	Small Absorptive Refrigerator or Biogas Cook Stove
Digester effluent	Slurry and digestate
Effluent use	Fertilizer for gardening or agriculture
O&M	IIT Personnel



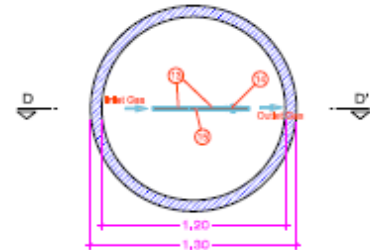
TOP VIEW - BIODIGESTER TANK



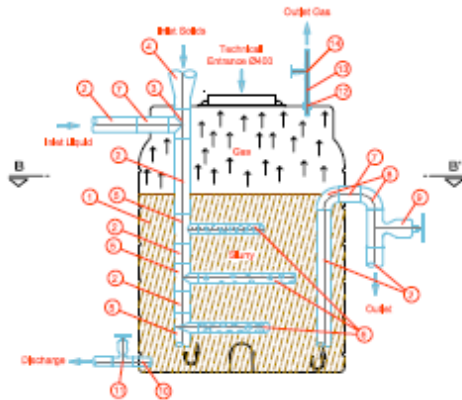
SECTION B-B'



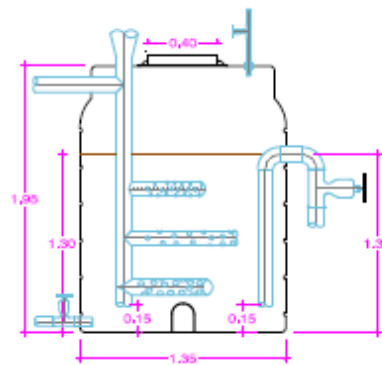
TOP VIEW - GAS HOLDER



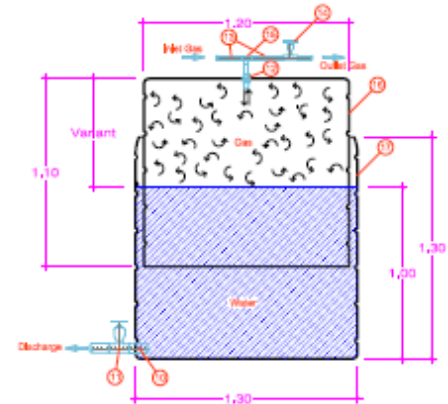
SECTION C-C'



SECTION C-C'



SECTION D-D'



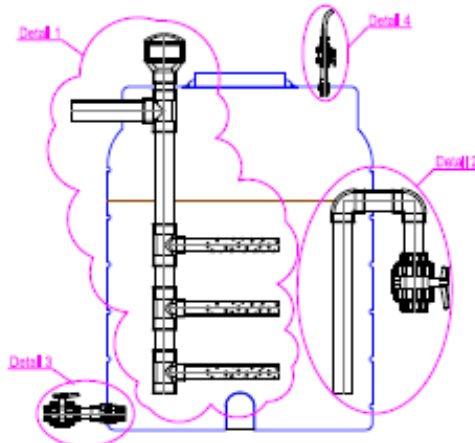
ITEM	MAT.	PN	DN	Dn	DESCRIPTION	LENGTH (mm)	QUANT.
1	PE	-	-	-	Vertical Tank 3000 Lt (Image 1)	-	1
2	PVC	10	90	-	Pipe	4500	1
3	PVC	10	90	90	Tease	-	1
4	PVC	10	140	90	Tapare	-	1
5	PVC	10	90	63	Tease	-	3
6	PVC	10	63	-	Perforated Pipe (Perforations with #20 mm)	3000	1
7	PVC	10	90	-	Anchoring and sealing sleeve	-	3
8	PVC	10	90	-	Bend 90°	-	2
9	PVC	10	90	-	Gate valve	-	1
10	PVC	10	50	-	Anchoring and sealing sleeve	-	2
11	PVC	10	50	-	Gate valve	-	2
12	PVC	10	25	-	Anchoring and sealing sleeve	-	2
13	PVC	10	25	-	Pipe	500	2
14	PVC	10	25	-	Gate valve	-	2
15	PVC	10	25	25	Tease	-	1
16	PE	-	-	-	Vertical Tank 1000 Lt	-	1
17	PE	-	-	-	Vertical Tank 1500 Lt	-	1

IMAGE 1

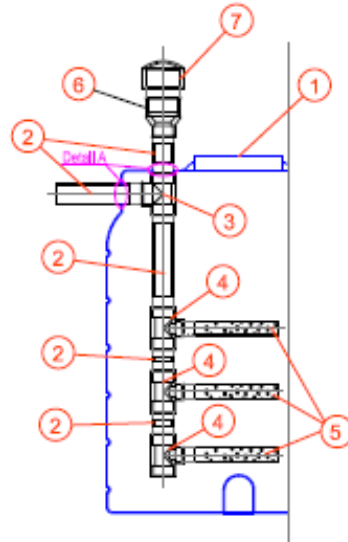


NO.	DATE	BY	CHKD.	APP.
1				
2				
3				
4				
5				
6				
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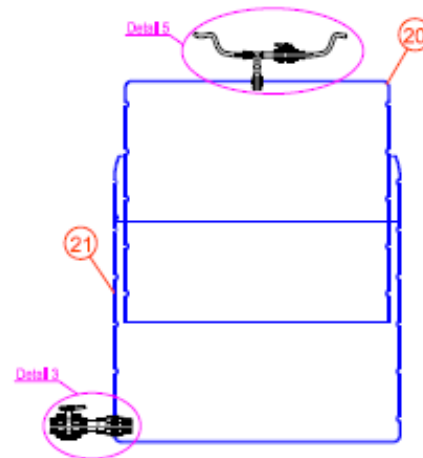
SECTION - BIO-BESTOR TANK



DETAIL 1



SECTION - GAS HOLDER



ITEM	MAT.	DESCRIPTION
1	FE	Vertical Tank 3000 lt
2	PVC	Typ DN25 Connect Jointing
3	PVC	Tee DN25 Connect Jointing, Flange Ref. 01 05 1003 090
4	PVC	Reducing Tee DN25x43 Connect Jointing, Flange Ref. 01 05 1004 014
5	PVC	Perforated Pipe DN25 (Perforation with 400 mm)
6	PVC	Reducing Tee DN100x25 Connect Jointing, Flange Ref. 01 05 1001 025
7	PVC	Dr. Cap DN100, Flange Ref. 01 05 1012 160
8	PVC	Globe VV DN25 Connect Jointing, Flange Ref. 01 05 1001 090
9	PVC	Globe VV DN25 Connect Jointing, Flange Ref. 01 10 1212 025
10	PVC	Typ DN25 Connect Jointing
11	PVC	Typ DN25 Connect Jointing
12	PVC	Globe VV Solvent Socket DN25, Jambon Ref. 02225
13	PVC	Tank Adaptor DN25, Flange Ref. 01 10 1212 014
14	PVC	Typ DN25 Connect Jointing
15	PVC	Globe VV Solvent Socket DN25, Jambon Ref. 02222
16	PVC	Short Reducer Inlet/Outlet DN25x3/4", Flange Ref. 01 10 1212 005
17	Wool	Coarse Hose Inside 3/8", Metro Ref. 0285335
18	PVC	Double Hose for Sealing Gas 3/8", HAFMA
19	PVC	Tee DN25 Connect Jointing, Flange Ref. 01 05 1003 025
20	FE	Vertical Tank 1000 lt
21	FE	Vertical Tank 1500 lt

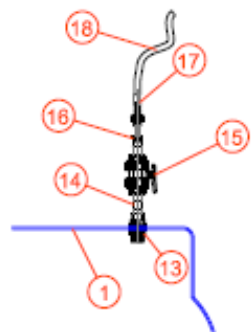
NOTES

- All accessories in PVC Joining Cement will be joined by glue for PVC type Jambon Ref 26305
- The crossings of the tubes in the tank (Detail A) must be achieved through the PVC weld:

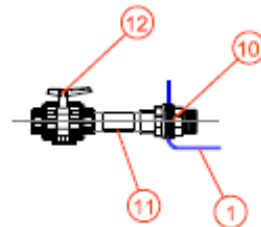


- All measurements must be verified in the draw

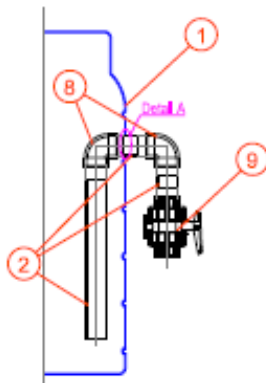
DETAIL 4



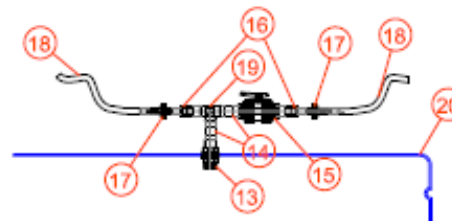
DETAIL 3



DETAIL 2



DETAIL 5



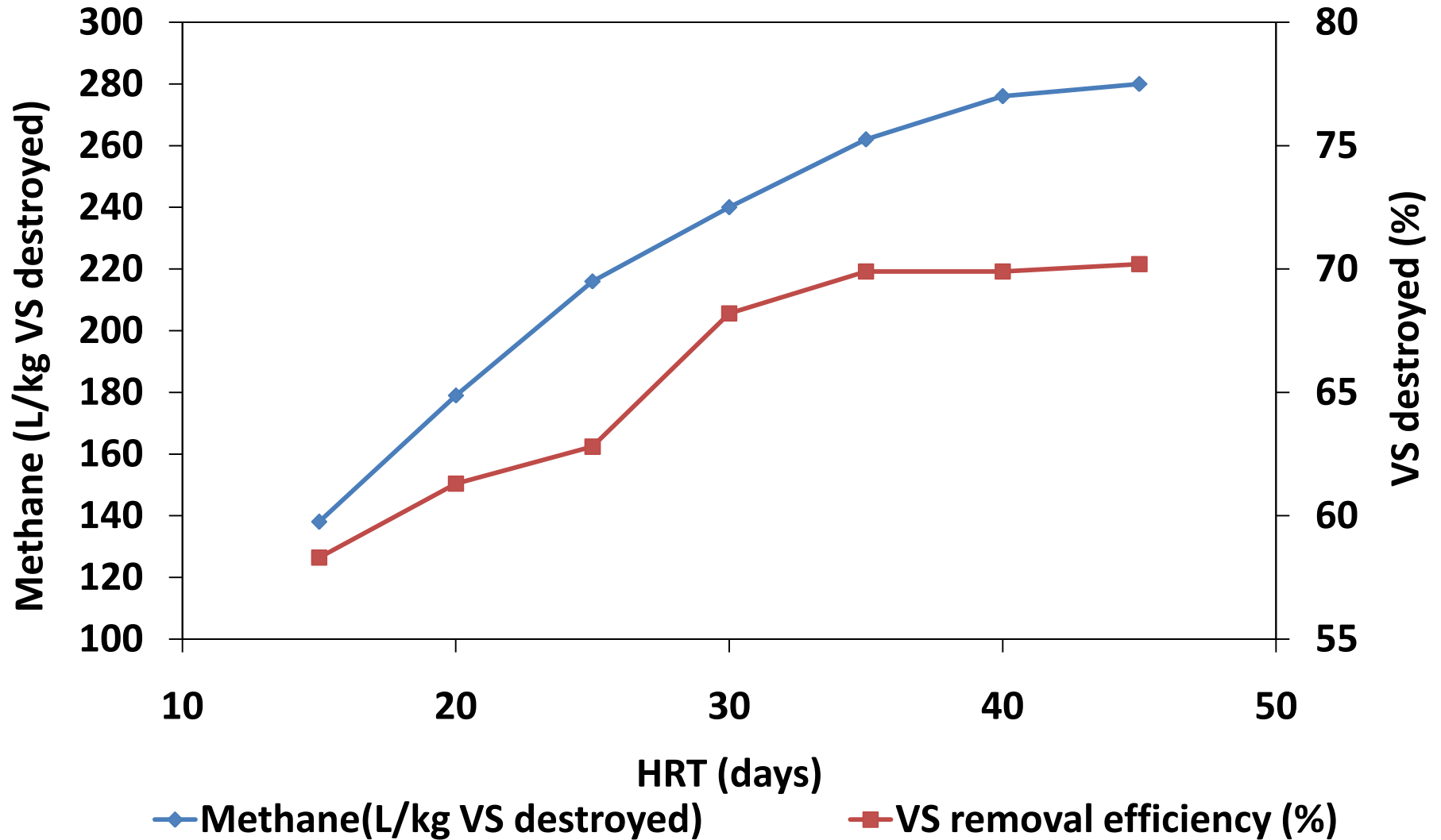
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20	FE	Vertical Tank 1000 lt
21	FE	Vertical Tank 1500 lt

# RESULTS

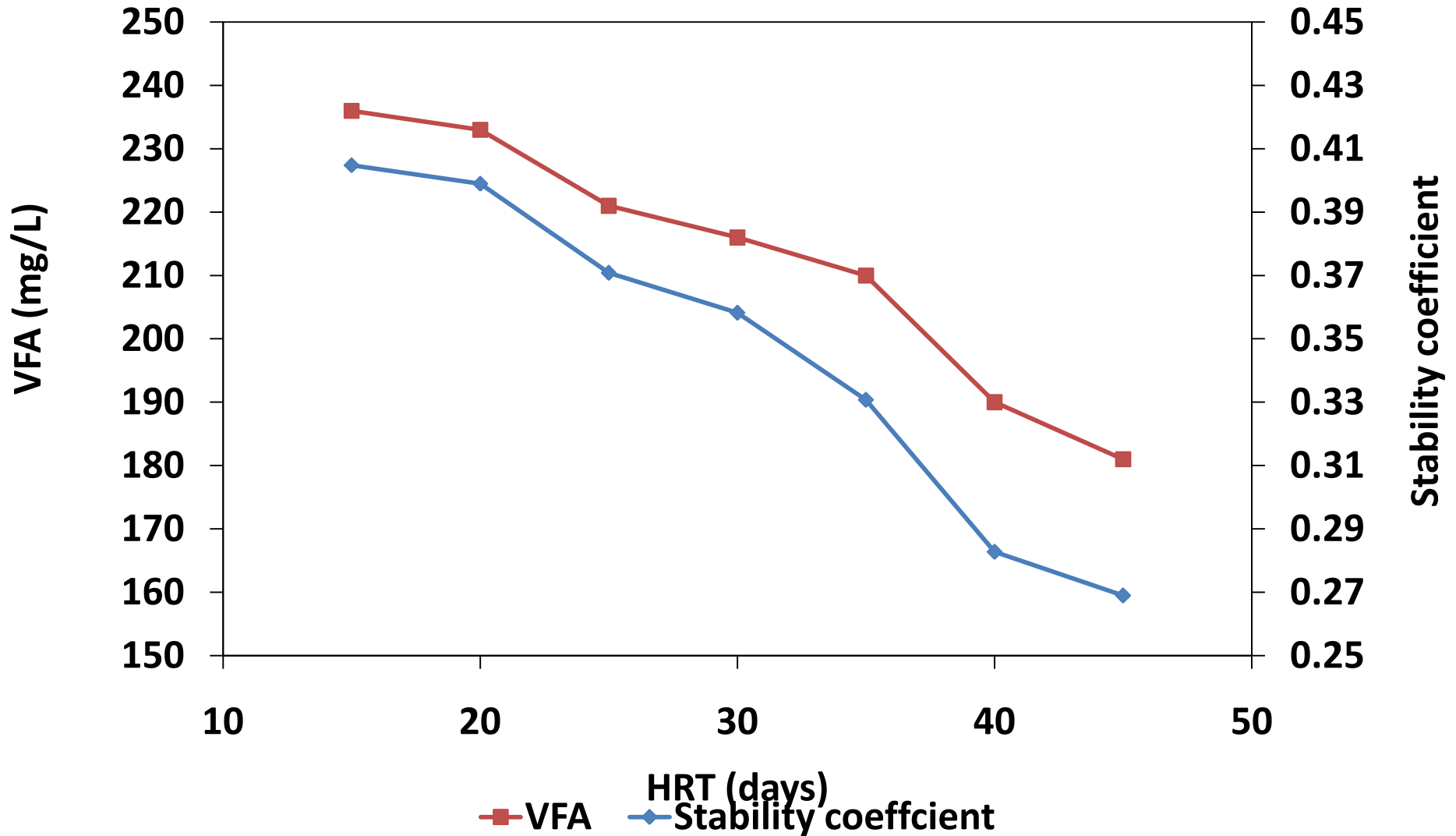
HRT (days)	Biogas (L/kg VS destroyed)	Methane (L/kg VS destroyed)	TCOD rem %	SCOD rem %	TS rem %	VS rem (%)	Protein rem %	Outlet VFA	Outlet Alkalinity
15	213	138	81.52	81.31	80	58.3	38.1	236	583
20	268	179	83.88	81.52	85	61.3	63.1	233	584
25	303	216	87.94	70.82	90	62.8	62.7	221	596
30	329	240	81.7	84.25	92	68.2	68.8	216	603
35	334	262	88.58	71.86	94	69.9	71.54	210	635
40	345	276	88.55	70.79	95	69.9	73.91	190	672
45	355	280	89.2	69.78	95	70.2	72.03	181	673



# RESULTS



# RESULTS



# FUTURE PLANS

- Explore possibility of co-digestion using kitchen waste